CONSTRUCTION AND STANDARDISATION OF A VERBAL GROUP TEST OF INTELLIGENCE IN THE KHASI LANGUAGE FOR SCHOOL GOING CHILDREN

ABSTRACT

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Abstract

ABSTRACT

1. INTRODUCTION:

Intelligence plays an important role in one's academic, professional, social and personal life. It is because of this reason that parents, teachers and employing organizations have always been concerned with the problems of measuring intelligence. Earlier primitive man employed crude methods of measuring intelligence by means of physical strength and solving puzzle. With the advancement of civilization and development of scientific enquiry the methods of measuring intelligence were also improved. Psychologists and educators have developed various kinds of tools like scales and tests to measure intelligence of children. With the help of these scales, IQ of children of different age-group can be measured. The use of intelligence tests has greatly increased in these days. The fact is due to wide individual differences that exist among individuals with regard to intelligence. Truly speaking, no two individuals, even identical twins or individuals nurtured in identical environments, are endowed with equal mental energy. The assessment of intelligence by various tests has given reasons enough to believe that not only does intelligence vary from individual to individual, but it also tends to vary in the same individual from age to age and situation to situation.

2. REVIEW OF RELATED LITERATURE:

To the French psychologist Binet goes the credit of giving the world the first systematic intelligence tests. Binet (1905) and his co-worker Simon published the first scale for measurement of intelligence known as Binet - Simon scale. Binet (1908) and

Simon revised the scale and it was the first Age-Scale which had created interests among the psychologists. The concept of Mental Age (MA) which gives a measure of the individual's level of intellectual development, though formulated by Binet in 1905, was first used in the 1908 scale. Terman (1916) brought out the Stanford Revision of the Binet-Simon scale which is known as the Stanford-Binet Scale and popularized the term 'Intelligent Quotient' (IQ), which has since then, been found to be an extremely practical concept. American Psychologist Wechsler (1949,67) published his new intelligence test known as the Wechsler-Bellevue scale for children above 10 and adults and the new version was named as WAIS- Wechsler Adult Intelligence Scale. He also devised a scale for children known as Wechsler Intelligence Scale for Children aged 5-15 and a scale known as the Wechsler Pre-school and Primary Scale of Intelligence. Cattell (1930) developed a Culture Fair test of Intelligence while Thurstone (1938) developed the Primary Mental Abilities (PMA). Kuhlman and Anderson (1963) developed an intelligence test for children age group KG to grade 12 levels. McCarthy (1972) developed a scale of children abilities known as the Mc Carthy Scales of Children Abilities (MSCA) suitable for children between the ages $2^1/_2$ to $8^1/_2$. Thorndike & Hagen (1982) devised a Cognitive Abilities Test (CAT) for primary levels. Kaufman & Kaufman (1983) developed the Kaufman Assessment Battery for Children (K-ABC) aged $2^1/_2$ to $12^1/_2$ and in 1990 they developed the Kaufman Brief Intelligence Test (K-BIT), designed as a quick screening instrument to estimate the level of intellectual functioning of the age group 4 to 90 years.

Historically, In India, construction of psychological testing was started by the Christian missionaries' upto the year 1921. The first Indian who took the initiative in the construction of Intelligence test was Rice in 1922 who about the year 1929 published his

"Hindustani Binet Performance-Point Scale". The test was an adaptation of the Binet test along with some additional performance tests. Kamat in the thirties adapted the 1917 version of the test in Marathi and Kannada, Shukla in the forties developed the Gujrati version. Mahalanobis was the pioneer in developing group intelligence tests in Bengali. Subsequently, we have the tests developed by Lal, Jalota and Mohsin in Hindi. Bhatia Standardized for the first time a battery of performance tests for school going children. The first Indian doctorate in test construction was awarded to Desai (1954) for developing a group test of intelligence in Gujrati. In the area of non-verbal intelligence test, Pathak (1955) made a pioneering study of Good-enough's Draw-a –man Test and developed a new scoring method in her standardization of the test for Gujrati children. In the area of Performance test, Mehta (1961) developed a pioneering study in a group test of intelligence for students of the age group 11 and 17 years. In the field of adaptation of foreign tests Malin (1964) worked out the first Indian adaptation of WISC for the students of age-group 6-15. Kapat (1960) constructed a group test of intelligence in Bengali for children of grade V- VII, Pandey (1961) constructed and standardized a group test of intelligence in Nepali for children of class VIII to X. Pathak (1961) constructed a group test of intelligence in Marathi for the age group 9 to 13 years. Hundal and Singh (1963) devised their scale for Punjabi speaking children of age group 13 to 17 years. Ahuja (1966) & Ahuja (1969) constructed a group test of intelligence in English for Bombay children in age group of 13 to 17 and 9 to 13 years respectively. Patel (1970) Constructed and standardized verbal group test in Gujrati for children of 14 + to 16 + years of age. Thakur (1979) Constructed and standardized a Verbal Group Test of Intelligence in Assamese for students reading in classes V to VIII in Upper Assam. Mishra (1985) Constructed and

standardized a Verbal Group Test of Intelligence in Oriya for the age group 12 + to 15 +. Lalhmingliana (2005) Constructed and standardized a Verbal Group Test of Intelligence in Mizo language for the age group 13 to 16 + years of Mizoram state.

From the above reviews it could be observed that there are many standardized intelligence tests in the country today, but most of those tests were found to have developed for a specific regional languages and cultures. No fully fledged study could be traced out with respect to the intelligence testing for the Khasis children in Meghalaya.

3. NEED AND JUSTIFICATION OF THE STUDY:

Shillong the capital of Meghalaya in North-East, India, has always been the hub of educational prospects in the region, where students of different backgrounds and different socio-economic status flock in to receive the best education, which different institutions of the state provide. So, the capital of the state has become the home of many communities. This has lead to the increased educational competition and challenges amongst the Khasi students and outsiders. As the world is also becoming more and more advanced and complex; educational performance and competition among the students have also become more and more difficult. The teachers and parents are often confused, curious and talked about the differences in the educational performance and academic achievement of the school going children; as most of them believe that intelligence is one of the main determinants in the student's success and failure. It is this phenomenon which has encouraged the investigator to study the intelligence of the Khasi School going children of the state. In fact, if a child's potential or talent could be measured, estimated or at least identified before he enters into a course of training or discipline, much wasted efforts could

be spared. The measurement or identification of intelligence and other mental abilities is very crucial at all stages and it can be checked and examined by intelligence test. A good intelligence test may contribute to the improvement of education. Tests of abilities and other personal characteristics play a large role in modern life, contributing to countless decisions that shape individual's upbringing, schooling and careers.

As uses of Intelligence Tests are manifold, many intelligence tests have been constructed and standardized by researchers of our country from time to time. Tests prepared by others researchers of the country are not suitable to the Khasi children of the state in terms of item, content and language Seeing the relative importance of both, the general ability of the students as a development to human resources in one hand and the necessity of intelligence tests as a measuring tool, on the other; the investigator, feels that it is important to properly test the intelligence of the Khasi school-going children, in order to provide effective educational policies and programs.

The investigator therefore, decided to construct and standardize a verbal group test of intelligence in the Khasi language for the Khasi school-going children, on the following grounds:

1. Intelligence Tests prepared for children of other states are not suitable in terms of the culture, content and language of Khasi children
2. So far no test has been constructed and standardized in the Khasi language for Khasi children of the state of Meghalaya.
3. No intelligence test is available with the local norms

4. STATEMENT OF THE PROBLEM:

The problem of the study is stated as follows:

"Construction and Standardization of A Verbal Group Test of Intelligence in the Khasi language for School going children"

5. OPERATIONAL DEFINITIONS OF THE TERMS USED:

The terms used in the title of the study are operationally defined as follows:

i *Intelligence*: Intelligence is a general intellectual capacity which consists of the abilities: to reason well with abstract materials, to comprehend well, to have a clear direction of thought, to relate thinking with the attainment of a desirable end.

ii *Intelligence Test*: Intelligence test is a standardized instrument which measures general mental abilities of an individual.

iii *Construction:* Construction of a test means writing of items and selection of items by means of items analysis.

iv *Standardization*: Standardization means preparing the uniform procedures of administering and scoring the test and establishing its reliability, validity and norms.

6. OBJECTIVES OF THE STUDY:

The objectives of the study are as follows:

1. To construct a verbal group test of intelligence in the Khasi language for school going children studying in classes VIII, IX and X of the age group 14 to 16 + years.

2. To standardize the test by establishing its reliability and validity.
3. To set up norms for the test
4. To develop a test manual
5 To study the level of intelligence of the Khasi children (age-wise) as obtained by the intelligence test constructed by the investigator.

7. DELIMITATION OF THE STUDY:

The study is delimited in the following ways:

1. The sample of the population is restricted only to the Khasi speaking school-going children of four districts of the state of Meghalaya viz.: East Khasi Hills, West Khasi Hills, Jaintia Hills and Ri Bhoi District.
2. The test instrument is limited only to measure the intelligence of the students belonging to the age-group 14 to 16 + years studying in classes VIII to X.
3. The test items and instructions in the manual were prepared in the Khasi language. However, English version was also made available for the purpose of references only.

8. RESARCH DESIGN:

The present study was designed as follows:

(i) Population:

For the present study, the population comprises of both Khasi boys and girls students of the state of Meghalaya studying in classes VIII to X of the age group 14 to16 +

years. The total number of Khasi speaking students studying in classes VIII to X at the time of collecting the data was about 32,110.

(ii) Sample of the study:

For the present study, the investigator adopted the Simple Random Method which was found appropriate for the study. The study has three sets of samples for the different stages of test construction.

(a). Sample for preliminary try-out:

For the preliminary try-out a very small sample of 180 Khasi students studying in classes Viii - X was taken randomly comprising of 80 boys and 100 girls.

(b). Sample for first try-out:

For the first try-out a sample of 555 Khasi students comprising of 277 boys and 278 girls was selected randomly representing each grade.

(c). Sample for the final try-out:

For the final try-out, a sample of 3000 Khasi students (ten percent of the total population) comprising of 1298 boys and 1702 girls were selected randomly from the Khasi speaking population of 4 districts of the state (Table 3.3).

(iii). Tools Used:

For the present study, the following tools were used:

i. Verbal Group Test of Intelligence constructed by the investigator

ii Ahuja's Group Test of Intelligence

iii. Cattell's Culture Fair Test of Intelligence

iv. Rating scale constructed by the investigator

(iv) Method of Study:

As the objective of the present study is to construct and standardize an Intelligence test, the investigator decided to use a descriptive method of research, to prepare the following materials: (Appendix 1-4)

(a) Test Booklet (b) Test Manual

(c) Answer Sheet (d) Scoring Key

(a) Test Booklet:

For the present study, a booklet containing the general instructions of the test and ten sub-tests spreading in 100 items was prepared. In each subtest of the booklet, necessary instructions and practice examples were provided. The investigator has carefully categorized the selection of items, so, as to make the present test comprehensive enough, to cover out the intellectual behaviour of the students of classes VIII –X, as follows:

1. Classification 2. Coding 3. General Comprehension

4. Akin/Imitative Words 5. Verbal Analogy 6. General Reasoning

7. Number Series 8. Evaluation of Relationship

9. General Information 10. Arithmetic Reasoning.

(b) Test Manual:

For the present study, the investigator has prepared a Manual of the test, (both in Khasi and English language) which consists of the details of the following: (Appendix 1-B and 2 –B):

(1). Construction procedure

(2). Direction for Administering and Scoring the test.

(3). Sample for Standardization

(4). Reliability and validity of the Test.

(5). Different kinds of Norms in Tables

(6). Interpretation.

(c) Answer Sheet

For the present Test, a compiled answer sheet of all the subtests was prepared where in the subject (student) is required to put a (X) cross mark at the correct answer indicated by the alphabets A, B, C, D, (Appendix 1- C and 2 –C).

(d) Scoring Key

For the scoring key of the present test, the investigator has prepared a transparent stencils , where the correct answer of each item of all the ten subtest were indicated by a box in a tracing paper (Appendix1-D and 2-D).

(v) Collection of Data:

Based on the nature of the study, the collection of data was done in three phases:

(a) First Phase:

The first phase of collection of data for the preliminary try-out was done in the month of May 2007. The test was administered to 180 Khasi students from 6 High Schools. Data obtained from this phase was used to make a preliminary modification of the test.

(b) Second Phase:

The second phase of data collection was done in October 2007. The same procedures of administering the test were followed by the investigator in the second phase.

For this try-out a sample of 555 Khasi students were taken randomly from 10 High Schools (Table 3.2).

(c) Third Phase:

The third phase of data collection for final try-out was done in the months of May to August, 2008. In this phase a large sample of 3000 Khasi students were drawn from 42 High Schools (Table 3.3) of the schools population from four Khasi speaking districts of Meghalaya. The data was collected by administering the following three tools:

(i). Investigator's Group Test of Intelligence (in Khasi language).

(ii). Ahuja's Group Test of Intelligence.

(iii). Cattell's Culture Fair Test of Intelligence. (Scale 2 Form A)

Data collected from the third phase was used for the standardization of the test.

(vi) Statistical Techniques used:

In the present study, the investigator used the following statistical techniques

(i) *For scoring procedures:* to avoid the problems of guessing, the formula of correcting the difficulty index of an item for chance success was used as suggested by Garrett[1].

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

(ii) *For Item Analysis*: the difficulty value and discriminative power of an item was calculated by applying Davis's formula[2].

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[1] H.E Garrett: *Statistics in Psychology and Education*, Valkis, Feffer and Simon Ltd, Bombay, 1981, p. 364.

[2] S.A Sharma: *Essentials of Measurement in Education & Psychology*; Surya Publication, Meerut, 2005, p.187.

$$DV = (P_u + P_l)/2$$

$$DP = P_u - P_l$$

(iii) *For Item selections*: only the items whose difficulty values (DV) found between 0.30 to 0.70 and discriminative power (DP) equal to 0.40 and above as suggested by Stanley & Hopkins[3] were retained for the final form.

(iv) *For estimating the reliability of the test*: The (a) Split-half and (b) Kuder-Richardson reliability methods were used. For calculating the Split-half, Pearson's Product Moment and Spearman-Brown Phrophecy formulae were used. The formulae were as follows:

(a) Pearson's Product Moment formula:

$$r = \frac{N \Sigma X'Y' - \Sigma f X' \Sigma f Y'}{\sqrt{\{N \Sigma fX'^2 - (\Sigma f X')^2\} x \{N\Sigma f Y'^2 - (\Sigma f Y')^2/\}}}$$

Spearman-Brown Prophecy formulae:

$$r_{11} = 2 r'_{11} / (1 + r'_{11})$$

(b) K-R 21 formula

$$r_{11} = \frac{n\sigma^2_t - M(n-M)}{\sigma^2_t \quad (n-1)}$$

(v) *For estimating the validity of the test* the following three methods were adopted:

a) Content Validity of the test was rated by the expert's judgment.

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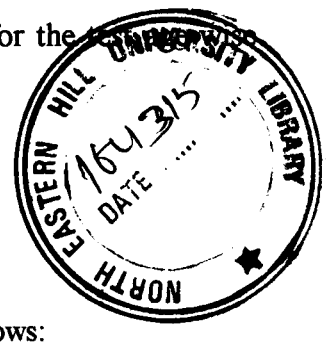
[3] J.C Stanley & K.D. Hopkins: *Educational & Psychological Measurement and Evaluation,* Prentice Hall of India Pvt. Ltd., New Delhi, 1978, p. 270.

b) *Concurrent Validity* was studied by correlating the present test scores with two external criterion tests: Ahuja Group test and Cattell"s Culture Fair Test and was calculated by Pearson's Product Moment Method.

c) *Construct validity* of the test was studied by the Inter subtest Correlation and Factorial validity was verified by Thurstone's Centroid Method. To estimate the internal consistency of the present test, the inter-subtests correlation among all ten subtests and the correlation of the sub-tests with the total were computed with the help of computer software Packages of social Sciences.

d) *For Testing the Normality age-wise and class-wise*: the normality of the distribution of the scores was calculated by the Mean, Median, Standard Deviation, P_{10}, P_{90}, Skewness and Kurtosis.

e) *For establishing the Norms*: Sigma Score or Z-Score, Percentile Score, T-Score, DIQ and Stanine score were used to derive for the [illegible] and class-wise.



9. CONSTRUCTION OF THE TEST;

The steps involved in the construction of the present test were as follows:

(i) Planning, (ii) Preparation, (iii) Preliminary try-out, (iv)Try-out, (v) Item Analysis, (vi) Item selection, and (vii) Final form of the test

(i) Planning:

Planning is an essential activity in all stages of test construction. Test planning not only involves the preparation of an outline or specifying the content or operation to be

covered by the test, but it also involves decision with regards to the: (a) Nature of the test, (b) Types of items to be included, (c) Time-limit for the test and (d) Scoring procedure

(a) Nature of the Test:

After referring to different related psychological tests, the investigator decided to develop a comprehensive test by including ten sub-tests so that the general mental abilities of students may be measured as widely as possible. For the present test, the following ten subtests were included:

1. Akin/Imitative Words	2. Classification
3. Verbal Analogy	4. Number Series
5. Arithmetic Reasoning	6. General Information
7. General Reasoning	8. Coding
9. Evaluation of Relationship	10. General Comprehension

(b) Types of items to be included:

The second step in test construction is the preparation of the type of items to be included. For the present study, the investigator decided to have the multiple-choice items. Multiple-choice items have come to be the most popular, common, flexible and effective form for standardized testing in recent years and they are also found to have the following advantages:

i. They help to measure the student's capacity for interpretation and discrimination.

ii. They are highly objective, and can be readily scored either by hand as well as machine.

iii. They are not difficult for students to understand and use.

iv. They are not so much influenced by guessing.

(c) Length of the Test:

For the present study the investigator decided that the length of test should be within a period of school hour i.e. 35 minutes for attempting all the 100 items of the final form including the instructions.

(d) Scoring Procedures:

For scoring, the test unit weightage procedure has been preferred over differential weightage. Hawks, Mann and Lindquist (1936) recommended that the simplest and nearly in all cases a satisfactory procedure for scoring an objective test is to give a credit of one to each correct response, the total score thus being the total number of correct responses. To avoid the problems of guessing the investigator has decided to apply the formula of correcting the difficulty index of an item for chance success as has been suggested by Garrett (1981)[4].

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

Where,

P = the percent who actually know the right answer
R = the number who get the right answer
W = the number who get the wrong answer
N = the number of examinees in the sample.
Hr = the number of the examinees who do not reach the item (and hence do not try)
K = the number of options or choices.

Scoring was done with the help of a scoring key which was prepared by the investigator. The score, thus obtained was used for estimation of reliability and validity as well as item analysis of the test.

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[4] H.E Garrett: *Statistic in Psychology and Education,* Valkis, Feffer and Simon Ltd, Bombay, 1981, p. 364.

(ii) Preparation:

For the present study, the preparation was based on the following steps:

(a) Writing the test items.

(b) Test Directions for the examinees.

(c) Reviewing and editing of the test items and

(d) Preparing the answer-sheets and scoring key.

(a) Writing the Test Items:

While preparing the test items, the investigator has referred to all the possible common sources available. Intelligence tests prepared by researchers, books on test your IQ, related psychological tests, related dissertations available in the field, magazines, journals and books on the Khasi's culture were critically examined. In addition to these, the investigator has also consulted various subjects' experts to share their views in this matter. On the basis of all the above information collected, the investigator prepared around 400 items. These items were then tried out on 20 students of classes VIII, IX, X. After a thorough study of the responses collected from the 20 respondents, the following 200 items were retained:

Total No. of Subtests & Items included for Preliminary Try-out

Sl. No.	Name of Subtests	No. of items included
1	Akin/Imitative Words	20
2	Classification	20
3	Verbal Analogy	20
4	Number Series	20
5	Arithmetic Reasoning	20
6	General Information	20
7	General Reasoning	20
8	Coding	20
9	Evaluation of Relationship	20
10	General Comprehension	20
Total		200

(b) Test Directions for the Examinees:

For the present study, the directions has specified clearly in front page of the test booklet and in all its subtests separately. Test directions contained the following information:

(i) The time allowed for completing the test.

(ii) Number of items in the tests.

(iii) Maximum marks for the test.

(iv) How and where to record the answers.

(c) Reviewing and Editing of the Test Items:

After the test items of the present study have been written, it has to be reviewed and edited; the purpose was to have a final decision concerning several matters like: length of the test, time-limits, arranging of items of the test, or any technical flaws, directions for the examinees, if any. When all these problems were sorted out, reviewed and edited, the test items were prepared in test booklet form and were made ready for a preliminary try-out.

(d) Preparing Answer - Sheet and Scoring Key:

For scoring the answers, a separate answer sheet was prepared rather using the test booklet itself, because the test booklet was prepared to be reusable whereas answer sheets were prepared to be consumable. The answer sheet was prepared in such a way that spaces were provided for the choices A, B, C, D, against each item. The students were instructed before hand to put a (X) cross mark corresponding to the correct answer.

To make the scoring easier, the investigator used tracing paper of the same size of the answer sheet and by drawing boxes at places corresponding to the correct answer. In each page of answer sheet star marks were put at the top and bottom corners at the right and left to fix the

scoring key in the correct position. The correct answers was visible in a 'X' cross mark at the boxes of the scoring key which was adjusted on the page of the answer sheet. Then the total scores were then counted easily.

(iii) Preliminary try-out:

The main purpose of the try-out was to improve and modify the language ambiguity and difficulty of the test items. It was a step to find out how pupils react to the test in terms of content and language. The prepared test at this stage contained of 200 items which was given for preliminary try out on the sample of 180 Khasi students of six High Schools of Shillong town. The time- limit was not set at this stage. The responses and reactions of the testees were recorded. On the basis of the feedback collected, the items which were found vague and different were modified and re-arranged accordingly. After some modifications, it was decided that all the 200 items were to be included in the first try-out.

(iv) First try-out:

The main purpose of the first try-out in the present study was to select the appropriate items and reject the inappropriate ones on the basis of item analysis for obtaining item indexes, viz., (i) Difficulty Value and (ii) Discriminative power and (iii) Determining the time limit of each subtest and length of the test. For this try-out, a sample of 555 Khasi students was drawn from ten high schools of Shillong town as already described in chapter 3. The test containing of 200 items spreaded over ten sub-tests was administered to 555 students and data was collected.

(v) Item Analysis:

When the items have been tried out, they were subjected to procedures called Item analysis. Item Analysis is a statistical technique which is used for selecting and rejecting the items

of a test on the basis of their difficulty values and discriminative power. The present study employed the Kelley's method of item analysis, where the indices of item difficulty and discriminative power were calculated by 27 percent top and 27 percent bottom dichotomy and rejecting the middle 46 percent. To compute the difficulty value and discriminative power of an item of the present test, answer sheets of 555 students were arranged in descending order (i.e. from the highest to the lowest score) The three groups were formed as follows:

(i). Upper 27 percent of total sheets (i.e 150 sheets)

(ii). Middle 46 percent of total sheets (i.e.255 sheets)

(iii). Lower 27 percent of total sheets (i.e. 150 sheets)

To get the corrected value for chance success the following Guildford's formula of correction as suggested by Garrett (1981)[5] was adopted:

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

Where,

Pc = the percent who actually know the right answer
R = the number who get the right answer
W = the number who get the wrong answer
N = the number of examinees in the sample.
HR = the number of the examinees who do not reach the item (and hence do not try)
K = the number of options or choices.

Now, for each item the proportion of the pupils who passed an item correctly in the upper and the lower groups was determined. The difficulty value and discriminative value of an item was

[5] H.E. Garrett: *op.cit.* p. 368.

then calculated by using the following formula as suggested by Davis as quoted by Sharma[6]

Difficulty value (DV) = $(P_U + P_L)/2$

Discriminative Power (DP) = $P_U - P_L$

Where,

P_U = Proportion of correct answers on the item of upper group examinees
P_L = Proportion of correct answers on the item of lower group examinees.

(vi) Items Retained for the Final Form of the Test:

The items whose difficulty value found in between 0.30 and 0.70 and discriminative power 0.40 and above were retained as suggested by Stanley and Hopkin[7]. The items with negative discriminative power were rejected. However, items which did not fall under the said difficulty value and discriminative power were omitted. As a result, out of 200 items, 100 items were rejected who's item difficulty and discriminative power did not fall in the range as mentioned above. The total 100 items were then retained for the final test was given as below:

[6] R.A. Sharma: *op. cit.* p. 187

[7] J.C.Stanley and K.D. Hopkins: *Educational & Psychological Measurement and Evaluation,* Prentice Hall of India Pvt. Ltd., New Delhi, 1978, p. 270.

Table Showing the number of items retained in each subtests having

DV 0.30-0.70 and DP above 0.40

Test No.		Items accepted having DV .30-.70 and DP above .40	Total No. of Items accepted in each subtests
1	CL	5, 10, 12, 13, 15, 16, 17, 19	9
2	CO	3, 5, 12, 13, 14, 15, 16, 17, 18, 19, 20,	11
3	GC	2, 4, 6, 8, 9, 10, 11, 12, 16, 17	10
4	AW	2, 4, 6, 7, 8, 10, 11, 12, 13, 14, 17, 20	12
5	VA	1, 4, 7, 10, 12, 13, 15, 17, 18, 19	10
6	GR	2, 3, 7, 8, 9, 12, 13, 17, 18	9
7	NS	4, 5, 6, 8, 9, 10, 12, 13, 14, 15, 16, 18, 19	13
8	ER	3, 4, 5, 6, 9, 10, 13, 14, 15, 17, 20	11
9	GI	2, 6, 8, 9, 13, 16	6
10	AR	1, 2, 3, 5, 12, 14, 15, 16, 18	9
Total			100

Table Showing the Difficulty value and Discriminative indices of the items retained for final form in subtest wise in order of increasing difficulty values

Sub Test – 1: Classification (CL)

Sl. No.	No. of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	12	.69	.55
2	13	.67	.50
3	5	.65	.56
4	10	.60	.68
5	14	.58	.69
6	16	.56	.60
7	15	.55	.74
8	19	.49	.69
9	17	.44	.81

Sub Test – II: Coding (CO)

Sl.No	No. of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	3	.70	.57
2	5	.68	.56
3	12	.64	.68
4	15	.64	.62
5	19	.59	.64
6	17	.60	.80
7	13	.54	.88
8	14	.54	.84
9	20	.48	.94
10	16	.47	.97
11	18	.42	.81

Sub Test – III: General Comprehension (GC)

Sl. No.	No. of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	4	.64	.48
2	17	.52	.54
3	2	.51	.55
4	6	.51	.54
5	9	.50	.43
6	10	.50	.58
7	11	.45	.46
8	12	.40	.78
9	16	.38	.63
10	17	.52	.54

Sub Test – IV: Akin/Imitative Words (A/IW)

Sl. No	No. of Items	Difficulty Indices .30 -.70	Disc. Indices .40 and above
1	7	.55	.72
2	4	.50	.62
3	8	.50	.75
4	6	.49	.69
5	13	.49	.76
6	14	.48	.79
7	10	.45	.84
8	20	.44	.70
9	12	.41	.96
10	17	.40	.54
11	11	.36	.74
12	2	.31	.65

Sub Test – V: Verbal Analogy (VA)

Sl.No	No. of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	1	.59	.50
2	12	.54	.64
3	13	.54	.48
4	18	.51	.59
5	19	.46	.66
6	17	.45	.75
7	15	.45	.51
8	10	.35	.45
9	7	.32	.42
10	4	.30	.51

Sub Test – VI: General Reasoning (GR)

Sl. No.	No. of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	2	.65	.58
2	7	.61	.40
3	8	.60	.49
4	3	.58	.56
5	17	.44	.47
6	13	.36	.54
7	12	.36	.65
8	9	.34	.54
9	18	.34	.64

Sub Test – VII: Number Series (NS)

Sl.No.	No.of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	6	.63	.51
2	19	.55	.76
3	15	.54	.79
4	12	.54	.78
5	13	.53	.74
6	18	.52	.84
7	8	.51	.91
8	9	.49	.74
9	4	.45	.75
10	5	.43	.58
11	14	.41	.89
12	10	.37	.73
13	16	.34	.88

Sub Test – VIII: Evaluation of Relationship (ER)

Sl.No.	No.of Items	Difficulty Indices .30 - .70	Disac. Indices .40 and above
1	5	.63	.41
2	15	.54	.70
3	14	.51	.81
4	10	.50	.63
5	4	.47	.55
6	20	.45	.71
7	17	.44	.63
8	13	.40	.75
9	6	.37	.61
10	9	.34	.56
11	3	.31	.59

Sub Test – IX: General Information (GI)

Sl.No.	No.of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	9	.56	.65
2	8	.51	.48
3	6	.47	.58
4	13	.38	.55
5	2	.32	.41
6	16	.31	.43

Sub Test – X: Arithmetic Reasoning (AR)

Sl.No.	No.of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	1	.59	.59
2	12	.57	.60
3	18	.51	.60
4	14	.50	.53
5	3	.48	.58
6	5	.46	.66
7	2	.38	.72
8	16	.32	.90
9	15	.31	.69

(vii) Final Form of the Test:

On the basis of their recorded time in the answer-sheet, average time taken by 555 students was calculated for each sub-test. Thus the final form of the test after item analysis and time taken in each subtest was given as follows:

Number of Items retained & Time taken in each Subtest

Sl. No.	Sub-Test	No. of Items retained	Time- taken (in Minutes)
1	Classification	9	$1^{1}/_{2}$
2	Coding	11	4
3	General Comprehension	10	3
4	Akin Words	12	3
5	Verbal Analogy	10	$2^{1}/_{1}$
6	General Reasoning	9	3
7	Number Series	13	4
8	Evaluation of Relationship	11	4
9	General Information	6	1
10	Arithmetic Reasoning	9	4
Total		100	30 mins

10. STANDARDIZATION OF THE TEST:

For standardization of the present test, reliability and validity of the test have been estimated and norms have been established. For estimating the reliability, validity and derivation of norms of the present test, the final data collected from the entire sample of 3000 was used. The data was collected by administering the three types of tests viz.

Ahuja's Group Test of Intelligence, Cattell's Culture Fair Test of Intelligence and the Investigator's Group Test of Intelligence

(i) Estimation of Reliability:

For computing the reliability of the present test, Split-half and Kuder-Richardson reliability methods were used. To compute the split-half reliability the scores of the entire sample 3000 were divided into two equivalent halves of odd and even items. The coefficient of correlation (r'_{11}) between the two sets of scores obtained from the two halves was computed by Product Moment Method and was found to be 0.76. From the reliability of the half test, the self correlation of the whole test was then estimated by Spearman-Brown Prophecy formula. The coefficient of correlation was found to be 0.86. For estimating the reliability index of the present study, the formula of K-R 21 was followed. The Kuder-Richardson reliability coefficient of the present test was found to be 0.89.

(ii) Estimation of Validity:

For estimating the validity of the present test, the following three methods were used:

(a). Content Validity

(b). Concurrent Validity

(c). Construct Validity

(a). Content Validity:

For rating the present test, the investigator constructed a rating scale consisting of seven questions. The constructed rating scale was given to 20 experts. According to them the items by and large were representative of the mental ability of the school going

children of age-group 14 to 16 + to a great extent and the test was able to measure the level of intelligence. Further, the test covered the various components of intellectual abilities to a great extent and items were suitable for school going children in terms of content, difficulty and language.

(b). Concurrent Validity:

The concurrent validity of the test was determined by correlating the present test scores with two external criterion scores obtained from the Ahuja's test and Cattell's Culture Fair Test. The obtained concurrent validity coefficient of correlation of the present test with Ahuja's test was found to be 0.80 and with respect of Cattell's Culture Fair test was 0.66 respectively.

(c). Construct Validity:

To estimate the internal consistency or construct validity of the present test, the inter-subtests correlation among all ten subtests and the correlation of the sub-tests with the total test were computed with the help of a Computer Software Packages of Social Science (SPSS). On computation it was found that all the ten subtests were inter-correlated and significant at .01 level. The internal consistency of the present test was further verified by using Thurstone's Centriod Method. It was found to be a unifactor test

(iii) Establishment of Norms:

The data collected from the sample of 3000 Khasi students (1298 boys and 1702 girls) was used for derivation of norms. Before deriving the norms, the normality of the frequency distribution was tested age-wise and grade-wise. In order to judge the normality of the distribution of the scores, the value of Mean, Median, S D, P_{10}, P_{90}, Skewness and

Kurtosis were calculated. The Mean, Median, SD, of each Age-group and Grade was found to be very close to one another, skewness is 0.198 and kurtosis is .282 as required for normal distribution. This shows that the distribution of the sample was approximately normal.

As the present test is meant for the Khasi students of classes VIII – X (age group 14 – 16 +) Sigma score norms, Percentile norms, T-score norms, DIQ and Stanine scores have been derived grade-wise and age- wise.

(a) Sigma Score Norms (Z):

Sigma scores are a kind of standard measure which indicate how many standard deviation the given score deviates from the mean of the distribution. In other words, deviations from the mean expressed in SD units are called Sigma Scores. Sigma Scores are also called as 'Z-Score'. The Sigma Scores or Z-Scores were calculated by applying the following formula:

$$Z = (X - M)/\sigma$$

Where

Z = Standard score in σ units
X = Raw score of an individual
M = Mean of test score
σ = Standard Deviation of the test scores.

The sigma score for each raw score of the present test were given in Table 5.18-5.33

(b) Percentile Norms:

Percentile Norms are expressed in percentile ranks. A Percentile Rank indicates a pupil relative's position in a group in terms of percentage of pupils scoring below him. To calculate the individual's percentile norms on a test, the deviation of scores were first

expressed in sigma score as already described above. With the help of these scores percentage of deviation from the mean was obtained by seeing area under the normal probability curve from Garrett's Table A[8]. The percentile norms were then established by adding or subtracting 50 to this value. The percentile norms for each raw score were given in Table 5.18-5.33

(c) T-Score Norms:

T-Score are normalized standard scores converted into the distribution with a mean of 50 and SD of 10 (Garrett)[6]. If normalized standard score is multiplied by 10 and added to or subtracted from 50, it is converted into T-Score.. Thus the formula used for calculating T-Score is as follows:

$$\text{T-Score} = 50 \pm 10 \text{ (Z score)}.$$

The values of T-scores for each raw score were calculated for different age groups of both the sexes and class group separately and presented in separate Tables 5.18-5.33

(d) Deviation Intelligence Quotient (DIQ) Norms:

Deviation Intelligence Quotient is a normalized standard score which does not involve the mental age of a child. It is not the ratio of mental and chronological ages. The raw scores were transformed into DIQs with the help of the following formula:

$$\text{DIQ} = 100 + 16\,(\sigma)$$

The DIQ scores for each raw score were calculated and presented for different age groups of both the sexes and class group and presented in Table 5.18-5.33. The separate

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[8] H.E. Garrett: *Statistics in Psychology and Education*, Valkis, Feffer and Simons Ltd., Bombay, 1981, p.458

Tables for DIQ scores in classified forms for all age groups and sex-wise were also worked out and presented in Table 5.34 - 5.41.

(e) Stanine Score Norms:

In Stanine scale, raw scores are converted to a nine points scale (ranging from 1-9) with a mean of 5 and SD of 1.96 (approximately 2). Stanine norms for each raw score were calculated and presented in Table No. 5.18 to 5.33.

(iv) Studying the Level of Intelligence of the entire Sample 3000:

The level of intelligence of the present study was studied by the same data collected on the sample of 3000 which have been used for estimating the reliability, validity and establishing the norms. The levels of intelligence of the entire sample N= 3000 were described in Table 5.34 to 5.40 sex-wise and age-wise. A glance to these tables showed that the level of intelligence of the entire sample sex-wise and age-wise was normally distributed. Table 5.41 revealed that the Mean of every age-group was very closed to 100 and S.D to 16. The Mean and S.D. of the entire sample (3000) were 99.64 and 16.01 respectively. This leads to the conclusion that the process of standardization of the present study was quite satisfactory

5. FINDINGS AND IMPLICATIONS OF THE STUDY:

(i) The Test:

The main reason for construction of the present Verbal Group Test of Intelligence in the Khasi language is because there was no such standardized psychological test constructed in the Khasi language to measure either the general mental ability or the

constructed in the Khasi language to measure either the general mental ability or the scholastic achievement of the school going children. Therefore, to meet this demand the investigator constructed the verbal group test of Intelligence for the Khasi speaking school-going children of the state of Meghalaya, studying in classes VIII – X of the age-group 14 -16 years +. The Test has been designed in such a way that it covered the different aspects of mental abilities of the school-going children and to be able to administer easily in 35 minutes of the school period. The provision of answering the items in the separate Answer-Sheet allows one to re-use the Test Booklet. To administer the test, clear Instructions and Practice Examples of all the 10 sub-tests have been written clearly in the Test Booklet.

(ii) **Subtests**: The test contained the following 10 sub-tests:

(a) ***Classification:*** This type of item is used to assess the ability of seeing the relationship to form the group and the power of discrimination to isolate the correct response. In this type of item, words, terms, concepts, facts and objects are given which belong to a class or group, but of these, one does not belong to the class that is to be identified.

(b) ***Coding:*** This type of items is mainly used to assess the perceptual and memory ability. The letters of a word are substituted by numbers or the numbers are substituted by the letters of a word. The examinees have to substitute by using the same code for another set of code letters. The same system of code letters can be used for substituting another word.

(c) ***General Comprehension:*** This type of item is used to asses the ability to grasp, understand and react to a given situation. In this type of sub-test, items are defined

as a series of sentences in which certain important words or phrases have been omitted. The examinees are required to fill in or continue the sentence by selecting from the alternative words or phrases to complete the statement.

(d) ***Akin/Imitative Words*:** this type of item is commonly used in the Khasi community and cannot be translated into English. It is used to assess the ability of relationship of a particular word with another. When speaking, an imitative word is added, like adding tags to a speech, e.g. hynmen-hynbew, here the word hynmen means an elder brother and hynbew is an akin/Imitative word. The examinee is required to choose the correct response from the given four words.

(e) ***Verbal Analogy:*** An analogy is a type of item which involves two parallel or similar situations. In the first situation two words are given having some specific relationship. In the second situation, an incomplete form is given where only one word is provided. The second word is to be selected or to be recalled for establishing the same relationship by the examinees

(f) ***General Reasoning***: This type of test is used to assess the ability to reason logically. In this sub- test, the examinee is required to find out the solution of the given problems.

(g) Number Series: In this type of items, the numbers are arranged to form a series of numbers. These numbers are related to each other to continue to form series. An examinee has to identify this relationship with the help of his number reasoning ability. In the same order, he has to provide the next number in the continuation of the series.

(h) ***Evaluation of Relationship:*** This type of item is used to asses the ability to evaluate the relationship of people. The examinee is required to find out the correct relationship of an individual with another. This sub-test is based on the Khasi's culture.

(i) ***General Information:*** This is a type of mental ability test which is used to understand and grasp substantive meaning in language, thought and action. In this test the examinee is given a problem. He is required to solve the problem by selecting the best answer from the given alternatives.

(j) ***Arithmetic Reasoning*:** This type of test is commonly used in a general mental ability test. In this test a problem is given in one or two sentences and the examinee is required to solve the problem in numerical

(iii) Number of Items:

The whole Test contained of 10 sub-tests in 100 items which can be administered in 30 minutes. Following were the items retained and time taken in each sub-test:

Number of Items Retained and Time taken in each subtest

Sl. No.	Sub-Test	No. of Items retained	Time- taken (in Minutes)
1	Classification	9	$1^{1}/_{2}$
2	Coding	11	4
3	General Comprehension	10	3
4	Akin Words	12	3
5	Verbal Analogy	10	$2^{1}/_{1}$
6	General Reasoning	9	3
7	Number Series	13	4
8	Evaluation of Relationship	11	4
9	General Information	6	1
10	Arithmetic Reasoning	9	4
Total		100	30

(iv) Reliability of the Test:

The Split-half and Kuder-Richardson reliability of the test were found as follows:

Reliability of the Test

Types of Reliability	r_{11}	P
Split-half reliability	0.86	.01*
Kuder-Richardson reliability	0.89	.01*

* Significant at .01 level.

(v) Validity of the Test:

(a) Content Validity of the Test:

The Content Validity was determined by seeking the expert's opinions on a rating scale. The analysis of the responses revealed that the test items were suitable in terms of the contents, difficulty and language.

(b) Concurrent Validity:

The Concurrent Validity of the present test was calculated by using Ahuja's Group Test of Intelligence and Cattell's Culture Fair Test as the criterion test which were as follows:

Validity of the Test

Criterion test used	r_{11}	P
Ahuja's test validity	0.80	.01*
Cattell's test validity	0.66	.01*

* Significant at .01 level.

(c) Construct Validity:

Construct validity of the test was calculated by determining the inter-subtests correlations and factorial validity indicating first common factor as given below:

Inter-Subtests Correlations

Sub-test	Internal consistency r with the total test	First Common factor (Thurstone's Cantroid method)	Ranks order of the sub-test
1.Classification	.527	.563	8
2. Coding	.661	.620	5
3.General Comprehension	.574	.601	7
4. Akin Words	.555	.543	9
5. Verbal Analogy	.632	.653	2
6.General Reasoning	.643	.654	1
7. Number Series	.680	.625	3
8.Evaluation of Relationship	.602	.604	6
9.General Knowledge	.363	.441	10
10.Arithmetic Reasoning	.616	.621	4

On computation it was found that all the ten subtests were inter-correlated and significant at .01 level.

(vi) Normality of Sampling Distribution:

The test constructed was administered on a sample of 3000 students and data was collected. The statistics obtained from the data analyzed was as follows:

Distribution of Descriptive Statistics

No	Mean	Median	SD	SK	KU
3000	55.43	54.86	14.34	0.198	0.282

The above statistics revealed that the Mean, Median of the data fall nearly at the same point, Skewness is 0.198 and Kurtosis is .282 as required for normal distribution. It shows that the distribution of the sample was approximately normal.

(vii) Derivation of Norms:

For the present test, Sigma score norms, Percentile Ranks, T-Score norms, Deviation IQ norms and Stanine Score norms have been derived and presented in Tables 5.18 – 5.33

(viii) Interpretation Table for Deviation IQ:

The DIQ of the entire sample was classified in the following seven (7) groups as suggested classification of revised Stanford-Binet test for interpreting the DIQ of the child:

Classification for Interpreting DIQ of the entire Sample

DIQ Scores	Total	Percentage	Classification
Below 70	55	1.83	Mentally Defective
70 -79	285	9.50	Borderline Defective
80 -89	512	17.07	Low Average
90 – 109	1327	44.23	Normal/Average
110 – 119	455	15.17	High Average
120 – 139	361	12.17	Superior
140 & above	1	0.03	Very Superior
Total	3000	100.00	

(ix) Distribution of Level of Intelligence among the Total Sample:

The test constructed by the investigator was administered on a large sample of 3000 school going children (1298 Boys and 1702 Girls) of the age group 14 to 16 + years. The data so collected was utilized for computing the reliability, validity and establishing the norms. The same data was also used to study the level of intelligence of the sample which was given as below:

Classification of Sex-wise DIQs of the entire Sample (N=3000)
(Age group 13-17 years)

DIQ Scores	Boys	%	Girls	%	Total	%	**Classification**
Below 70	21	1.62	34	2.00	55	1.83	Mentally Defective
70 -79	124	9.55	161	9.46	285	9.50	Borderline Defective
80 -89	225	17.33	287	16.86	512	17.07	Low Average
90 – 109	559	43.07	768	45.12	1327	44.23	Normal/Average
110 – 119	216	16.64	239	14.04	455	15.17	High Average
120 – 139	152	11.71	213	12.51	361	12.17	Superior
140 & above	1	0.07	0	0	1	0.03	Very Superior
Total	1298	100	1702	100	3000	100.00	

A glance to the above table shows that the level of intelligence was normally distributed for both boys and girls and for the entire sample.

Classification of Age-wise distribution of DIQ, Mean & S.D of the total sample=3000

DIQ	13yrs	14yrs	15yrs	16yrs	17yrs	Total
50-55	0	0	0	0	0	0
55-60	0	3	1	0	0	4
60-65	2	5	3	5	1	16
65-70	3	13	12	6	1	35
70-75	10	23	40	24	4	101
75-80	22	54	51	47	10	184
80-85	20	69	66	48	13	216
85-90	30	108	89	51	18	296
90-95	30	93	97	80	15	315
95-100	30	117	119	60	19	345
100-105	43	91	96	90	16	336
105-110	37	103	108	56	27	331
110-115	30	63	92	73	9	267
115-120	15	67	56	39	11	188
120-125	13	56	52	22	7	150
125-130	12	38	31	26	7	114
130-135	9	22	21	12	5	69
135-140	3	6	6	12	5	32
140-145	1	0	0	0	0	1
145-150	0	0	0	0	0	0
150-155	0	0	0	0	0	0
155-160	0	0	0	0	0	0
Total	310	931	940	651	168	3000
Mean	99.90	99.58	99.47	99.44	100.89	99.64
SD	16.09	16.07	15.77	16.17	16.46	16.01

The above table shows that the age-wise distribution of DIQs for the entire sample N=3000 was found to be normally distributed. It is observed that the Mean of every age-group was very close to 100 and S.D to 16. The Mean and S.D. of the entire sample (3000)

were 99.64 and 16.01 respectively. This leads to the conclusion that the process of standardization of the present study was quite satisfactory.

(x) Implications of the Study:

The present test is the first Verbal Group Test of Intelligence constructed in the Khasi Language for school-going children of the state of Meghalaya of the age-group 14 to 16 + years aims to serve the following purposes for the Khasi students:

(a) Testing the Intelligence of the Khasi Students:

The problem of the teachers and parents could only be solved if modern tools are available to identify the level of intelligence of the students. The present test could be used as one of those tools to measure the level of intelligence of the Khasi student and the knowledge so collected could be used for providing educational guidance according to the level of the intelligence of the students

(b) Intelligence Testing in Selection and Classification of Candidates:

The school authority or any authority either for administrative and organizational reasons, can use the present test for selection and placing candidates of lower grades base on the obtained scores. Candidates may be classified as superior, average and below average.

(c) Intelligence Testing and Promotion of Pupils:

From time to time it has been seen that a large number of school students failed to score the minimum pass mark. When the number of failure is sufficiently large, pupils are awarded grace mark on some principle and thus the pass percentage is raised to a

comfortable figure. In some schools, marginal cases are considered upon taking into account pupil's performance in previous examinations or class work. These methods of promotion for marginal cases are often found to be not quite related to the basic problem of giving the most potential pupil a chance to improve. Therefore a test like the present intelligence may be useful to school authorities in solving promotional problems of the Khasi students at the higher level

(d) Intelligence Testing and School Admission:

When people have realized the value of education, there is always a rush for admission in good schools and colleges especially at the level-entrance classes. The school authority used to select students on the basis of their over-all performance of the last examination. Such procedures can faster the screening process, especially when there is a huge demand for admission. No doubt such screening is useful for selecting pupils; but such type of yardstick is not healthy for all students and for all times together, as certain uncontrollable factors may affects the student's performance. It is in such a situation that the present test may offer considerable help in selecting students for admission.

(e) Intelligence Testing and Researches:

The present test could be used by the B.Ed/M.Ed students who have to do a project work as a part to fulfill the partial requirement of the syllabus. The test will also be useful for the research scholars at Ph.D. level to collect information on the level of intelligence of the Khasi speaking students of the state. This will be a great help to them to get the correct information. The test will also be used by research workers as external criteria to validate another test.

(xi) Suggestions for Further Researches:

Construction of intelligence testing have been a long pursuit all over the country, but with respect to the Khasis of the state of Meghalaya, this is the first study where attempt has been made to construct and standardize a verbal group test of intelligence in the Khasi language for school going children of the age group 14 to 16 + years. The present study may have its own limitations as it may not cover all aspects of intelligence testing which needs to be investigated. The investigator, therefore, would like to suggest the future investigators to conduct studies on the following aspects:

1. Construction and standardization of verbal group test of intelligence in Khasi language for pre-primary school children of the age group 3 to 5+ years of Meghalaya.
2. Construction and standardization of verbal group test of intelligence in Khasi language for primary school going children of age-group 6 to 12+ of Meghalaya.
3. Construction and standardization of verbal group test of intelligence for adults of the state of Meghalaya.

CONSTRUCTION AND STANDARDISATION OF A VERBAL GROUP TEST OF INTELLIGENCE IN THE KHASI LANGUAGE FOR SCHOOL GOING CHILDREN

THESIS

Submitted in Partial fulfillment of the requirement for the degree of Doctor of Philosophy in Education

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DECLARATIONS

I Mrs. Winnie Joice Shylla, hereby declare that the subject matter of this thesis is the record of the work done by me, that the contents of this thesis did not form the basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/Institute.

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Date: 29.03.2010

Winnie Joice Shylla

Place; Shillong

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INTRODUCTION

1.1 INTRODUCTION:

Intelligence plays an important role in one's academic, professional, social and personal life. It is because of this reason that parents, teachers and employing organizations have always been concerned with the problems of measuring intelligence. Earlier primitive man employed crude methods of measuring intelligence by means of physical strength and solving puzzle. With the advancement of civilization and development of scientific enquiry the methods of measuring intelligence were also improved. Many psychologists and educators developed various kinds of tools like scales and tests to measure intelligence of children. With the help of these scales, IQ of children of different age-group can be measured.

The use of intelligence tests has greatly increased in these days. The fact is due to wide individual differences that exist among individuals with regard to intelligence. Truly speaking, no two individuals, even identical twins or individuals nurtured in identical environments, are endowed with equal mental energy. The assessment of intelligence by various tests has given reasons enough to believe that not only does intelligence vary from individual to individual, but it also tends to vary in the same individual from age to age and

situation to situation. The intelligence of an individual can be observed only to the extent that he manifests it in one or more intelligence tests.

Intelligence tests have had very extensive use in educational classification, selection and planning from the first grade through the university. When intelligence tests are used to determine an individual's intellectual abilities, the purpose is to provide educational and vocational guidance. In business and industry, tests are helpful in selecting and classifying personnel for placement in jobs that range from the simpler semiskilled to the highly skilled, from the selection of filling clerks and salespersons to top management. For any of these positions, however, tests results are only one source of information.

As uses of Intelligence Tests are manifold, many intelligence tests have been constructed and standardized by researchers of our country from time to time. But, India being a country of multi- lingua and diverse cultures, intelligence tests prepared and constructed in the country were found to have developed for their own specific needs, culture and languages of a particular state and region. Meghalaya being one of the states of India also practices its own distinct culture and language. So, tests prepared by other researchers of the country were not suitable to the Khasi children of the state in terms of item, content and language. Based on this ground the present test was developed.

1.2 PROFILE OF MEGHALAYA:

Meghalaya is one of the seven sister states in the North East India. The state was inaugurated as an autonomous state within Assam on 2nd April 1971. It was declared a state of Indian Union on January 21st 1972, with Shillong as its capital. Meghalaya primarily

consists of three ranges- the Khasi, Jaintia and Garo, named after the tribes who are its predominant inhabitants. The unique common trait of all the three major tribes is matrilineal. Administratively Meghalaya consists of seven Districts namely, East Garo Hills, West Garo Hills, Jaintia Hills, East Khasi Hills, West Khasi Hills, Ri-bhoi and South Garo Hills, together with three Autonomous Districts Councils.

The state has an area of 22, 429 sq.km. It extends for about 300 Km in length and about 100 Km in breadth, bounded by Assam on the north and East and on the South and West by Bangladesh. The total population of the state according to the Census 2001, was 23, 18,822, with 11, 76,087 males and 11, 42,735 females. Population density is 103 per square kilometre. The Schedule Tribes constitute 85.94 % and the Schedule Castes and others 14.6% that is 11,139.

In fact the inhabitants of Meghalaya are the Pnars, the Bhois, the Wars, the Lyngngams, the Khynriams and the Achiks (Garos). Other than these, the state is also the home of various minor tribes like the Rabhas, Koch, Mizos, Nagas, Mikirs and Hajongs having their own linguistic and cultural identities. Besides these, there are other communities, like the Bengalese, Assamese, Nepalese, Manipuri, Biharis, and Punjabis etc. who are mostly confined in the urban areas. The main languages spoken by the majority of the population in Meghalaya are Khasi, Pnar and Garo, with English as the official language of the state. The medium of instruction in educational institutions is English, except at the primary school stage where mother tongue is the medium of instruction.

The education system in Meghalaya was nurtured by the Christian missionaries, though, during the British Raj, its progress was very slow. Educational development mainly started after independence when the number of schools began to multiply gradually. The

progress of education was further enhanced with the launching of the First-Fie Year plan, and the state and central government's efforts to fulfil the aims enshrined in the Constitution of India.

When Meghalaya attained its statehood, the system of education followed then was that of pre-independence days with the Director of Public Instruction at the helm of affairs in the Directorate of Public Instruction within the Department of Education. With the trifurcation of the erstwhile Directorate of Public Instruction (DPI) in 1997 the restructured Directorate now has three separate Directorates within the Department of Education each with powers, functions and jurisdictions as notified by the state government. The Directorate of Elementary & Mass Education (DEME) is to look after elementary school education: the Directorate of Higher & Technical Education (DHTE) to look after secondary, higher secondary school education , college and technical education: and the Directorate of Educational Research & Training (DERT) to look after teacher education. The state follows the National pattern of education of 10 + 2 + 3. The system was introduced in 1994 under the Meghalaya Board of School Education (MBOSE).

In recent years, Meghalaya has developed significantly in the educational sector leading to more opportunities to the students of North East region as well to the other parts of the country. It has many colleges offering various degrees as well as professional courses. Most of the colleges are affiliated to the North Eastern Hill University. Some of the famous colleges are Saint Mary's college, Saint Edmund's college, Saint Anthony's college, Lady Keane and Shillong College. The establishment of the North Eastern Indira Gandhi Regional Institute of Health and Medical Science (NEIGRHS) in the state has attracted more students from outside. At present the state has three universities, four Teachers' Training colleges,

one polytechnic one Engineering institute, two Law colleges, and more than 55 colleges offering Arts, Science and Commerce education, and 711 High and Higher Secondary schools, 1759 middle schools, and 5851 primary schools. The free and compulsory elementary education till the age of 14 years has added to the increasing rate of literacy (according to the 2001 census is 63.31% approximately) and also to the educational development.

Though, the literacy rate of the state is far from satisfactory, the general education provided by its different institutions still attracts lots of students from our neighbouring states. But to be at par with other advanced states, it still has a lot more to achieve in the field of science and technology, research and development. More contributory studies should be conducted and tests, instruments and measurements should be developed. As of now, the state is still far behind in those areas. Till today, the state does not have a single psychological test of its own that can measure the general ability, aptitude, personality etc. of the school or college students. So far no single study has been carried out in this field.

1.3 NEED AND JUSTIFICATION OF THE STUDY:

Shillong the capital of Meghalaya in North-East India has always been the hub of educational prospects in the region, where students of different backgrounds and different socio-economic status flock in to receive the best education, which different institutions of the state provide. So, the capital of the state has become the home of many communities. This has lead to the increased educational competitions and challenges amongst the Khasi students and outsiders. As the world is also becoming more and more advanced and complex; educational performance and achievement amongst students have also become

more and more difficult. The teachers and parents are often confused, curious and talked about the differences in the educational performance and academic achievement of the school going children; as most of them believe that intelligence is one of the main determinants in the student's success and failure. It is this phenomenon which has encouraged the investigator to study the intelligence of the Khasi School going children of the state. In fact, if a child's potential or talent could be measured, estimated or at least identified before he enters into a course of training or discipline, much wasted efforts could be spared. The measurement or identification of intelligence and other mental abilities is very crucial at all stages and it can be checked and examined by intelligence test. A good intelligence test may contribute to the improvement of education. Tests of abilities and other personal characteristics play a large role in modern life, contributing to countless decisions that shape individual's upbringing, schooling and careers.

Seeing the importance of intelligence of students and the necessity of intelligence tests as a measuring tool, the investigator feels that it is important to have a separate intelligence test to measure the general mental ability of the Khasi school-going children. As of now the state does not have a single psychological tool of its own to assess the general mental abilities of the children. Even though there are many intelligence tests that have been constructed and standardized by researchers of our country from time to time, they were found not suitable for Khasi children in terms of content and language.

The investigator therefore, decided to construct and standardize a verbal group test of intelligence in the Khasi language for the Khasi school-going children on the following grounds:

1. Intelligence Tests prepared for children of other states are not suitable in terms of the content and language of Khasi children.
2. So far no test has been constructed and standardized in the Khasi language for Khasi children of the State of Meghalaya.
3. No intelligence test is available with the local norms

1.4 NATURE OF INTELLIGENCE:

Intelligence is a term which is so commonly used and yet rather difficult to define in a precise and generally accepted form. This difficulty of definition is perhaps not because of our lack of information about it, but, because in recent years, psychologists have gathered so much materials about it by the use of intelligence tests that we find it difficult to adapt a simple and comprehensive meaning of the term. Aggarwal (2002)[1] quoted Ballad's observation, "While teacher tried to cultivate intelligence and the psychologist tried to measure intelligence nobody seems to know what intelligence was". To understand the meaning and nature of intelligence, it is worthwhile to quote some of the important definitions and discuss the various theories as follows:

The term 'Intelligence' comes from a Latin Word 'Intelligentia' coined by Cicero[2] to translate a Greek word used by Aristotle to cover all cognitive processes. It was assumed that this capacity of cognition was something inherent in human nature (and possibly in animals). It was recognized that every man was born with a general cognitive capacity which was conveniently termed Intelligence. Spencer regarded intelligence as a capacity of

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1 J.C. Aggarwal: *Essentials of Educational Psychology*, Vikas Publishing House Pvt. Ltd., New Delhi, 2002, p.304.

[2] J.D. Boaz: *General Psychology*, Published by the Author, Madras. 1957, p. 179.

the organism to adjust itself to an increasingly complex environment. This view was shared by a number of biologists who were agreed that intelligence was an innate capacity. Galton put forward the view in line with the traditional faculty theory that there was a kind of super faculty called the general cognitive ability. From this general ability he distinguished special abilities like memory and imagination. Galton sometimes used the term intelligence for this general cognitive ability. This distinction of Galton was accepted by Binet.

Binet (1916) viewed intelligence as the ability, 'to judge well, to understand well, and to reason well.' He believed that intelligence projects itself in several ways. According to Terman (1921) 'An individual is intelligent in proportion as he is able to carry on abstract thinking'. As per Spearman's (1923) definition 'Intelligence is the analytic and synthetic ability of mind'. While to Thorndike (1923) 'Intelligence is power of good responses from the point of view of truth and fact'. Wagnon (1937) defined, 'Intelligence is the capacity to learn and adjust to relatively new and changing conditions.'

To Stoddard (1943) intelligence is 'The ability to undertake activities that are difficult, complex and abstract and which are adaptive to a goal, and are done quickly and which have social value and which lead to the creation of something new and different.' Wechsler (1944) gave a comprehensive definition, 'Intelligence is the global or aggregate capacity of an individual to act purposively, to think rationally and to deal effectively with his environment.' Burt (1946) defined, 'Intelligence is all round innate mental ability. It is a power of readjustment in novel situation by organisation of new psycho-physical combination.' According to Piaget (1952), 'Intelligence is the ability to adapt to one's surroundings'.

Vernon (1960) perceives intelligence as: 'all round thinking capacity or mental efficiency'. Cattell (1963): considers that intelligence is composed of two components which he describes as fluid (Gf) and crystallized (Gc). Fluid intelligence represents the influence of biological factors on intellectual development and is thought to be comparable to inherited ability. Crystallized intelligence is the outcome of the skills and concepts which have become established through cultural pressure, education and experience' Heim's (1970)[3] definition of intelligent activity 'as consisting of grasping the essentials in a given situation and responding appropriately to them'.

Sternberg (1986) defined 'intelligence as the mental capacities to automatise information processing and to emit contextually appropriate behaviour in response to novelty.' Bruno (1986) viewed, 'Intelligence is usually associated with the abilities to learn quickly, to adapt to new situation, to use abstract reasoning, to understand both verbal and mathematical concepts and to perform the tasks in which relationship is grasped'. According to Gardner (1993), 'Intelligence is the ability or skill to solve problems or to fashion products which are valued within one or more cultural settings.' Schank & Birnbuam (1994) say 'what makes someone intelligence is what he/she knows.' According to a report of Task Force convened by the American Psychological Association in 1995, "Mainstream Science on Intelligence" signed by 52 intelligence researchers 1994[4], "A very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather, it reflects a

[3] NCERT, *Is Intelligence Inherited?* New Delhi, 1978, p. 4.
[4] http://en.wikipedia.org/

broader and deeper capability for comprehending our surroundings- "catching on", "making sense" of things, or "figuring out" what to do". Another simple and efficient definition is, "The ability to apply knowledge in order to perform better in an environment".

As to Perkins (1995)[5], 'We can become more intelligent through study and practice, through access to appropriate tools, and through learning to make effective use of these tools.'

While to Simonton (2003)[6], "...intelligence is a set of cognitive capacities that enable an individual to adapt and thrive in any given environment they find themselves in, and these cognitive capacities include things like memory and retrieval, and problem solving and so on so forth. There is a cluster of cognitive abilities that lead to a wide range of environments."

According to the Encyclopaedia Britannica (2006)[7], "Intelligence is the ability to adapt effectively to the environment, either by changing the environment or finding a new one ....Intelligence is not a single mental process, but rather a combination of many mental processes directed toward effective adaptation to the environment"

Though, there were many definitions mentioned above, but the terminology and language used by different psychologists in defining intelligence, seems to have agreed on the following:

- Intelligence must be understood as the mental capacity or mental energy available within an individual at a particular time in a particular situation.

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[5] htt.//otec.uoregon.edu/intelligence.htm # Perkins

[6] www.indiana.edu. (Simomton, Personal communication, July, 5, 2003).

[7] www.vetta.org/shane/intellgence ehtml

- This, mental capacity helps him in the task of theoretical as well as practical manipulation of things, objects or events present in his environment in order to adapt to or face new challenges and problems of life as successful as possible.
- His capacity or the fund of mental energy available with him can be judged only in terms of the quality of his behaviour or performance.
- Intelligence is an umbrella term used to describe a property of the mind that encompasses many related abilities, such as the capacities to reason, to plan, to solve problems, to think abstractly, to comprehend ideas, to use language, to learn and to adapt effectively to the environment.

The nature of intelligence can be properly understood by explaining its different theories. From time to time psychologists have propagated different theories trying to uncover the components or elements of intelligence. Galton, influenced by his cousin Darwin, was the first to advance a theory of general intelligence. For Galton, intelligence was a real faculty with a biological basis that could be studied by measuring times to certain cognitive tasks. Galton's research on measuring the head size of British scientists and ordinary citizens led to the conclusion that head size had no relationship with the person's intelligence.

The present study classified the theories of intelligence into Factor theories and Cognitive theories as follows:

A. Factor Theories of Intelligence:

Factor Theories are those theories which employed factor analysis techniques for identification of factors or commons abilities which constitute one's intelligence. These theories exhibit wide variations in terms of the number of factors that they consider important. The range of such factors goes from 1 (monarchic theory) to 150 (Guilford's intellect model). Following are the factor theories:

(i) Binet's Uni-factor Theory (1904):

The theory was originally developed by Binet and was supported by Stern, Terman, and Ebbinghouse. The supporters of the theory considered intelligence as a faculty which affects all the mental activities. According to this theory if a person is proficient in one area, he should be proficient in other areas as well. Hence the originator of this theory tried to prove that intelligence can be defined as 'unifactor'. It is on this basis that intelligence is defined by Binet[8] as 'ability to reason', by Terman as 'ability to think' and by Stern as 'ability to adjust to the new circumstances'.

The ideas propagated by this theory are not however born out in real-life situations. It may be seen for instance that a child who is good in mathematics may not despite genuine interest and diligence be able to do as well in civics while an above average performer in the laboratory may not exhibit comparable competence in learning a language. This goes to show that intelligence is not just a unitary factor and the unitary theory is therefore not acceptable.

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[8] NCERT, *op.cit.*

(ii) Spearman's Two-factor Theory (1905):

According to this theory, intelligence is made up of a general factor (or 'g' factor) and several specific factors (s_1, s_2, s_3, s_4 ...). The 'g' factor is common to all individuals and is present in all mental activities. It defined the g factor as a mental energy that is required in all mental tasks that individuals possess in varying degrees (because people differ in their mental activity). The s factors are specific to particular tasks. Thus different tasks may require different s factors. Such a factor is unique to the activity itself. The's' factor require for arithmetic is not the same as those required for reading and spelling. As's' factors vary from task to task; it also differs from individual to individual. Thus two students may have a high level of general intelligence. But one student may be less capable in arithmetic than the other who has high s factor required for arithmetic. Usually persons having high general intelligence have more s factors at their command, but these are exceptions. This is why a person with above average (or below average) general intelligence tend to be above average (or below average) in most thing they do. Spearman[9] proposed that the aim of any intelligence test should be to measure the amount of 'g' factor of each person because it provides the most important basis of predicting a person's behaviour in different situations. It is relatively of little use to measure the s factor because it is unique to a specific activity.

[9] C.E. Spearman: *The Nature of Intelligence and Principles of Cognition*, Macmillan, London, 1923.

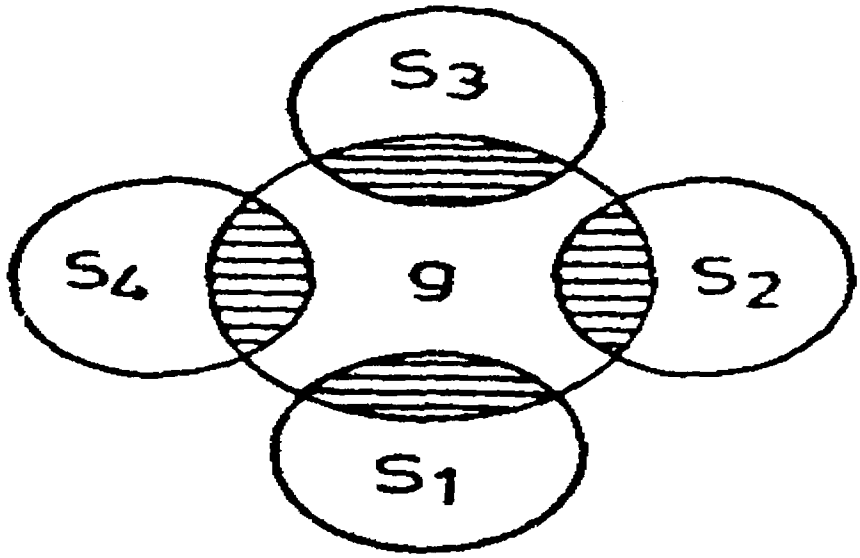
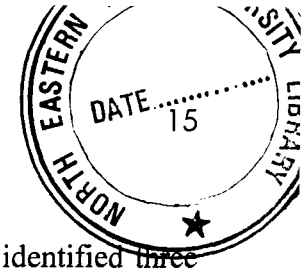


Fig.1.1: Spearman's Two-factor theory of intelligence

The theory has been criticized on the grounds that intelligence may be expressed in terms of two factors, as have said above, but there are not only two but several factors (g,. s_1,s_2,s_3,s_4). According to Spearman, each job requires some specific ability. This view was untenable as it implied that there is nothing common to different jobs except a general factor and professions such as those of nurses, compounders and doctors could not be put in one group. They overlap and give rise to certain common factors.

(iii) Thorndike's Theory of Neural Connections (1914):

Thorndike differed sharply with Spearman by asserting that there are no such things as general intelligence or general mental ability. Thorndike's theory was more of an abstract one. His theory is based on the idea that intelligence is due to the number and kind of neural connections. Thus a bright person has more neural connections of an adequate nature than a dull person. According to him every mental act is different from the other. But there are



common elements in all mental acts. Based on these common elements he identified three components of intelligence such as: (a) concrete thinking (the ability to deal with things) (b) social thinking (the ability to deal with people) and (c) abstract thinking (the ability to deal with ideas).

Thorndike's theory has been criticized as placing too much emphasis upon the fact that a person's degree of observable behaviour depends upon the number of connections in the brain and nervous system as a *sine qua non* of his intellectual activities. The theory would seem to make no provision for flexibility in the whole pattern of intellectual life[10].

(iv) Thurstone's Group Factor Theory (1938):

According to this theory intelligence activity is not an expression of innumerable highly specific factors as Thorndike claimed. Nor is it the expression primarily of a general factor that pervades all mental activity and is the essence of intelligence as Spearman held. Instead the analyses and interpretations of Thurstone and others led to the conclusion that certain mental operations have in common a 'primary' factor that gives the psychological and functional unity and that differentiates them from other mental operations. These mental operations then constitute a 'group'. A second group of mental operations has its own unifying primary factor; a third group has a third; and so on. In other words there are a number of groups of mental abilities (the number being as yet undetermined) each of which has its own primary factor giving the group a functional unity and cohesiveness. Each of these primary factors is said to be relatively independent of the others. Thurstone and his

[10] L.D. Crow & A. Crow: *Educational Psychology,* Eurasia Publishing House (P) Ltd, New Delhi, 1991, p.148.

collaborators concluded that six primary factors emerged enough for identification and use in test design and construction. They are as follows:

(i) Number factor (N)- ability to do numerical calculations rapidly and accurately

(ii) Verbal factor (V)- found in tests involving verbal comprehensions

(iii) Space factor (S)- involved in any tasks in which the subject manipulates an object imaginably in space.

(iv) Word fluency (W)- involved whenever the subject is asked to think of isolated words as at rapid rate.

(v) Reasoning factor (R)- found in tasks that require the subject to discover a rule or principle involved in series or groups of letters

(vi) Rote memory factor (M)- involving the ability to memories quickly.

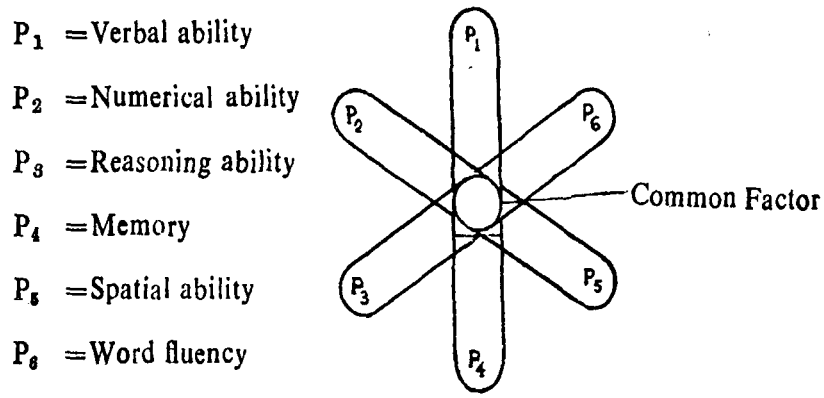


Fig.1.2: Thurstone's Group factor theory of intelligence

Although primary mental abilities (or factors) were originally said to be functionally independent of each other it was found that they are positively and significantly inter-correlated.

The theory has been criticized on the ground, that some studies show a positive relationship among these abilities. Thus a person who is average (or above or below) in one ability is usually average (or above or below) in the others. This is evident to suggest that different types of mental activities share something in common and that they may all be influenced in part by general intellectual ability.

(v) Thompson's Sampling Theory (1939):

The theory propagated by Thompson assumes that the mind is made up of several independent bonds or elements. Any specific test or school activity samples some of those bonds. It is possible that two or more tests sample and utilize the same bonds, and a general common factor can be said to exist among them. It also possible that some other tests sample different bonds, in which case the tests have nothing in common and each of them is specific.

The sampling theory combines several theoretical viewpoints in that, as it appears to be similar to Thorndike's multifactor theory except that he concedes to the practical usefulness of a concept like 'g', and at the same time Thompson seems to maintain that the concept of a group factor (G) is of equal practical usefulness.

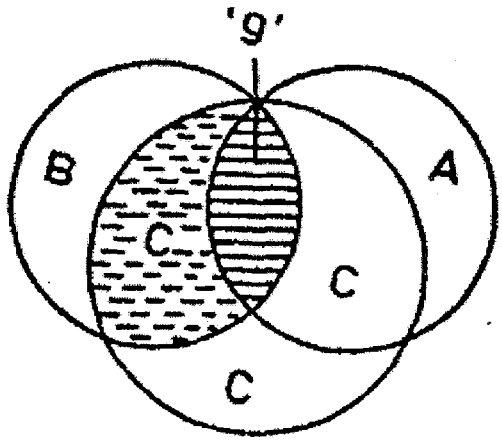


Fig.1.3: Thompson's Sampling theory of intelligence

(vi) Vernon's and Burt's Hierarchical theory (1950):

Vernon & Burt suggested a hierarchical structure for the organization of intelligence. According to them, the mind is a kind of hierarchy in which 'G', is the most prominent mental ability, i.e. an overall factor measured through intelligence tests. Under 'G', there are two major group factors: (i) Practical Ability and (ii) Academic Ability. Further division of factor takes place at next step. Practical ability is divided into- perceptual, mechanical and spatial ability, while academic ability is divided into reasoning, numerical and verbal ability. These major factors can be divided into minor group factors and ultimately these minor factors may be further sub-divided into various specific factors related with minute specific mental abilities. The theory is propounded on the basis of factor analysis approach[11].

[11] P.E. Vernon, *The Structure of Human Abilities*, Methuen, London, 1971, p. 25.

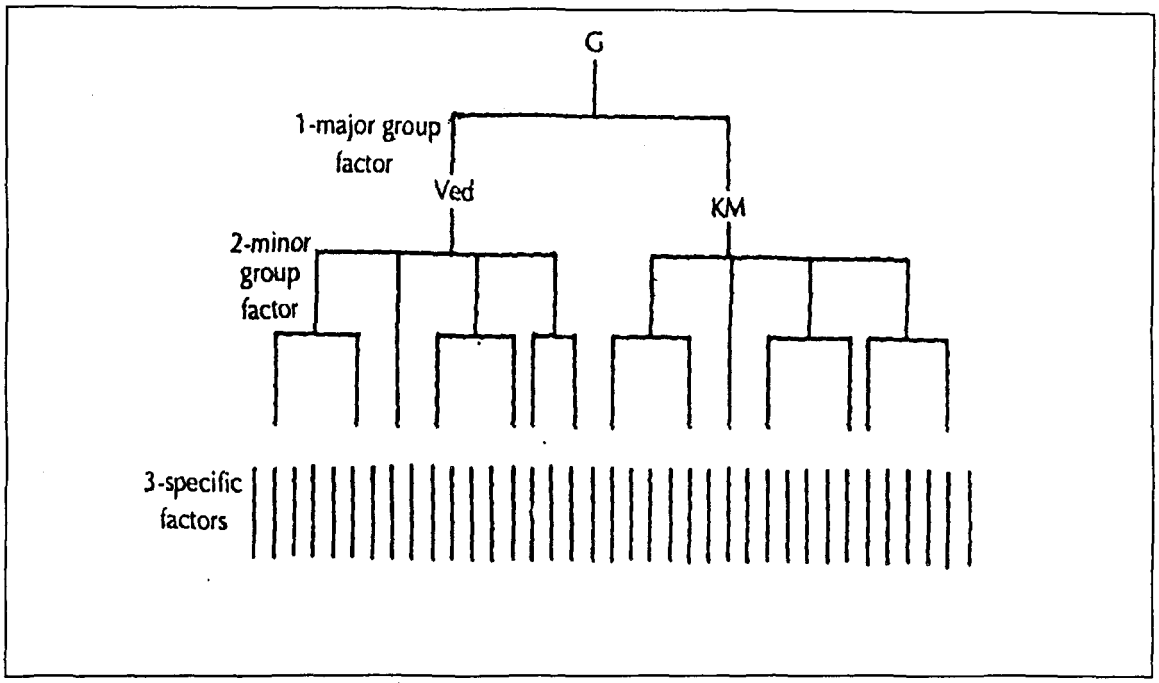


Fig.1.4: Vernon's & Burt's Hierarchical theory of intelligence

(vii) Guildford's Structure of Intellect Model (1967):

Guildford and his associates defined Intelligence on the basis of structural considerations of discrete factors. On the basis of his factor-analytic research of nearly 20 years, Guildford (1967)[12] has proposed a three-dimensional box-like model which he calls the *structure of intellect model or SI model.* The model has tried to simplify the picture of intellectual trait relationships by organizing the traits along three dimensions viz. *contents, operations and products*. Each of these aspects of intelligence were analyzed and separated into subcategories: five for operations, six for products and five for contents, making a cube of 5X6X5=150 cells. A description of these three categories and sub-categories is given below:

[12] J.P. Guilford: *The Nature of Human Intelligence*, Mc Graw-Hill, New York, 1967, p. 63.

(i) *Operations*: It refers to the basic intellectual processes of thinking used by persons. It has five subcategories: *Cognition, Memory, Divergent Production, Evaluation and Convergent Production.*

(ii) *Content:* It refers to a type of content or material on which operations are performed, that is, terms in which the person think. It has five categories: *Visual, Auditory, Symbolic, Semantic and Behavioural*

(iii) *Products:* It refers to the results of performing operations on contents, that is, the form of thought produced by individuals. It has six categories: *Units, Classes, Relations, Systems, Transformation and Implications*

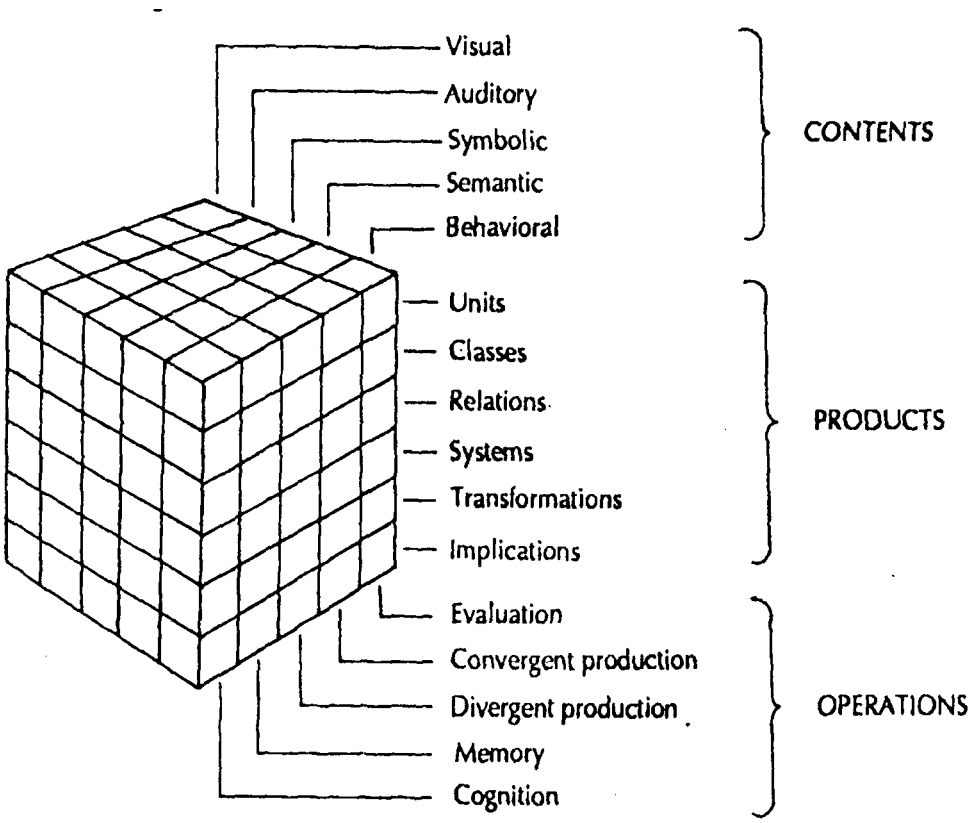


Fig.1.5: Guilford's Structure of Intellect Model

Thus, the factor theories of intelligence try to throw light on the structure of intelligence by pointing out the number of its constituents or factors, e.g. the unitary theory holds that intelligence consists of only one factor, quite contrary to this, the multi-factor theory or theory of neural connections considers intelligence to be a combination of numerous separate elements or factors. Spearman's two factor theory advocates the presence of two-factors- general intelligence 'g' and specific intelligence 's'. The group factor theory postulates that all intellectual tasks can be categorized in definite groups i.e. six such group factors. Vernon suggested a hierarchical structure for the organization of intelligence in the shape of G, an overall factor branching into two major group factors and various specific factors. Guilford's theory lays down a model of the intellect involving three interrelated and interacted basic parameters - operations, contents and products for explaining the structure of human intelligence.

B. Cognitive Theories of Intelligence:

Cognitive theories analysed and described intelligence in terms of certain fundamental cognitive processes which are as follows:

(i) Piaget's Stages of Intellectual Development Theory (1952):

Piaget defined intelligence as the ability to adjust, adapt or deal efficiently with one's environment. Intelligence changes and develops as the organism matures biologically and as it gains from experience. As the child grows, he learns to adapt to the world around him. This adaptation becomes possible through two ways: assimilation and accommodation. By assimilation Piaget refers to a kind of matching between the already existing cognitive

structures and the environmental needs as they arise; and accommodation, he refers to an adjustment to new ways of thinking and behaving in place of assimilating or behaving in the same old fashion. Cognitive development, like all other development is a continuous process. Piaget divides cognitive development into four broad periods or stages which are as follows[13]:

i The Sensorimotor Stage: (from birth to $1^1/_2$ years):

At this stage the child creates his own individual world which is connected with the satisfaction of his physical wants and its scope lies in the immediate sensation. During the last months of this phase the child begins to think about his experiences. He begins to gain some consciousness about objects and he also begins to gain some understanding regarding their stability. This is the period when he begins to develop some notion of object permanence. He starts comprehending casually, understanding of the principles that events can be caused. This sets the stage for later cognitive development. On the whole during this period, he remains confused regarding himself and his environment.

ii The Pre-operational Stage: (from $1^1/_2$ to 7 years):

At this stage, the child develops ways of representing events and objects through symbols, including the verbal symbols of language. The child's language development takes place; this provides him with a good tool for thinking. He can now think about things that are not immediately present and he can begin to solve certain types of problems, particularly

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[13] J.C. Aggarwal: *Essentials of Educational Psychology*, Vikas Publishing House Pvt. Ltd., New Delhi, 2002, p.325

based on visual items, but cannot be related to abstract concepts, or items that are not apparent.

This stage is further sub-divided into (a) the pre-conceptual phase (approximately two to four years) and (b) the intuitive-phase (approximately four to seven years) which are discussed as follows:

(a) The pre-conceptual phase (approximately two to four years):

In the early part of this stage, the children seem to identify objects by their names and put them in certain classes. However, they usually make mistake in this process of identification and concept formation. Their mode of thinking and reasoning is quite illogical at this stage. Their thinking is sometimes too imaginative and far removed from reality. The intellectual structure of the child at this stage is concerned with his egocentric nature. By egocentric, Piaget means that the child can see the world only from his own standpoint.

(b) The Intuitive-phase (Approximately Four to Seven Years):

At this stage the child progresses towards the formation of various concepts at a more advanced level. The child's thinking at this stage is not logical and is full of contradictions. It is clearly reflected in the absence of the two main cognitive characteristics namely, the ability to reverse and the ability to see an object as permanent even though its length, width or shape changes.

iii The Concrete Operational Stage: (from 7 to 12 Years):

This stage shows marked development in the cognitive functioning of the child. The child now learns to deal with concepts and ideas that exist only in mental terms. His thinking becomes more logical and systematic. The child now develops the ability to conserve both in terms of quantity and number of objects. The thinking of the child is no longer rigid and irreversible. Now he is no longer ego-centric in his thinking. The child now develops the abilities to deal adequately with classes; he can classify objects, he can serialize things in order, and the number concepts also developed, but it all happens in a very simple concrete form. The child now learns to carry out rather complex operations or tackle problems as long as they are concrete and not abstract. In this way, the child reaches a satisfactory level in terms of intellectual development by his thinking becoming quite systematic and logical. However, what is done or thought by him at this stage is done purely on a concrete level.

***iv The Formal Operational Stage: (from 12 onwards)*:**

This stage begins at about the age of 12 and is consolidated during adolescence. But in some cases the stage may extend beyond the age of 16. Individual differences are greater during this stage than during other stages. At this stage the adolescent's thought is flexible and effective. He can deal efficiently with the complex problems of reasoning. He can imagine the many possibilities of solving a problem in a very systematic and logical way. Unlike the concrete operational child whose thought is limited to concrete objects and events, the adolescent can deal with hypothetical propositions. The creative aspects in the adolescent are very much visible during this age not only in terms of concrete operations but also in terms of abstraction and pure imagination. At this stage, many adolescents may

appear to be very idealistic in their thinking, but Piaget said that the adolescent's idealism is temporary. This false idealism will change during subsequent years when he will confront the real world. False idealism is a necessary prior development to realistic thought. At this stage, the adolescent also begins to think about himself, his role in life, his plans and the validity on his beliefs. In fact, Piaget was of the opinion that the thought processes and the intellectual functioning of a child at this stage reflect the beginning of the most advanced stage in the functioning of his cognitive system. According to Piaget, after the expiry of the formal operation stage the child may reach full intellectual potential.

Piaget's theory on intellectual development has been questioned and challenged on the ground, that, Piaget's views on the pattern of intellectual development are not as uniform and universal as claimed by him. He based his theory on detailed observations of European children as they grew up in 1920s, 1930s, and 1940s. The subsequent researches in Europe and outside have demonstrated significant deviations from the chronological ages linked different stages of intellectual development by Piaget. His view that thinking proceeds in distinct stages has also been seriously challenged. It has been found that cognitive performance at particular ages is usually very inconsistent.

(ii) Cattell's and Horn's Theory of Fluid and Crystallized Intelligence (1965, 1978):

The term 'fluid' and 'crystallized' intelligence was first introduced by Cattell. He distinguishes between two types of intelligence, i.e. fluid intelligence and crystallized intelligence. Although viewed as different and distinct, these two types of intelligence intermingle and interact to produce overall intelligence. Fluid intelligence is considered to be the mental capacity of an individual, which is required for learning and problem solving.

It is dependent on neurological development and is relatively free from the influences of education and culture. In other words, it is derived more from biological and genetic factors and is less influenced by training and experience. This type of intelligence is put to use when facing new and strange situations requiring adaptation, comprehension, reasoning, problem solving and identifying relationships etc. It reaches full development by the end of an individual's adolescence.

Crystallized intelligence, on the other hand, is not a function of one's neurological development and therefore is not innate or unlearned like fluid intelligence. Rather, it is specially learned and is, therefore, dependent on education and culture. It involves one's acquired fund of general information consisting of knowledge and skills essential for performing different tasks in one's day-to-day life. It can be identified through one's fund of vocabulary, general knowledge of the world affairs, the knowledge of customs, traditions and rituals, manner of behaving in the society, handling of machines and tools, craftsmanship and art, computation and keeping of accounts and various other such tasks requiring knowledge, experience and practice.

Thus, while fluid intelligence is characterized by a relatively high degree of culture, education, experience and training-free performances in abstraction, thinking, reasoning and imagination, crystallized intelligence is known for its evolution through experience, training and interaction with one's environment over a number of years. That is why it is found to continue to increase throughout one's life span.

(iii) Jensen's Theory of Mental Functioning (1969):

Jensen propounded the theory of mental functioning. According to this theory, the functioning of one's mind depends upon the type and degree of intelligence one possesses. Jensen describes one's intelligence as being composed of two types of abilities, viz., associative abilities and conceptual abilities. Associative intelligence includes one's ability to remember, reproduce, identify, discriminate, synthesize, associate, assimilate, transfer, and apply etc. Such abilities are usually measured by means of intelligence tests items, or tasks involving free recall, recognition, serial learning, free and controlled associative learning, selection and discrimination, etc. Conceptual abilities on the other hand, involve one's ability to carry out higher order of thinking, reasoning, analyzing and the capacity of problem-solving. These abilities are measured through tasks and test items requiring the use of conceptual ability, abstract reasoning, and novelty of situation and methods as also analytical and divergent thinking. According to Jensen associative abilities relate to biological maturation and show little variation among social classes and races. Conceptual abilities, however, are dependent on education and culture and are therefore, responsible for the observed differences in conceptual reasoning and abilities among social classes and races[14].

This attribute of intelligence in an individual according to Jensen, is two-dimensional, having intellectual breadth and intellectual altitude. The former consists of the intellectual fund of general information, vocabulary, practice and skill of handling tools and machines, ways and manners of behaving in society, etc. It usually depends upon one's

[14] S.K. Mangal: *Advanced Educational Psychology*, Prentice-Hall of India, Pvt. Ltd., New Delhi, 1993, p. 235.

interaction with one's environment. Thus, it is described as a function of one's learning, education and culture. It is similar to Cattell's concept of crystallized intelligence. The latter, depends more on innate and neurological factors than on learning, training and environmental influences. It imparts altitude to one's intellectual structure by involving the relatively high-level cognitive abilities like abstract and divergent thinking, logical reasoning, imagination and conceptualization, problem solving etc. A person's intelligence is thus said to be built up on the base provided by his intellectual breadth and height maintained by his intellectual altitude. How intelligently he will function in a given situation thus depends upon his innate basic abilities and the required mental functioning.

(iv) Campione and Brown's Theory of Intelligence (1979):

According to the psychologists Campione and Brown, one's intelligence is composed of a two-part system. The first part is a biologically based architectural system and the second, an environmentally influenced executive system. The architectural system works as a base for one's intellectual functioning. It includes such basic mental abilities as memory capacity, the rate of loss of memory, the ability of proper information processing, etc. The executive system works as a store-house of knowledge and information and is said to include the cognitive abilities like schemata, cognitive learning strategies and metacognition (i.e. the awareness of one's abilities to plan, evaluate and regulate learning). The executive system works on a higher level and is thus responsible for higher order mental functioning and the abilities comprising this system are dependent on training and experience. The abilities comprising the architectural system, on the other hand, are innate

and biological and are thus relatively independent of the education, culture and training influences.

(v) Gardner's Theory of Multiple Intelligence (1983):

This theory suggests that traditional psychometric views of intelligence are too limited. Gardner first outlined his theory in his 1983 book *Frames of Mind: The Theory of Multiple Intelligences*, where he suggested that all people have different kinds of "intelligences." He originally identified seven components of intelligence (Gardner, 1983)[15]. He argues that these intelligences are relatively distinct from each other and that each person has some level of each of these seven intelligences. More recently, he has added an eighth intelligence to his list (Educational Leadership, 1997) and has suggested the possible addition of a ninth known as "existentialist intelligence". In order to capture the full range of abilities and talents that people possess, Gardner suggests that people do not possess just one intellectual capacity, but have many different intelligences including musical, interpersonal, spatial-visual and linguistic intelligences. Table 1.1 lists the eight intelligences identified by Gardner. It provides some examples of the types of professionals who exhibit a high level of intelligence. The eight intelligences are listed in alphabetical order.

Gardner's theory has come under criticism from both psychologists and educators. The critics argue that Gardner's definition of intelligence is too broad, and that his eight different "intelligences" simply represent talents, personality traits and abilities. Gardner's theory also suffers from a lack of supporting empirical research.

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[15] http:/www.geocities.com/Athens/column/7568/gardner.html

Table 1.1: Showing Gardner's Theory of Intelligence

Sl. No.	Intelligence	Examples	Discussion
1	Bodily kinesthetic	Dancers, athletes, surgeons, crafts people	The ability to use one's physical body well.
2	Interpersonal	Sales people, teachers, clinicians, politicians, religious leaders	The ability to sense other's feelings and be in tune with others.
3	Intrapersonal	People who have good insight into themselves and make effective use of their other intelligences	Self-awareness. The ability to know your own body and mind.
4	Linguistic	Poets, writers, orators, communicators	The ability to communicate well, perhaps both orally and in writing, perhaps in several languages.
5	Logical-mathematical	Mathematicians, logicians	The ability to learn higher mathematics. The ability to handle complex logical arguments.
6	Musical	Musicians, composers	The ability to learn, performs, and composes music.
7	Naturalistic	Biologists, naturalists	The ability to understand different species, recognize patterns in nature, classify natural objects.
8	Spatial	Sailors navigating without modern navigational aids, surgeons, sculptors, painters	The ability to know where you are relative to fixed locations. The ability to accomplish tasks requiring three-dimensional visualization and placement of your hands or other parts of your body.

(vi) Sternberg's Theory of Triarchic Function Intelligence (1985, 1988):

Triarchic theory of human intelligence takes a somewhat different track from that of Gardner. The theory attempts to link cognition to context through three parts or sub-theories, known as '***Triarchic***'[16].

First, according to this theory, intelligence serves three functions in real world contexts. The first, adaptation to the environment, refers to people's changing to themselves in order to suit the environments in which they live. The second, shaping of environment, refers to people's changing to their environment to suit themselves. And the third, selection of environments, refers to people's choosing new environments when they are unable to make their environments work for them either through adaptation or shaping.

Second, according to the Triarchic theory, environments and the tasks we confront within them vary in terms of their familiarity. At one extreme, we have tasks within environments that are extremely novel and that we have never before encountered. At the other extreme we have tasks that are so familiar that we accomplish them almost without thinking. According to the Triarchic theory, the two levels of experience that is most relevant for assessing intelligence are the zones of relative novelty and of automatization.

Third, we apply certain cognitive process to tasks at various levels of experience in order to adapt to, shape and select environments. The Triarchic theory distinguishes among three types of information-process components-metacomponents, performance components, and knowledge acquisition components. Metacomponents are used to decide what to do, to monitor it while it is being done, and to evaluate what one has done after it is completed.

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[16] R.J. Sternberg: *Thinking and Problem Solving*, Academic, New York, 1994, p. 282.

Performance components are used in the actual execution of a task. And knowledge acquisition components are used to learn how to perform a task in the first place. Metacomponents activate performance and knowledge-acquisition components, which in turn provide feedback to the metacomponents.

(vii) Carroll's Three-Stratum Model of Cognitive Ability (1993):

Carroll presented three-stratum model of cognitive ability according to which, at the most general level, there is a g factor, responsible for stable differences in the performances on the wide variety of cognitively demanding tasks. At the next level (the broad spectrum), there are a number of areas of ability, which imply that the rank ordering of individual's task performance will not be exactly the same across all cognitive tasks, but rather will show some clustering. The broad abilities in Carroll's model include the following;[17]

(1) Fluid intelligence, (2) crystallized intelligence, (3) general memory ability, (4) broad visual perception, (5) broad auditory perception, (6) broad retrieval ability, and (7) broad cognitive speediness. Some people do well on the broad range of memory tasks and others do well on the broad range of tasks of cognitive speediness. These broad ability areas can be characterized in terms of number of more specific abilities (the narrow spectrum).

The narrow spectrum includes (1) induction, (2) language development, (3) memory span, (4) spatial relations, (5) sound discrimination, (6) word fluency, and (7) perceptual speed. According to Carroll, tests designed to measure g and the tests designed to measure more specific aspects of intelligence both have independent place. It is up to the researcher

[17] http:/reprints.nec.gov.pk

to choose the ability area in the hierarchy according to the purpose of testing rather than by personal preferences.

***(viii) Perkins's Three Components of Intelligence (1995)*:**

In his book titled 'Smart Schools', Perkins analyzes a number of different educational theories and approaches to education. His analysis is strongly supportive of Gardner's theory of multiple intelligences. Perkins' book contains extensive research-based evidence that education can be considerably improved by more explicit and appropriate teaching for transfer, focusing on higher-order cognitive skills, and the use of project-based learning.

Perkins (1995)[18] examines a large number of research studies both on the measurement of IQ and of programs of study designed to increase IQ. He presents detailed arguments that IQ has three major components or dimensions.

1. Neural intelligence. This refers to the efficiency and precision of one's neurological system.
2. Experiential intelligence. This refers to one's accumulated knowledge and experience in different areas. It can be thought of as the accumulation of all of one's expertise.
3. Reflective intelligence. This refers to one's broad-based strategies for attacking problems, for learning, and for approaching intellectually challenging tasks. It includes attitudes that support persistence, systemization, and imagination. It includes self-monitoring and self-management.

[18] http.//otec.uoregon.education/intelligence.htm#Perkins

Moreover, there is general agreement that neural intelligence has a "use it or lose it" characteristic. It is clear that neural intelligence can be maintained and, indeed, increased, by use.

Experiential intelligence is based on years and years of accumulating knowledge and experience in both informal and formal learning environments. Such knowledge and experience can lead to a high level of expertise in one or more fields. People who live in "rich" learning environments have a significant intelligence advantage over people who grow up in less stimulating environments. Experiential intelligence can be increased by such environments.

Reflexive intelligence can be thought of as a control system that helps to make effective use of neural intelligence and experiential intelligence. A person can learn strategies that help to make more effective use of neural intelligence and experiential intelligence. The habits of mind included under reflexive intelligence can be learned and improved. Metacognition and other approaches to reflecting about one's cognitive processes can help.

In summary, it can be said that, the cognitive theories of intelligence tried to analyze and described intelligence in terms of certain fundamental cognitive processes, e.g. Cattell and Horn's theory state that intelligence is made up of two types of intelligence - fluid and crystallized intelligence. Jensen's theory of mental functioning, describes one's intelligence as composed of two types of abilities, i.e. associative abilities and conceptual abilities. Campione and Brown's theory suggests that intelligence includes a biologically based architectural system and an environmentally influenced executive system. Sternberg's theory explains the individual's cognitive or problem-solving behaviour. It outlines our

mental functioning as definite steps explaining what we do with information from time we perceive it till we finish using it to solve our problem. Gardner's theory defines intelligence as a set of abilities, talents, or mental skills that permits an individual to solve problems or fashion products that are of consequence in a particular setting. The theory provides a comprehensive view of the human cognitive structure, believes that there are eight independent types of intelligence. Carroll presented three-stratum model of cognitive ability- g factor, the seven broad abilities, and the seven specific abilities, which imply that the rank ordering of individual's task performance will not be exactly the same across all cognitive tasks, but rather will show some clustering. Perkins presents three major components or dimensions of intelligence - Neural intelligence, experiential intelligence, and Reflective intelligence.

Thus, the different conceptions of the nature of intelligence has challenged the thinking of educational psychologists, stimulating intensive study and research and have contributed to the development of a widely diversity of tasks for testing it.

1.5 BRIEF HISTORY OF INTELLIGENCE TESTING:

Among the first to investigate individual differences in mental ability was a British scientist Galton, who compared people based on their awards and accomplishments. This research convinced him that intelligence was inherited and led to further studies which involved evaluating individual differences and specificity of the senses, which have since been shown to correlate with academic success. He devised most of the simple tests and paved the way for the application of rating scale and questionnaire methods etc. One of his disciples, Pearson carried forward his work.

Cattell of America occupies a prominent position in the development of psychological testing. He used the term "mental test" in an article in 1890[19]. This article related to a series of tests which were being administered annually to college students in the efforts to determine their intellectual level. Cattell like Galton felt that a measure of intellectual function could be obtained through tests of sensory discrimination and reaction time. The early experiments of Wundt were all concerned with sensory discrimination and motor ability. His worthy pupil Cattell did much useful work in America.

To the French psychologist Binet, however, goes the credit of giving the world the first systematic intelligence tests. He and Simon found that tests of practical knowledge, memory, reasoning, vocabulary and problem solving were better predictors of school success than the sensory tests used by Galton. In 1905 Binet and his co-worker Simon, published the first scale for measurement of intelligence known as Binet - Simon scale. In 1908 Binet and Simon revised the scale, and it was the first Age-Scale which had created interests among the psychologists. The concept of Mental Age (MA) which gives a measure of the individual's level of intellectual development was formulated by Binet and Simon in 1905 and was first used in the 1908 scale. In 1916 Terman brought out the Stanford Revision of the Binet-Simon scale which is known as the Stanford-Binet Scale and popularized the term 'Intelligent Quotient' (IQ), which has since then been found to be an extremely practical concept. In 1937 and 1960, the Stanford – Binet scale was revised by Merill and Terman. With the Binet-Simon scale as the basis, various revisions have been made from time to time by workers in the fields. Some of the most important revisions

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[19] J.C. Aggarwal: *Essentials of Examination System, Evaluation, Tests & Measurement,* Vikas Publishing House Pvt. Ltd, New Delhi, 2006, p. 292.

include (a) Goddard's Revision in 1911, (b) the Point Scale of Yerkes in 1915 and (c) Burt's Revision in 1921.It is important to mention that Yerkes' scale was the first 'point scale'. Instead of giving scores in terms of mental age, it is given in terms of points in this scale.

The next development in the history of intelligence testing was the creation of a new measurement instrument by American Psychologist Wechsler. Dissatisfied with the limitations of the Stanford-Binet, he published his new intelligence test known as the Wechsler-Bellevue scale for children above 10 and adults. The scale was revised in 1955 and the new version was named as WAIS- Wechsler Adult Intelligence Scale. In 1949, he devised a scale for children known as Wechsler Intelligence Scale for Children aged 5-15. In 1967 he also developed a scale known as the Wechsler Pre-school and Primary Scale of Intelligence.

The application of intelligence tests in the field of army recruitment led to two very important developments, namely evolution of group test and performance tests. The first was born out of the urgent need for assessment of a large number of people in the shortest possible time, while the latter out of the need to find a workable and dependable tool of assessment for illiterate people and those who could not read English because of foreign origin. The two tests were developed by a group of psychologists, led by Yerkes. The most widely used of the Army Scales were the Army Alpha Test brought into use for the first time about the year 1937[20], and the Army Beta Test. The former test was for literates and the latter for illiterates. It consisted of a variety of pictures and diagram and the directions were given without the use of language. Soon after, the group tests were widely and successfully

[20] J.N. Chatterjee: "Educational Miscellany", *A Quarterly Journal of the Directorate of Education*, Vol. 1, No. 1, Tripura, p. 25.

used in the United States Army, psychologists started constructing group tests for their use in schools and colleges. The National Intelligence Test, developed by Terman and Yerkes was first used around 1920 to test school children. The Scholastic Aptitude Test (SAT) was introduced in 1926 to help colleges and universities screen prospective students.

A group of non-language tests not requiring the use of pencil and paper but rather requiring the manipulation of actual objects came to be designated as Performance Tests and work in the construction of such tests also proceeded simultaneously along with the other non-verbal tests and group tests. The Michigan Non-verbal series by Green, the Drawing Test by Goodenough and tests devised by Brown published in 1936 was followed by the Terman Group test and the Otis Self administering Test of Mental Ability.

In detailing the history of intelligence tests, it has been seen how individual intelligence tests were supplemented by group intelligence tests and how the original verbal test technique had to be expanded by new techniques depending on non-verbal. In the series of non-verbal tests techniques were developed depending either on the use of paper and pencil, or objects, or simultaneously on both. The limitations of depending on single tests for the assessment of intelligence were recognized early in the history of their application and the use of a battery of tests comprising a number of individual tests came into general practice.

Historically, in India, Christian missionaries were the first to use psychological tests. Up to 1921 the missionaries who were engaged in educational work displayed interest in the construction and validation of some well known psychological tests. Amongst the Indians, It was Rice who first attempted the standardization of Binet-Simon in Urdu and Punjabi. Kamat in the thirties adapted the 1917 version of the test in Marathi and Kannada, Shukla in

the forties developed the Gujrati version. Professor Mahalanobis was the pioneer in developing group intelligence tests in Bengali. Subsequently, we have the tests developed by Lal, Jalota and Mohsin in Hindi. The first Indian doctorate in test construction- 'group test of intelligence in Gujrati' (1954) was awarded to Desai. Bhatia Standardized for the first time a battery of performance tests for school going children. By the forties tests construction had spread rapidly all over India. Menzel himself a missionary, published the first book on 'test and measurement', in India which is still widely used by students of psychology and education as their guide towards new type of tests. Following these pioneer works, numerous translations and adaptations in Bengali, Hindustani, Tamil, Telegu, Hindi and Urdu at various Training Colleges and universities by eminent educationists have been subsequently made. The prominent institutions and organizations in the field of testing are National Council of Educational Research and Training (NCERT) New Delhi, Department of Education, Delhi University/Central Institute of Education, University of Delhi., Department of education and Psychology of Indian Universities etc.

Intelligence testing remained for long the most popular pursuit. Harper[21] observed in 1960 that in 1956, 40% of test development work in India related to intelligence. In the First Mental Measurement Handbook for India brought out by the NCERT, of the 326 tests on which abstracts and information had been provided, 100 were intelligence, 96 achievement, 60 aptitude, 45 personality, 15 interest and 10 were classified as 'miscellaneous'

Intelligence testing is not free from criticisms like, measurement experts are unable to define intelligence in a way which satisfies everyone, and it is illogical to measure

17 M.B. Buch: "Perspectives in Education", *A Journal of the Society for Educational Research and Development*, Vol. 8, No. 2, April, 1992, p. 53.

something we cannot define. IQ tests assess abilities that are too narrow and tell nothing about creativity, motivation, honesty, friendly and other human traits and characteristics. IQ tests are only achievement tests that measure what the child has already learned, rather than his innate capacity to learn. It is not unusual for an individual's IQ to show extreme fluctuation from one test administration to the next. The standardization sample fails to include all ethnic, racial, regional and socio-economic groups. IQ tests suffer from content bias that is related to inappropriate vocabulary that is not related to the purpose. Administrators do not ask for IQ scores for admission to schools and colleges or for employment purpose

Even though intelligence tests suffer from criticisms, but they are indispensable tools of modern society. Intelligence tests are intended to help in: Selection of courses and careers, classification of pupils into homogeneous groups, diagnosing the causes of educational backwardness, predicting the future progress of the individual, selection and placement of candidates, giving educational guidance and counselling, for identifying the gifted children, for identifying the degree of mental retardation, for measuring general learning readiness, and for indicating individual differences in capacities of children of same chronological age.

1.6 STATEMENT OF THE PROBLEM:

The problem of the study was stated as follows:

"*Construction and Standardization of Verbal Group Test of Intelligence in the Khasi language for School going children*".

1.7 OPERATIONAL DEFINITIONS OF THE TERMS USED:

The terms used in the title of the study were operationally defined as follows:

(i). *Intelligence*: "Intelligence is a general intellectual capacity which consists of the abilities: to reason well with abstract materials, to comprehend well, to have a clear direction of thought, to relate thinking with the attainment of a desirable end.

(ii). *Intelligence Test*: "Intelligence test is a standardized instrument which measures general mental abilities of an individual."

(iii). *Construction:* "Construction of a test means writing of items and selection of items by means of items analysis".

(iv). *Standardization*: "Standardization means preparing the uniform procedures in administering and scoring the test and establishing its reliability, validity and norms".

1.8 OBJECTIVES OF THE STUDY:

The objectives of the study were as follows:

1. To construct a verbal group test of intelligence in the Khasi language for school going children of the age group 14 to 16+.
2. To standardize the test by establishing its reliability and validity.
3. To set up norms for the test
4. To develop a test manual
5. To study the level of intelligence of the Khasi children (age-wise) as obtained by the intelligence test constructed by the investigator.

1.9 DELIMITATION OF THE STUDY:

The study was delimited in the following ways:

1 The sample of the population is restricted only to the Khasi speaking school-going children of four districts of the state of Meghalaya viz.: East Khasi Hills, West Khasi Hills, Jaintia Hills and Ri-Bhoi District.

2 The test instrument is limited only to measure the intelligence of the Khasi students belonging to the age-group 14 to 16 + years studying in classes VIII to X.

3 The test items and instructions in the manual are prepared in the Khasi language. However, English version is also made available for the purpose of references only.

1.10 SCOPE OF THE STUDY:

Every educational institution needs standardized tests for effective identification, classification, and placement of its students and workers. It is true that almost all societies have their own standardized tests reflecting their own culture and language. As of now, there is no intelligence test available in the Khasi language, so the present study will serve the long felt need of the Khasi society of having its own verbal group test of intelligence in Khasi language reflecting the Khasi's culture. The test will be of great help to the state administrators, educational researchers and teachers to assess the intelligence of the school going children of the state of Meghalaya. It will help them in selection and placement of candidates, classification and grouping of students according to their abilities and providing guidance services.

The test will also be of immense use for the Degree Honours students, the B.Ed., M.Ed. students and research scholars to collect information on the level of intelligence of

the Khasi speaking students of the state. This will be a great help to them to get the correct information. The test can also be used by research workers as external criteria to validate another test.

CHAPTER – II

REVIEW OF RELATED LITERATURE

2.1 : Studies Conducted abroad

2.2 : Studies conducted in India

2.3 : General conclusion of researches

2.4 : The present study.

CHAPTER – II

REVIEW OF RELATED LITERATURE

Any scientific investigation starts with a review of the literature. The main objective of a review of the literature is to have an understanding of the trends of research in the field and about the gaps in research if any. Therefore, this chapter devoted to achieve the aforesaid objective by highlighting the related studies conducted in India and abroad; its general conclusion and present study.

2.1 STUDIES CONDUCTED ABROAD:

Binet (1857-1911): In the beginning of the present century, a very important step in the development of the Individual Intelligence *Tests* was taken by Alfred Binet who established in France the first psychological laboratory in 1889. Working with Simon a physician, Binet developed an intelligence test for diagnosing slow learners and mentally retarded children in Paris Schools. The test is known as Binet - Simon scale, first published in 1905. The test consisted of 30 items which were arranged in ascending order of difficulty. The difficulty level was determined empirically by administering the test to 50 normal children aged 3 to 11 years and to some retarded children and adults. The test was designed to cover a wide variety of functions, with special emphasis on judgement, comprehension and reasoning, which Binet regarded as essential components of intelligence. In1908 Binet

and Simon revised the scale, and it was the first Age-scale which had created interests among the psychologists. Binet and Simon further revised the scale in 1911 in which the age-range was extended from three years to adult level. The first important revision of the Binet-Simon was done by Terman and his associates at Stanford University in1916 and was known as Stanford-Binet scale. The test included 90 items with many changes and modifications and was restandardized on an American sample of 1400 in which 1000 were children and 400 were adults. The most important aspect of this revision was the concept of I.Q., which for the first time introduced in a psychological test. In 1937 Terman along with Merrill did the second revision of the 1916 Stanford-Binet scale and commonly known as 1937 Binet. This revision comprised of two equivalent forms-L and M. The third revision of the Stanford-Binet scale was done again in 1960; and is known as L-M form, incorporating the best items from the 1937 revision. The items were grouped into different age levels of 3 to 8 years, average adults and superior adults. In the year 1972 the scale has been re-standardized on a sample of 2,100 cases. Norms were derived from three new samples. This edition retained most of the advantages of the earlier editions which reflects intervening developments in both theoretical conceptualizations of intellectual functions and methodology of test construction. This edition is designed for use from the age two to the adult level. The fourth edition, sometimes referred to as Stanford Binet Fourth Edition was released in 1986. The test population consisted of over 5,000 people between the ages of 2years to 23 years 11 months. It differs from the earlier versions of the test because it gives sub test scores in the four areas as well as a single composite IQ score.[1]

[1] http:www.answers.com/topics/intelligence/personality research.org/

Wechsler Scales (1939)[2]: Wechsler developed a scale known as Wechsler-Bellevue scale for children above 10 and adults. The scale consists of ten subtests of which five were verbal and five were non-verbal tests or performance test. In 1955 the Wechsler Bellevue scale was revised and renamed as the Wechsler Adult Intelligence Scale or WAIS, which consisted of eleven subtests- six were verbal and five were non-verbal or performance scales. The scale was standardized on the sample of 1700 individuals; age levels 16 to 64. Raw scores on each subtest are transformed into a normalized standard score with a mean of 10 and SD of 3 and thus, each subtest score becomes directly comparable. The test yields a separate IQ for the verbal test by adding these scale or standard scores on all the six subtests and a separate IQ for the performance tests by adding scores on all the five subtests. A Full score scale is obtained by adding the scaled score on all the 11 subtests and on the basis of the Full scale score, the Full scale IQ is computed. Subsequently, these standard scores are expressed in the form of the Deviation IQ with a mean of 100 and SD of 15. The purpose of expressing the scores in the form of DIQ is to know the extent to which the scaled or standard scores deviate from the mean of the examinee's own age group. The manual (73)[3]Freeman reports split-half reliability coefficients and standard error of measurement based upon results obtained with three groups 18-19, 25-34 and 45-54. There are only slight differences between coefficients found for each group. The reliability coefficients for the three types of IQ are highly satisfactory. Their standard errors of measurement, furthermore, indicate high "absolute" reliability.

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[2] F.S. Freeman: *Psychological Testing*, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, 1962.
[3] *Ibid.* p. 251.

In 1949, Wechsler developed a test known as the Wechsler intelligence scale for children aged 5-15 or WISC. The WISC is very similar to the WAIS except that the items have been remodelled to suit the children's interest. It comprises of 12 subtests, of which two are used as alternative or supplementary tests provided time permits. Like the WAIS the subtests are grouped into 6 verbal scales and 6 performance scale. The WISC is scored as the WAIS. The raw score for each subtest is determined and subsequently, each is transformed into a normalized standard score with a mean of 10 and SD of 3. After that, standard scores for the verbal subtests and performance subtests are added separately and for both the verbal and performance subtests separately. Then three sets of standard scores are converted into the Deviation IQ with a mean of 100 and SD of 15 to yield verbal IQ, Performance IQ and Full Scale IQ.

In 1967 Wechsler has also developed a scale known as the Wechsler Preschool and Primary scale of intelligence, WPPSI to measure the intelligence of the children aged 4-$6^1/_2$ years. The WPPSI items are similar to WISC. The scale has 11 subtests of which 6 are verbal scales and 5 are performance scales. The method of computing IQ is similar to WISC. Raw scores on each subtest are first converted into standard scores with a mean of 10 and SD of 3. The sum off the standard scores for verbal, performance and full scale is calculated and then transformed into the Deviation IQ with a mean of 100 and SD of 15.

In 1974 the revised edition WISC-R was published designed for 6-16 years old. The current versions published under the name of Wechsler after his death are- the Wechsler Adult Intelligence Scale-Revised 1981 age span 16-74, the Wechsler Intelligence Scale for Children-third edition 1991 age groups 6-16 years and 11 months, and the Wechsler Preschool and Primary Scale of Intelligence-Revised 1989 age group 3-7 years and 3 months. The fourth

edition of the WAIS-IV was released in 2008 by Pearson[4]. It composed of 10 core subtests and five supplemental subtests, with the 10 core subtests comprising the Full Scale IQ. It was standardized on a sample of 2,200 people in the U.S. ranging in age from 16-90. An extension of the standardization has been conducted with 688 Canadians in the same age range. The median of Full Scale IQ is centered at 100, with a SD of 15. In a normal distribution, the IQ range of one SD above and below the mean (i.e between 85 and 115) is where approximately 68% of all adults would fall.

Cattell (1930)[5] constructed and standardized the group and individual intelligence test for children of the age 2 months -30 months. The objective of the test was to measure individual intelligence in a manner designed to reduce, as much as possible, the influence of verbal fluency, cultural climate and educational level. The reliability of the test was calculated by odd-even number method and corrected by Spearman Brown formula. Coefficient ranged from a low of 0.56± 0.05 at the age of three months, to a high of 0.90± 0.01 at 18 months. The median coefficient was 0.86 ± .02.

In 1960, Cattell devised the test in format of scale 1, 2 & 3 designed in form A & B. The scale is meant for children of 4-8 years and scale 2 & 3 are for adults. The reliability of the test in full form (A & B) and in short form (A) for scale 2 was estimated by applying three methods of consistency over items, consistency over parts and consistency over tomes on different on different samples. The reliability coefficient of correlation of scales 2 in full form (A & B) was found to be 0.87, 0.80 and 0.84 and in short form (A) was found to be 0.76, 0.67 and 0.73 respectively. The reliability coefficients of correlation of scales 3 in full

[4] http://en.wikipedia.org/
[5] F.S. Freeman: *Psychological Testing*, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, 1962, p. 307.

form (A & B) were found to be 0.85, 0.82 and 0.82 and in short forms (A) were 0.74, 0.70 and 0.69 respectively. The validity of the test was studied by the methods of concept validity and concrete validity. The validity coefficient of correlations of scale 2 in full form (A & B) was found to be 0.85 and 0.77 and in short forms (A) were 0.81 and 0.70 respectively. The validity coefficients of correlations of scale 3 in full form (A & B) were found to be 0.92 and 0.69 and in short forms (A) were 0.85 and 0.66 respectively.

Raven (1936)[6] developed a Standardized Progressive Matrices Scale. It is a non-verbal test and was devised to measure 'immediate capacities for observation and clear thinking' with the help of figures. The scale has been revised many times. There are 60 problems grouped under 5 sets, arranged in progressive order of difficulties. The scale measures the whole range of intellectual development from early childhood to adulthood. The scale can be applied to any age group and individually as well to groups. The scale was standardized on a sample of 6 to 65 years of age. The test-retest reliability varies from 0.83 to 0.93. It correlates 0.86 with Terman-Merrill Scale. It has a 'g' saturation of 0.82.

Thurstone (1938)[7] developed the Primary Mental Abilities (PMA) tests and published by American Council of Education. The tests were designed in two forms-Chicago long (two hours) and short form (45 minutes).The test were constructed for use primarily at the high school level. The battery of tests consists of 11 tests, selected from the 60 tests tried out experimentally on 1154 pupils after using factor analysis. A second experimental battery of 21 tests was tried out on 437 subjects and factorially analyzed. These 11 tests measure six primary mental abilities – (i) Verbal reasoning, (ii) Special

[6] K.G. Rastogi: *Educational Psychology,* Rastogi Publication, Meerut, 1983, p. 396.
[7] S.A Sharma: *Essentials of Measurement in Education & Psychology,* Surya Publication, 2003, p. 432.

abilities, (iii) Number ability, (iv) Memory ability, (v) Reasoning and (vi) Word fluency. These have been arranged in booklets which can be administered in school periods. The validity coefficient of the test was estimated by correlating with university examination grades. Traxler (1941)[8] ascertained that the reliabilities of the original PMA tests were high, estimating by both split-half and test-re-test techniques. The inter-correlation of the tests was reported 0.20 to 0.90, the mean being 0.49

Goodenough-Harris Drawing Test (1963)[9] made a revision of the good enough Draw-a Man Test, together with a similar Draw-a Woman and an experimental Self-Drawing scale. The man and woman figures that the examinee is instructed to draw are scored for bodily and clothing details, proportionality among the various body parts (e.g. head to trunk), and other characteristics, rather than according to artistic merit. The test is untimed but usually takes from 10 to 15 minutes to complete. Norms for children from age 3 to 15 years are reported as standard scores and percentile ranks, separately for boys and girls.

Kuhlman and Anderson (1963)[10] developed an intelligence test for children age group KG to grade 12 levels. The test is in verbal and non-verbal form. Each level takes 50 to 70 minutes to administer. Different norms of cognitive skills quotient, standard scores, percentile and Stanine scale from different grade and age were established on the verbal and non-verbal.

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[8] *Ibid.*, pp. 432-435.
[9] R.A. Lewis: *Psychological Testing and Assessment,* Allyn and Bacon, Inc., 1971, p. 175.
[10] *Ibid.*, p. 172.

Otis and Lennur (1967)[11] developed the Mental Ability Tests on review of certain tests in the Otis Services, the Otis Self Administer Tests of Mental Ability and the Otis Quick Scoring Mental ability Test. The test was therefore, known as Otis-Lennon Mental Ability. The tests composed of a variety of items to measure the general mental ability. The six levels of the tests extend from Primary I (last half of kindergarten) through advanced grades (10-12). Testing time varies from 30 to 45 minutes, depending on the level. The norms, which are based on a national, sample 200,000 pupils, are expressed as mental ages, deviation IQs, percentile ranks and Stanine by age and grade.

Bayley (1969)[12] published a well constructed test for the earliest age levels, known as the Bayley Scales of Infant Development and now available in its second edition (Bayley-II – Bayley, 1993)[13].The Bayley-II Scales provide three complimentary tools for assessing the developmental status of children between the ages of 1 month and $3^1/_2$ years: the Mental Scale, the Motor Scale and the Behaviour Rating Scale. The Mental Scale samples such functions as sensory and perceptual acuities, memory, learning, problem-solving, and vocalization, the beginning of verbal communication and rudimentary abstract thinking. The Motor Scales provide measures of gross motor abilities such as sitting, standing, walking and stair climbing, as well as manipulatory skills of hands and figures; items that assess sensory and perceptual-motor integration are also included. The Behaviour Rating Scale is designed to assess various aspects of personality development such as emotional and social behaviour, attention span and arousal, persistence and goal directedness. It has a 5 point scoring system for each item and descriptors specific to the behaviour being rated. The

[11] *Ibid.*, p. 172.
[12] A. Annastasi, & S. Urbina: *Psychological Testing,* Pearson Education; 2004, New Delhi, p. 237.
[13] *Ibid.*, p. 237.

Behaviour Rating Scale, which is completed by the examiner after the other two parts have been administered, is based on information obtained from the child's caregiver as well on the examiner's own impression. Norms were established on 1,700 children, including 50 females and 50 males in each of 17 age groups between the ages of 1 and 42 months only normal children were considered for the sample. The Mental and Motor Scales yield separate developmental indices, expressed as normalized standard scores with a mean of 100 and SD of 15. These indices are found within the child's own age-group, classified in 1 month intervals up to 36 months and in 3 months interval thereafter. The Behaviour Rating Scale yields percentile rank scores that are, in turn, categorized as 'Non-Optimal', 'Questionable' or 'Within Normal Limits'.

Mc Carthy (1972)[14] developed a scale of children abilities known as the Mc Carthy Scales of Children Abilities (MSCA) suitable for children between the ages of $2^1/_2$ and $8^1/_2$ years. It consists of 18 tests, giving the examiner multiple opportunities to observe the child's approach to a variety of problems and stimuli. The tests are grouped into six overlapping scales: Verbal, Perceptual-Performance, Quantitative, General Cognitive, Memory and Motor. The General Cognitive score, based on 15 of the 18 tests in the battery, comes closest to the traditional global measure of intellectual development. This General Cognitive Index (GCI) is a normalized standard score, reported in the same units as traditional IQs (with a mean of 100 and SD of 16) and found within each 3-months age group. In the development of the MSCA the term IQ was deliberately avoided because of its many misleading connotations. The GCI is described as an index of the child's functioning

[14] *Ibid.*, pp. 239-240.

at the time testing, with no implications of immutability. Scores on the 5 additional scales are based on the same age groups and have a mean of 50 and SD of 10.

Henmon-Nelson (1973)[15] the Henmon-Nelson Tests of Mental Ability was devised by Henmon and Nelson. The tests cover four grade-levels: grades 3 through 6, 6 through 9 and 9 through 12 (Form I) and Kindergarten through grade 2 (Primary Battery). A college-level edition of the tests is also available. Each of the three levels of Form I consists of 90 items arranged in spiral-omnibus format, including items on scrambled words, verbal analogies, verbal classification, verbal inference, number series, arithmetic reasoning, figure analogies and following directions. Testing time for Form I is 30 minutes. The norms, which are based on a random sample of 35,000 pupils tested in 1972, are expressed as deviation IQs, Stanine and percentile ranks by grade level. The Primary Battery test is untimed but usually takes 25 to 30 minutes. It is composed of three subtests: a listening test of thirty general information items, a picture vocabulary test of thirty-five items and number test of twenty-three items. The Primary battery was standardized on 5,000 pupils. Scores are expressed as deviation IQs, Stanine and percentile ranks by grade level.

Mc Crow (1981)[16] developed a California Test of Cognitive Skills (TCS), a successor to the well known California Short Form Test of Mental Maturity and the Short Form Test of academic Aptitude. The test composed of four subtests: Sequences, Analogies, Memory and Verbal Reasoning- at five grade levels (2-3,3-5,5-7,7-9,9-12). In addition to age or grade percentile rank, Stanine and standard score norms for each subtest, the combined scores on all four subtests may be converted to a Cognitive Skills Index (CSI).

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[15] R.A. Lewis: *Psychological Testing and Assessment,* Allyn & Bacon, London, 1976, p. 172.
[16] *Ibid.*, p. 173.

Scores on the test may also be used in combination with scores on the Comprehensive Tests of Basic Skills (CTBS-U and V) or the California Achievement Tests (CAT & D) to determine anticipated achievement at successive elementary and high school levels.

Thorndike & Hagen (1982)[17] devised a Cognitive Abilities Test (CAT) for primary levels. The test consists of a Primary Battery for kindergarten through grade 3 and a Multilevel Edition (A-H) for grades 3 through 12. The Primary Battery was designed to assess cognitive development on primary school by use of pictorial materials and oral directions. There are two levels, Primary I (kindergarten to grade 2) and Primary II (grades 2-3), with two forms at each level. The four subtests at each level - oral vocabulary, relational concepts, multi-mental (one that does not belong to the others), and quantitative concepts - take 12 to 16 minutes each and are administered in four separate sessions. New national norms (deviation IQs, percentile ranks, Stanine scores) were obtained.

Kaufman & Kaufman (1983)[18] developed the Kaufman Assessment Battery for Children (K-ABC) designed primarily to access the abilities of children. The K-ABC was standardized on a national sample of 2,000 children aged $2^1/_2$ to $12^1/_2$. Additional groups of Black and White children were tested to develop socio-cultural norms for race and parental education that may be used as a supplementary interpretive aid. The design and organization of the K-ABC was also intended to accommodate the testing needs of special groups and to aid in the diagnosis of learning disabilities. The battery yields four global scores: Sequential Processing, Simultaneous Processing, Mental Processing Composite (combining the two) and Achievement. Each of these is a standard score with a mean of 100 and an SD of 15.

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[17] *Ibid.*, p. 173.

[18] A. Annatasi & S. Urbina: *Psychological Testing,* Pearson Education; Delhi, 2004, p. 223.

In1990[19] the Kaufman Brief Intelligence Test (K-BIT) was developed by Kaufman & Kaufman. It was designed as a quick screening instrument to estimate the level of intellectual functioning. The K-BIT covers the age range of 4 to 90 years. The scale was standardized on a sample of 2,000 cases. The test consists of one verbal subtest of 45 Expressive Vocabulary items and 37 Definitions and one non-verbal subtest of 48 Matrices. The three scores (verbal, nonverbal and composite) yielded are expressed in terms of deviation IQ units, as are those of other Kaufman scales. Reliability of the test with other tests was estimated. Norms were also established.

In 1993[20] the Kaufman Adolescent and Adult Intelligence Test (KAIT) was devised by Kaufman & Kaufman. The KAIT was designed as a measure of intelligence for ages 11 to 85 years or older. It represents an attempt to integrate the theory of fluid and crystallized intelligence articulated by Horn and Cattell with notions about adult intelligence proposed by other theorists. The battery is composed of a Crystallized Scale, which measures concepts acquired from schooling and acculturation, and a Fluid Scale, which taps the ability to solve new problems. The core battery consists of three subtests from each scale. An expanded Battery, intended for use with individual suspected of neurological damage, can also be employed by adding any of four specified subtests. The KAIT also includes a brief Mental Status test to assess attention and orientation in examinees that are too cognitively to take the full battery.

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[19] *Ibid.*, p. 225.
[20] *Ibid.*, p. 225.

Hashmi (2000)[21] constructed and standardized an Intelligence Test in Urdu for the middle level students of classes VI –VII of the age group 11+ to 12 +. The test was administered on a sample of 12,120 students taken from the schools of Bahawalpur, D.G. Khan, Multan and Sargodha divisions. The test contained of 10 sub-tests. To find the reliability of the test K-R formula, K-R 20 and K-R 21 for class VI & VII were used. Coefficient of correlation was computed for internal reliability of the test. Thurstone Model of Multiple Factor Theory of Intelligence was used.

Hussain (2001)[22] constructed and standardization a verbal group test of intelligence in Urdu for adolescent's age group 17 – 20 years. The test comprised of 128 multiple choice items was standardized on 1080 candidates of PMA Long Course centre, Rawalpindi. The reliability of the test was determined by Kuder Richardson Method, Split-half and test-re test method. The result suggests high reliability of the test. The validity of test was established and evidenced of high validity of the test.

Khan (2006)[23] constructed and standardized Verbal Group Test of Intelligence for the students of age group 14 to 16 years. The final test consists of 60 items of 4 subtests: analogies, series (number & alphabetical), classification and word building. The test was administered on a sample of 10,000 children of the Province of Punjab and Islamabad. The reliability of test was explored by using split-half and K-R methods. The values of

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[21] M.A. Hashmi: "Standardization of an intelligence test for the middle level students", *Ph.D. Thesis*, Bahauddin Zakariya University, Multan, 2000.

[22] S.S. Hussain: "Development, validation and standardization of a group verbal intelligence test in Urdu for adolescents", *Ph.D* Thesis, National Institute of Psychology, Quaid-I-Azam University, Islamabad, 2001.

[23] Mahammud Khan: "Construction and Standardization of a Verbal Group Test of Intelligence for the Age Group 14 to 16 Years", *Ph.D Thesis*, University of Arid Agriculture, Rawalpandi; 2006.

correlations of all parts were 0.44, 0.39, 0.43 and 0.48 respectively. The different parts of the values were from 0.68 to 0.96. The mean and SD of the whole test were worked out.

2.2 STUDIES CONDUCTED IN INDIA:

There has been a marked trend in the number of studies in test construction in India during the past twenty-five years, and the first Indian doctorate in this area was awarded to Desai (1954). In the present study the abstracts of related studies have been categorized in four categories, such: (a). Verbal group tests of intelligence, (b). Non-verbal group tests of intelligence, ©. Performance tests of intelligence, and (d) Adaptation of foreign tests.

(a) Verbal Group Tests of Intelligence:

Jalota (1952)[24] standardized a Verbal Group Test of Intelligence in Hindi. The test has been standardized on high school students of Allahabad in U.P. It consists of 100 items which covers such areas as vocabulary, information, number sequence, analogy, classification, best answer, coding etc. The test has been used in many studies covering children from Hindi speaking states.

Desai (1954)[25] constructed and standardized a Battery or Group Test of Intelligence in Gujarati for the students of 12 to 18 years studying in standard VII to XI of secondary schools. The test was standardized on a sample of 4755 boys and 4770 girls from various classes of Gujarati medium schools. The test re-test reliability coefficient of the test was .77 and split-half was .94. Age-wise and grade-wise distribution was worked out. The

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[24] K.G. Rastogi: *Educational Psychology,* Rastogi Publication, Meerut, 1983, p. 398.

[25] M.B Buch: *First Survey of Research in Education,* Centre of Advanced Study in Education, M.S. University, Baroda, 1974, p. 213.

correlation coefficient of IQs with examination marks was .42, with teacher's estimate .53 and with Shukla's adaptation of the Stanford-Binet Intelligence scale was .82.

Pillai (1955)[26] constructed a General Mental Ability Test in Malayalam for school children. The test was standardized on a sample of 2000 students of the upper, middle and lower social strata representing Malayalam speaking children. The test consists of seven subtests yielding separate scores.

Mehta (1958)[27] revised his own test of intelligence in Hindi and standardized it with Rajasthani School going children age range 12 to 14 years. Its split-half reliability coefficient was .93 and that by K-R formula was .91. The correlation coefficient of test scores with school marks was .44

The Central Institute of Education (CIE) Delhi (1959)[28] developed and published a Verbal Group Test of Intelligence in Hindi. The test is intended to measure verbal intelligence of 13 years old school children of Delhi coming from Class VIII and above. The final version of the test consists of 85 items grouped under 12 subtests and was standardized on 1214 sample including 633 boys and 581 girls. The validity of the test was assessed on a sample of 174 in two ways: correlation of test score with teacher's estimate of children's intelligence (r =.60), and with the score on a Hindi-translated version of a Non-verbal test of intelligence (r = .71). The reliability is established in two ways: split=half reliability (r =.94) based on odd-even items and test re-test reliability (r =.87).

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[26] *Ibid.*, p. 214.
[27] *Ibid.*, p. 214.
[28] NCERT: *Indian Mental Measurement Handbook,* New Delhi, 1991, p. 117.

Kapat (1960)[29] constructed a Group test of intelligence in Bengali for children of grade V- VII. The test consists of 75 items: 40 non-verbal and 35 verbal. The test included five subtests yielding separate scores. The split-half reliability coefficient for different subtests ranged between .76 to .80 and that of the entire battery was found to be .90. The validity coefficient of the test ranged from 0.32 to 0.70. Separate grade and percentile norms were established.

Pandey (1961)[30] constructed and standardized a Group test of intelligence in Nepali for children of class VIII to X. The test was standardized on 2694 students of Nepali speaking children representing different social strata of Nepal. The reliability coefficient of the test with K-R formula 21 was ranging between 0.83 and 0.89 for different classes. The 'g' factor loading on various elements of the test ranged between 0.54 to 0.74.

Pathak (1961)[31] constructed a Group test of intelligence in Marathi for the age group 9 to 13 years. The test was standardized on a sample of 10738 students of Bombay, Puna, Ratnagiry, Thane and Surat schools. The reliability of the test with test re-test was 0.89 and the validity of the test against Kamat's test was 0.74

Joshi (1961)[32] developed a Group test of intelligence in Hindi for school and college going students. His test format was verbal omnibus spiral group point scale. The test was standardized on students of grades VIII to XII. The reliability coefficients ranged from .81 to .86 for different class levels and all the seven sub-tests were found to be highly saturated with 'g'.

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[29] M.B. Buch: *First Survey of Research in Education,* Centre of Advanced Study in Education, M.S. University, Baroda, 1974, p. 214.

[30] *Ibid.*, p. 214.

[31] *Ibid.*, p. 214.

[32] *Ibid.*, p. 214.

Bhatt (1962)[33] designed his scale for Gujarati children of standard V to VII belonging to urban, semi-urban and rural cultures. The test was partly verbal and partly non-verbal and was standardized on a sample of 5173 boys and 4649 girls drawn from 58 schools representing urban, semi-urban and rural schools in Gujarat. The reliability coefficient of the test was computed by K-R formula, split-half method, Gauttman's formula and Rulon's formula and it ranged from .91 to .98. The correlation of this test with Desai's Group Test of Intelligence was .88 and with Shukla's adaptation of the Stanford Binet Intelligence scale was .82 and with Joshi's Group Test of General Mental Ability was .68.

Hundal and Singh (1963)[34] devised their scale for Punjabi speaking children. The scale was administered on a random sample of 1882 student of age group 13 to 17 years selected from the schools in the Punjabi speaking areas of Panjab. The tests re-test reliability coefficients for different grades ranged from .87 to .90 and the validity coefficient against academic achievement was .83. Singh's group test of general mental ability was mainly on adaptation of the Jalota's General Mental Ability Test in Hindi. Out of seven subtests, five were taken from Jalota's scale and only few were developed fresh. The test was standardized on a sample of 2985 school going students of classes VIII to X of schools in Punjab. The split-half reliability coefficient was .93 and correlation coefficient with school marks varied from .41 to .50 for different subjects.

Agnihotri (1965)[35] constructed and standardized a Verbal group test of intelligence in Hindi for the age group 11+ in Madhya Pradesh. The test consists of 100 items in nine subtests and was standardized on 2000 students of 57 schools. The reliability coefficients

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[33] *Ibid.*, p. 213.
[34] *Ibid.*, p. 214.
[35] M.B. Buch: *Third Survey of Research in Education*, NCERT, New Delhi, 1987 p. 474.

worked out by using K-R formula was .94. The validity was established by correlating the test scores with the class teacher's rating on a five point scale; the validity coefficient was 0.63. Norms were prepared on the basis of Age allowances method. The time required for administration of the test was 45 minutes.

Patel (1966)[36] constructed an intelligence test contained Verbal and as well as Figural items covering reasoning, perceptual memory, numerical and spatial relations aspects of intelligence. The test was standardized on a sample of students in the age range 13 to 16 studying in grades VIII to XI of schools in Gujarat. The reliability coefficient of the test by test re-test was .87 and by split-half was .99. The validity coefficients with other test of intelligence in Gujarati and examination marks ranged between .68 to .80.

Kaul (1966)[37] developed a Group test of intelligence in Urdu for the age group of 12 + to 16 + in Kashmir. The test was standardized on a sample of 5872 pupils of 31 schools of three districts in Kashmir. The split-half reliability coefficient of the test was .94 and by test re-test method .90 The correlation coefficient of the test score with teacher's estimate was .52 and that with the Raven's Progressive Matrices .77.

Ahuja (1966) & Ahuja (1969)[38] constructed a Group test of intelligence in English for Bombay children in age group of 13 to 17 and 9 to 13 years respectively. The Ahuja (1966) test was standardized on 10132 children drawn from 53 schools on the stratified random basis. Age and grade norms were worked out and deviation IQs were computed. The test re-test and split-half reliability coefficients were .84 and .97 respectively. Correlation

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[36] M.B. Buch: *First Survey of Research in Education*, Centre of Advanced Study in Education, M.S. University, Baroda, 1974, p. 213.

[37] *Ibid.*, p. 214.

[38] *Ibid.*, p. 214.

coefficient of the test with the school marks was .53, with teacher's judgement .61 and with other intelligence tests; it varied from .55 to .80. The Ahuja (1969) scale was administered to 10373 students, randomly selected from 53 English medium schools of Greater Bombay. Age norms and grade norms were worked out separately for boys and girls. The reliability coefficient by test re-test and split-half techniques were found to be .85 and .94 respectively. The validity coefficients against examination marks and teacher's judgement were .49 each, with Nafde's non-verbal Test was.56 and against the Ahuja's Group Test of intelligence (1966) was .73

Oak (1967)[39] constructed and standardized an Omnibus self administering battery of group test of intelligence. The final form of a test consists of 95 items arranged in an omnibus spiral form. The test was administered to 4350 boys and 3596 girls of classes VII to XI age group 11+ selected randomly from 18 schools of Bombay city. The stability and internal consistency coefficients were found to vary from 0.84 to 0.93 and 0.88 to 0.94 respectively. Validity coefficient against teacher's judgement and annual examination marks for each school separately (predictive Validity) were found sufficiently high. The test scores were also correlated with the Otis Advanced Examination (r=0.65), the Army Alpha Test (r=0.82), the Desai's Intelligence Test in Gujrati (r=0.82) and the Nafde's Non-verbal Test of Intelligence (r=0.51).

Bora (1969)[40] developed an Omnibus type verbal group test of intelligence in Assamese for pupils of classes VII to X of schools in Assam. The test items were based on foreign tests like the Otis Group Test of intelligence, the Pressey Group Point, the Army

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[39] *Ibid.*, p. 244.
[40] *Ibid.*, p. 213.

Alpha Test, the Terman Group Test of intelligence and the Thorndike Intelligence Examination. The test was administered on 1193 girls and 2028 boys of Greater Guahati areas. The test re-test reliability coefficient was 0.94 and by K-R formula 20 was 0.89. The split-half reliability coefficient varied from 0.91 to 0.96 for different classes. The coefficient correlation of scores on the test with Hermon-Nelson Tests of Mental Ability, Grade 9-12, Form A, 1957' was 0.73

Patel (1970)[41] constructed and standardized Verbal group test in Gujarati for children of 14 + to 16 + years of age. The test consists of only verbal items related to series, analogy, synthesis and classification functions. The test was standardized on a sample of 4471 students. The test re-test, split-half, K-R and various other methods were applied to estimate the reliability of the test which varied between 0.82 and 0.97. The validity of the test with school marks was 0.54.

Shah (1975)[42] constructed and standardized an Omnibus test of intelligence for Gujarati speaking children of Greater Bombay between the age group 13 + to 16+. The final form of the test was administered to 4640 students of standard VIII and IX. The reliability coefficient obtained ranged from .77 to .88 for different groups. The validity of the test was established against Desai's group Test of Intelligence, a Scholastic Aptitude Test and a Non-verbal Test of intelligence.

Pillai (1978)[43] constructed and standardized a Verbal test of Intelligence in Tamil for the age group 10+ to 15+. The test was standardized on a sample of 5,000 pupils selected from thirty-four schools; using stratified proportionate sampling. The test included seven

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[41] *Ibid.*, p. 248.
[42] M.B. Buch: *Third Survey of Research in Education,* NCERT, New Delhi. 1978, p. 500.
[43] *Ibid.*, p. 500.

subtests: synonym, antonym, analogy, classification, mixed words, reasoning (verbal) and reasoning (numerical). On the whole there were 110 test items. The test re-test reliability was found to be 0.84 and the split-half reliability was 0.88. The content validity was considered on the basis of various types of behaviour assessed by the subtests. Norms were determined in respect of the total sample, grades and age groups.

Thakur (1979)[44] constructed and standardized a Verbal Group Test of Intelligence in Assamese for students reading in classes V to VIII on Assamese medium of high and higher secondary schools of Upper Assam. The test consists of seven subtests- logical selection, analogies, number series, synonyms-antonyms, proverbs, classifications and best answers. The final version of the test was administered to 3,039 boys and 2,243 girls adopted a stratified sampling technique. The reliability coefficients obtained by test re-test, split-half and rational equivalence methods for the entire sample and for the different classes of boys and girls separately were found to range from 0.89 to 0.97. The validity coefficients ranged between 0.87 to 0.97. The 'g' saturation obtained for all the seven subtests ranged from 0.39 to 0.90

Patel (1981)[45] constructed and standardized a General ability test for standards XI and XII for Gujarati speaking students of higher secondary schools of Gujarat state. The test consists of two parts. Part One tested the student's familiarity with the world around him through his experience in home, school and community. There were test questions in various fields of Indian culture, science, social science, community affairs and arts. Part Two avoided any culture content. It presented geometry drawings designed to test the student's

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[44] *Ibid.*, p. 508.
[45] *Ibid.*, p. 498.

power of abstract reasoning. This part of the test presented an equal challenge to all students regardless of their cultural background. The standardization sample consisted of 5,725 students studying in the higher secondary schools of Gujarat state. The coefficient of reliability ranged between 0.71 and 0.87 by different methods. The validity coefficients of the test with other tests of intelligence were 0.68 and 0.79. Factor loadings revealed that the test was heavily loaded with 'g' factor. Age norms and grade norms were established and deviation IQs and percentiles for the test were computed.

Bhatt (1981)[46] constructed and standardized a Verbal Reasoning test for the students studying in grades VIII to IX of secondary schools in Saurashtra, Gujarat. The test was standardized on the sample of 5,449 students selected from sixty-six schools of sixty-six different places of Saurashtra region by the stratified random sampling technique. The items were constructed on the lines of the DAT. The final form of the test consists of sixty items. Descriptive statistics like central tendencies, SD and skewness were worked out. Percentile scores, standard scores, T-scores and Stanine were developed. Reliability was established by test re-test, split half and Kuder Richardson formulas 20 and 21. The reliability coefficients were 0.82, 0.93, 0.91, and 0.82 respectively, validity of the test was established by correlation with intelligence tests, aptitude tests like abstract reasoning, numerical ability and verbal reasoning.

Shah (1981)[47] constructed and standardized a Verbal Reasoning test for the students of standard VI and VII in Saurashtra. The final test was administered to 9,382 students of 200 schools. The reliability of the test was established by test re-test, Rulon formula, K-R

[46] *Ibid.*, p. 477.
[47] *Ibid.*, p. 502.

and Flanagan formula. The reliability coefficients of correlations were found to be 0.88, 0.89, 0.86, 0.92 and o.84. The three types of validity established were construct validity (0.72 and 0.52), concurrent validity (0.88 and 0.80) and predictive validity range from (0.22 to 0.36).

Rathor (1983)[48] constructed and standardized a Group Test of Intelligence (verbal & non-verbal) in Oriya for the children of age group 8+ to 12+. The verbal form of the test contained seven parts namely, general information, arithmetic problems, logical reasoning, verbal comprehension numerical series, verbal relations and vocabulary. The non-verbal form included seven components like similarities, figure analogies, seeing the opposites, classification, progressive series, story sequences and matrices. For standardization of a sample of 2500 students studying in classes IV to VIII of Orissa state were taken. The split-half reliability of the test varied from 0.84 to 0.94 in the verbal test and 0.78 to 0.83 in the non-verbal test for different age groups. The K-R 21 reliability coefficient ranged from 0.80 to 0.91 for the verbal test and from 0.79 to 0.88 for different age group students. The validity coefficients against Cattell's CFIS-2 Form A, ranged from 0.50 to 0.75 and 0.63 to 0.76 for the verbal and non-verbal respectively. With Raven's Coloured Progressive Matrices, the validity coefficients varied from 0.64 to 0.71 and 0.61 to 0.70 for verbal and non-verbal respectively.

Nair (1984)[49] constructed and standardized a Battery of tests for measuring Intelligence of Indian children between the age group 2 months and 6 years in big cities like Bombay and were fluent in English. The study was conducted on 1084 children from sixteen

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[48] M.B. Buch: *Fourth Survey of Research in Education*, NCERT, M.S. University, Baroda, 1991 p. 559.
[49] *Ibid.*, p. 555.

schools in the city of Bombay. The test consists of problems involved thinking and reasoning, viz., classification, mixed sentences, sentences completion etc. The age norms, grade norms and validity of the tests were established. Percentile ranks, Stanine scores, sigma scores, standard scores, T-score, SD, Mean correlation coefficient and standard error were computed. The reliability of the test was calculated by the split-half method using the Spearman-Brown Prophecy formula, Rulon's formula and K-R formula. The coefficient of reliability as calculated by the above formula ranged from 0.75 to 0.89

Mishra (1985)[50] constructed and standardized a Verbal Group Test of Intelligence in Oriya for the age group 12+ to 15+. The items of the test were verbal analogy, verbal reasoning, vocabulary, general information and numerical relations. The final test was standardized on the sample of 2000 boys and girls chosen on a stratified random basis. Split-half, test re-test and other reliability coefficients were calculated. Age norms, percentile norms and other norms were calculated. The reliability indices were split-half: 0.89 and 0.90, test re-test 0.79,0.81, 0.80 and K-R reliability Form A:0.84 to 0.84, Form B: 0.82 to 0.86 and whole 0.90 to 0.92 The Current validity with Cattell's Culture- Fair Test Form Scale II was 0.63, 0.58 and 0.58 for form A,B, and whole test respectively.

Veerabhadraiah (1985)[51] constructed and standardized a Verbal and Non-verbal Group Test of Intelligence for Kannada pupils of standards V to VII in the age group 10 + to 13 + with special reference to Karnataka state. The final test consisted of four verbal and four non-verbal subtests was administered to 3250 boys and equal number of girls drawn from 50 government and private schools as well as urban areas of 11 districts of Karnataka.

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[50] *Ibid.*, p. 555.
[51] *Ibid.*, p. 564.

The reliability of the test was measured by test re-test, r=0.88; split-half r= 0.97. The test was validated against total marks obtained in the preceding annual examination r= 0.64; teacher's estimate of intelligence r= 0.59 and M.G. Premalatha's Non-verbal Test r= 0.58. Correlation between verbal and non-verbal subtests was found to be 0.71 and internal consistency of tests was found out by canonical correlation method using Hotelling's Principal Component method. The test was analyzed factorially and eight factors were extracted. The relation between the occupation of parents and the intelligence of children was found out r= 0.41 and relation between caste and intelligence was studied r= 0.24

Banmalidas (1987)[52] constructed and standardized a Scientific Aptitude Test in Oriya for the 10th class students of Orissa. The test consists of four components namely: general intelligence, reasoning ability, operational ability and scientific knowledge. The final form of the test battery had 215 items in total. The reliability coefficients for all the four components were 0.81, 0.91, 0.92 and 0.80 respectively. The validity o f the test battery for making predictions was computed on the achievement scores of science and mathematics. The four subtests correlated significantly with science and mathematics achievement scores and the correlation coefficient ranged from 0.29 to 0.81. The norms were established on the basis of standard scores with a mean of 50 and SD of 10.

Usha (1989)[53] constructed a battery of tests based on Guilford's SOI model for standards VIII, IX and X. The author selected this model on the ground that it gives wider concept of intelligence and specifying the nature of tests for minute intellectual functions. In final study 4,322 subjects were considered for the normative study. Effective sample size for

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[52] *Ibid.*, p. 550.
[53] *Ibid.*, p. 550.

each test ranged from 148 to 151 in item analysis study and 248 to512 for the development of final versions. The statistical techniques used included point bi-serial correlation, pass percentages, G index agreement'd' score ANOVA and't' test. The statistical techniques for internal consistency included split-half and rational equivalence. Further, the factor analyses by principal component method and Varimax rotation were also used on 196 students of grade IX. The indices of internal consistency and homogeneity were mostly satisfactory. The independence of factor was evidenced in the product wise analyses. The content wise and operation- wise analyses yielded some higher order factors common to products in the same content category.

Tarni (1994)[54] constructed and standardized a Verbal and Non-verbal Group Test of Intelligence for pupils of classes IX and X. The test was administered to 4500 students, 2700 males and 1800 females. The test consists of four subtests: words, classification, word analogy, best answer and test reasoning. Tests re-test, split half and rational equivalence reliability coefficients were 0.78, 0.85 and 0.91 respectively. The external validity coefficients against SEM as 0, 50, against VRT as 0.84 and against VNART as 0.87. The internal validity of test with split-half reliability coefficient was 0.92. Norms were established on the basis of Z-score for male and female separately.

Lalhmingliana (2005)[55] constructed and standardized a Verbal Group Test of Intelligence in Mizo language for the age group 13 to 16+ years of Mizoram state. The test consists of 100 items was administered on a sample of 3600 students. For estimation of

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[54] J. Tarni: "Construction and Standardization of a Verbal and Non-verbal Group Test of Intelligence for Classes IX-X", Ph.D. Thesis, Patna University 1994.

[55] Lalhmingliana: "Construction and Standardization of Verbal Group Test of Intelligence in Mizo Language", Mizoram University, Aizawl, 2005.

reliability of the test, split-half and K-R reliability were computed. The coefficient correlation was found to be 0.73. Using Spearman-brown formula, the split-half reliability of the test as a whole was 0.84. The K-R 21 reliability coefficient was found to be .82. The test was validated against the expert's opinions on rating scale. The validity of the test was also studied by correlating the test score with two external criterion tests Viz. Ahuja's Group Test and Cattell's Culture Fairs Test of Intelligence.

(a) Non-Verbal Test:

In the area of Non-verbal tests of intelligence, *Phatak* (1955)[56] made a pioneering study of Good Enough's Draw-a-Man Test and developed a new scoring method in her standardization of the test for Gujarati children. Validity of the new scoring plan was established by correlating the scores with Kamal's Intelligence Test and correlation was found to be 0.50. The reliability of scoring system by re-test method was 0.81. Norms were developed on 722 drawing of children in the age group 6+ to 8+. Validity of the major scoring points was tested by simple criterion of increase of the scores at successive ages.

Nafde (1961)[57] prepared a Non-verbal test on a model of NIIP 70/23 and test of Abstract Reasoning (DAT). The test was administered to 10,000 boys and girls mainly from the high schools of Bombay city. The sample included college students of science and arts as well of engineering and medicines and some post graduate students The split-half reliability was found 0.88 and by re-test 0.91 The validity of the test were 0.47, 0.54 and 0.35 respectively. Age norms, class norms and IQ distribution were worked out.

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[56] M.B Buch: *Second Survey of Education in Research*, NCERT, New Delhi,1979 p. 238.
[57] *Ibid.*, p. 238.

Premelatha (1962)[58] designed a battery of Non-verbal test of intelligence for children of 7 to 13 years of age. The test was standardized on a sample of 7841 boys and girls drawn from rural and urban areas of Mysore state. The split-half reliability of the test was 0.97 and the K-R 0.99. The test was correlated with school marks (0.37, teacher's estimate (0.35) and a standardized verbal test of intelligence in Kannada (0.69).

Shah (1964)[59] developed a Non-verbal measure of intelligence and standardized it on Gujarati children of the age group 7 to 13 years. The reliability was found to be 0.96 by the method of rational equivalence, 0.94 by the re-test method and 0.70 against a verbal test 0.55, against examination marks and 0.53 against teacher's estimate.

Jain (1965)[60] developed a Non-verbal test which was based on Spearman's two factor theory. The test with a parallel form was administered to 1000 cases which included students of Delhi region who had appeared for the higher secondary examination, and applicants for commission in the officer cadre of the Defence Services. The correlation between the scores on the two forms of the test was 0.80. Factorial study demonstrated that the two forms of the test had high 'g' saturation.

Bhavsar (1967)[61] prepared a Non-verbal test for high school students of grades IX to XI corresponding to 13 – 18 years of age. A sample of 3184 boys and 2718 girls drawn from 44 schools of Gujrat was used for standardization. Age norms, grade norms and sex norms were worked out. The reliability of the test was found to be 0.91 and split-half was 0.93. The

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[58] *Ibid.*, p. 238.
[59] *Ibid.*, p. 238.
[60] *Ibid.*, p. 238.
[61] *Ibid.*, p. 240.

test correlated 0.61 with the Desai's Group Test of Intelligence, 0.79 with Desai Bhatt's and 0.77 with Nafde's Non-verbal Test.

Nair (1970)[62] developed a Non-verbal of intelligence and standardized it on a sample of 5252 students of class VIII to X selected from twelve educational districts of Kerala. Reliability by test re-test with an interval of three months, one month and one week was 0.76 (N=246), 0.75 (N=124) and 0.80 was (N=121) respectively. By rational equivalence method the reliability of the test was found to be 0.86 (N=100). The test was validated against the Raven's Progressive Matrices, the Kerala University Verbal Group Test of Intelligence, teacher's rating and school marks and the correlation varied from 0.21 to 0.78 for a sample of 256 students. Deviation IQ norms and sex norms were worked out

Trivedi (1972)[63] constructed a Non-verbal group test of general ability for students of grades VII to IX in Haryana of the age group 12+ to 14+. The test was standardized on a sample of 2483 students. The re-test and split-half reliability of the test were found to be 0.94 and 0.97.

Patel (1974)[64] constructed a Non-verbal test with items in pictorial form designed to measure individual differences in intelligence for children studying in grade V to VII. The author reported that intelligence of the children increases with age, reliability of the test decreased with increase in time interval and pupils who scored well were good at arithmetic.

Nepal (1977)[65] constructed and standardized a non-verbal group Test of Intelligence for Nepalese adolescents, using a random sampling technique of 1,650 boys and girls in the

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[62] *Ibid.*, p. 240.
[63] *Ibid.*, p. 240.
[64] *Ibid.*, p. 240.
[65] M.B. Buch: *Third Survey of Research in Education,* NCERT, New Delhi, 1987, p. 495.

age range of 13 to 17 years. The final form of the test consists of eighty items. Age-wise and grade-wise, percentile and Stanine norms were computed. Test reliability was computed in terms of test re-test, split-half reliability and rational equivalence. It ranged from 0.759 to 0.933. Content validity was estimated in terms of phi-coefficient of each item against criterion of total scores which ranged from 0.58 to 0.83. Intrinsic validity of the test was 0,966. Concurrent validity was estimate against the criteria of Koh's Block Design Test (0.635), Alexander's Pass-along Test (0.62 and examination marks (0.635).

Shah (1981)[66] constructed and standardized a Spiral Omnibus Type Group Non-verbal Test of Intelligence for grades VIII to XII, age group 13 to 17 years. The test consists of six types of nonverbal tests namely: similarities, classification, analogies, series, conditions and matrices. A sample of 3,612 pupils of Gujarat was selected by the method of random sampling. The reliability of the test was estimated by test re-test method for different age groups ranged from 0.80 to 0.95. The tests re-test reliability for separate tests ranged from 0.60 to 0.80. The split-half reliability fro different age ranged between 0.80 to 0.87. The validity of the test was obtained by correlating the test with Bhasvar Non-verbal Test, Desai-Bhatt verbal Test., school examination marks and teacher's opinion, which were 0.88, 0.90 0.57 and 0.78 respectively.

Bureau of Psychology (1982)[67] constructed and standardized a Non-verbal group Test of Figural Ability for 12 + students. The test consists of four subtests. The test was standardized on a sample of 1.130 students of class VIII in Allahabad. The test –retest reliability coefficient ranged from 0.6 to 0.7. The concurrent validity was established by

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[66] *Ibid.*, p. 502.
[67] *Ibid.*, p. 478.

using Form Relation Test developed by NIIP, London. The concurrent validity coefficients were fairly high. Thus, the reliability and validity data revealed that the test was highly reliable and valid.

Chatterji & Mukerji (1982)[68] constructed and developed a Non-language test of intelligence for children reading in class VIII in ten boys' and seven girls' schools in Calcutta. The test was administered on 1,305 children. The test consists of sixty two items: analogy, classification, opposites and picture arrangement of the revised version. The reliability, validity and norms were determined. The reliability coefficients computed by K-R formula were found to vary from 0.51 to 0.83 for different parts of the test. Inter-correlation among the part scores were found to range between 0.30 and 0.56. Correlation between different parts of the test and the marks obtained in the annual examination in different school subjects were positive and significant at one percent level. Concurrent validity study results proved that the test measured verbal ability though the medium used was non-verbal. The factor analysis study indicated two different factors viz. verbal reasoning factor and verbal relation factor. Percentages of total communality for verbal reasoning and verbal relation factors were 66.4 and 33.6 respectively

Ao (1993)[69] constructed and standardized a Non-verbal group test of intelligence for the age group 13 to 17+ students in Nagaland. The final form of the test consists of nine subtests and was administered on a sample of 2396 students of Nagaland. The reliability of the test was estimated with sample of 599 by the method of K-R formula. The reliability coefficient by split-half was found to be 0.90, 0.92, 0.33 and 0.94 The validity of the test

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[68] *Ibid.*, p. 479.

[69] A. Imtingsungba: "Construction and Standardization of Non-verbal Test of Intelligence for the age Group 13 to 17 in Nagaland", *Unpublished Ph.D Dissertation*, NEHU, Shillong, 1993.

was estimated with Jalota's Group Test of General Mental Ability for construct validity by Pearson's Product Moment formula was found to be +0.88. Norms of percentile, Stanine and DIQ were estimated.

(b) Performance Tests:

Bhatia and Tandon (1964)[70] developed two forms: Form A for the age group three to five and Form B for the age group six to thirteen. The scale was standardized on a stratified sample of 1100 children in the age range from 3 to 13 of Moradabad town. The reliability of the test by split-half and K-R 20 for Form A ranged from 0.87 to 0.95 and for Form B it varied between 0.91 and 0.93. The test was validated against parents and teacher's estimate of child ability.

Bhattacharya (1964)[71] devised a battery of four performance tests of intelligence for the age group 8 to 22 years. The test included the Dearbon's Form Board Test, The Alexander Passalong Test, the Goddard's cube Construction Test and the Koh's Bloch Design Test. The battery was validated against verbal intelligence scale prepared by Calcutta University.

Patel (1973)[72] constructed a Performance scale of intelligence for the age group 6+ to 15+ in Gujarati. The test was standardized on 400 students. The test was validated factorially following the principal axes method. The three curves of mental growth for boys, girls and the mixed group were found to be regular.

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[70] M.B. Buch: *Second Survey of Research in Education,* NCERT, New Delhi, 1978, p. 240.
[71] *Ibid.*, p. 240.
[72] *Ibid.*, p. 240.

Chakraborty (1979)[73] constructed and standardized a Performance Test Battery of General Mental Ability for the children of age group six to ten years studying in classes I to V. A battery consists of six tests: Stringing Bead Pattern, Picture Sequence, Picture Assembly, Object Profile, Block Design and Symbol Substitution were standardized on a sample of 1000 children selected from 84 % of the total subdivisions of Manipur. The reliability coefficients of the battery and its tests (except Symbol Substitution) were estimated by K-R formula. For the symbol substitution test reliability coefficient was calculated by re-test method. The reliability coefficients were found to range from 0.66 to 0.91. The standard errors of estimate were found to vary from 0.017 to 0.056.

Patel (1979)[74] constructed and standardized a Group Performance Test of intelligence for the students studying in classes VIII to X of rural and urban secondary schools in the eight districts of Vidarbha region. The final test consists of forty problems to be solved in 45 minutes and the test was standardized on a sample of 1920 boys and girls. Factorial analysis indicated that the test was a uni-factor one. Grade-wise, percentile norms, T-score norms and Stanine norms were fixed. Test re-test reliability was found to be 0.73, 0.77, 0.76 and 0.71. Reliability coefficients by K-R formula in respect of five samples ranged from 0.80 to 0.90 with an average of 0.85. Validity coefficients with other standardized tests of intelligence and with school marks ranged between 0.36 and 0.61.

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[73] M.B. Buch: *Third Survey of Research in Education,* NCERT, New Delhi, 1978, p. 478.
[74] *Ibid.*, p. 499.

(c) Adaptation of Foreign Tests:

Attempts have been made to adapt some foreign tests for use in India. These are WISC, WAIS, Stanford - Binet test, Good-enough's Draw-A-Man test, Otis-administering Test of Mental Ability, Maslow's security - Insecurity and Culture Free Intelligence Test-Scale.

Malin (1964)[75] worked out the first Indian adaptation of WISC for the students of age-group 6-15. Only verbal subtests were modified to suit Indian conditions and the performance part was retained as it was in the original WISC. The test was standardized on 656 children. The test re-tests reliability for the verbal part was 0.92, for performance scales 0.93 and for the full scale 0.91. The scale was validated against teacher's rating's 0.61, Draw-A-Man Test 0.71 and the California Test of Mental Maturity 0.63

Pathak (1966)[76] adapted Draw-A-Man Test for Indian children. The test was standardized on 7536 students of the age group 6 to 10 for Gujarati children. The validity of the test has been established against developmental trends, scoring points and some external criteria. The reliability of the test re-tests method ranged from 0.57 to 0.92.

Ramalingaswami (1969)[77] adapted the Performance scale of WAIS. The test was standardized on a sample of 605 literate adults of both sexes in the age group 15 to 45 years representing Delhi's population. Reliability coefficients for subtests: picture completion, block design, picture arrangement and object assembly were worked out by using the formula Coefficient Alpha, suggested by Cronbach. The test re-test method was employed to

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[75] M.B. Buch: *First Survey of Research in Education,* Centre of Advance Study in Education, M.S. University, Baroda, 1974, p. 214.

[76] NCERT: *Indian Mental Measurement Handbook,* New Delhi, 1991, p. 52.

[77] M.B. Buch: *First Survey of Research in Education,* Centre of Advance Study in Education, M.S. University, Baroda, 1974, p. 215.

determine the reliability of digit symbol. Total test reliability was determined by Monsier's formula. The reliability coefficients of individual subtests ranged from .63 to .94. Apart from determining the construct and factorial validities, the test was also validated by comparing the results with those obtained by Wechsler. The results indicated that the test could be considered as a valid measure for assessing the intelligence of an Indian adult.

Yadav (1970)[78] adapted the verbal part of WISC in Hindi. The test was standardized on 700 school going children in the age group of 8 to 12 selected from schools in Delhi. Using Monsier's formula the reliability coefficients of the total scale was found to be 0.96. The validity coefficients of the total scale against a non-verbal test and other measures ranged from 0.51 to 0.66

Bhatt (1970)[79] adapted a WISC for Gujarati population. All the twelve subtests were adapted in Gujarati. The scale was standardized on a sample of 440 children of Ahmedabad city in the age group of 5+ to 15+. The test re-test reliability coefficient for the verbal scale was 0.98 and the split-half reliability coefficient was 0.90. For performance scale the test re-tests reliability coefficient was 0.97 and for full scale was 0.99. Validity was established against school marks and other intelligence in Gujarati.

Shah (1971)[80] adapted the 1960's revision of the Stanford-Binet Intelligence Scale for Gujarati children of the age group of 2+ to 18+. The test was standardized on a sample of 400 children. The reliability coefficient of the test by test re-test method was 0.95 and that by the average difference method was 0.96. Validity coefficients against eight different tests of intelligence ranged from 0.48 to 0.79.

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[78] *Ibid.*, p. 215.
[79] *Ibid.*, p. 215.
[80] *Ibid.*, p. 215.

Sheth (1979)[81] adapted Wechsler Adult Intelligence Scale in Gujarati by making changes in the items of WAIS, wherever necessary and standardized on the population of Ahmedabad city. Six subtests were verbal and five subtests were performance tests. The various subtests were general information, general comprehension, arithmetical reasoning, similarities, digit span, vocabulary, digit symbol, picture completion, block design, picture arrangement and object assembly. The sample comprised of 400 adults including women. The raw scores of each test were converted into scaled scores using M=10 and SD=3.Verbal, performance and full scale IQs were calculated by superimposing a normal probability curve of M=100 and SD-15 over the distribution of total scaled scores of group of subtests. Reliability of the test was checked by test re-test and split-half method and was found to be very high. Validity of the test was determined by comparing its IQs with IQs on Desai-Bhatt, Cattell Culture-Fair Tests and Raven's Standard Progressive Matrices and the correlations ranged from 0.37 to 0.90. The correlations of the subtests were factor analyzed by Hotteling'a principal axis method and centriod method and eight factors were extracted, the first of them being G.

Joshi (1982)[82] adapted a Wechsler Preschool and Primary Scale of Intelligence for the children of Ahmedabad in Gujarati. In the adaptation, some changes were made to suit the Gujarati children. The sample for the final norms consisted of 360 children (sixty from each six-month age group) from nine Kindergarten schools of Ahmedabad city. Their performance and total scale IQs were calculated for which deviation the IQ method as used in the original scale was used after converting the raw scores into scaled scores. The

[81] M.B. Buch: *Third Survey of Research in Education,* NCERT, New Delhi, 1978, P. 504.
[82] *Ibid.*, p. 489.

reliability of the scale was determined by split-half technique for all different age groups and also for individual tests which ranged from 0.28 to 0.94. By the test re-test method, the reliability ranged from 0.63 to 0.93. The validity of the scale was determined by correlating the WPPSI IQs with the Stanford=Binet IQs, Draw-A-Man Test IQs, school marks and teacher's ratings which ranged from 0.26 to 0.92.

2.3 GENERAL CONCLUSION OF THE PAST RESEARCHES:

Historically, In India, construction of psychological testing was started by the Christian Missionaries up to the year 1921. The first Indian who took the initiative in the construction of Intelligence test was Rice in 1922, who about the year 1929 published his "Hindustani Binet Performance-Point Scale". The test was an adaptation of the Binet test along with some additional performance tests. The first Indian doctorate in test construction was awarded to Desai (1954) for developing a group test of intelligence in Gujarati. In the area of non-verbal intelligence test, Pathak (1955) made a pioneering study of Good-enough's Draw-a–man Test and developed a new scoring method in her standardization of the test for Gujarati children. In the area of Performance test, Mehta (1961) developed a pioneering study in a group test of intelligence for students of the age group 11 and 17 years. In the field of adaptation of foreign tests Malin (1964) worked out the first Indian adaptation of WISC for the students of age-group 6-15. From time to time attempts have been made in the development of intelligence test, but their contributions were mostly of the adaptation of foreign tests only. Even today very little original work is done in this area. It was also found that most of the studies are concentrating on general mental abilities. Few studies were found to develop tests based on Spearman's two-factor theory, Thurstone's Theory of

primary mental abilities, and Theories on cognitive abilities. Most studies are concentrated on group tests, with the target-group 12-18 years, and classes V to XII. So far very little attentions were given to the infants and adults. Though we have many intelligence tests in the country today, the studies revealed that not all states of the country have attempted to develop tests of their own and most of the tests constructed are in Hindi, Gujarati and in other regional languages. The major reasons for such a situation are: we do not have any common language for all states, the largeness of the country and its huge population and high rate of illiteracy of the general masses.

In comparing with the West, though test development in India started almost contemporaneously with a similar movement in the West, the outcomes have been very different. The reasons are:

(i) Indian tests construction literature is filled with instances of 'psychometric borrowings' from the West that are irrelevant and meaningless in our cultural setting. Tests and measurement based on western concepts and their adaptation and use in a different cultural setting can raise innumerable questions e.g. the so called adaptation of foreign tests like the Binet-Simon or Terman-Merrill were no more than imperfect translations of some western tests.

(ii) Heavy dependence on the West in the field of psychological testing has resulted in almost a total lack of concern for specifying in clear terms the construct underlying the test and the theoretical framework of the test developed.

(ii) Psychological testing in the country is not having a healthy progress relates to its origin, as it was in the West, where it originated and grew out of social necessity. In contrast, as Kulkarni and Puhan have rightly observed, Indian research work has

been tool-oriented rather than problem-oriented, having very little to do with problems of human beings for whom the tools were supposedly developed.[83]

(iii) Another common defect of Indian work on test development has been inadequacies in sampling and incomplete description of sample characteristics. The samples on which tests are developed, standardized or adapted and data collected are frequently small, unrepresentative and incidental.

The following observations could be made from the above reviews:

(1) In most of the studies, the samples on which tests were developed and data collected are frequently concentrated on the urban representatives only. Moreover, the sample is not large enough.

(2) Most of the constructed and standardized intelligence tests revealed to have a limited coverage of mental abilities.

(3) Though we have many standardized intelligence tests in the country today, most of those tests are found to have developed for a specific regional languages and cultures.

2.4 THE PRESENT STUDY:

Intelligence testing remained for long the most popular pursuit in all over the World. Though many researches have been conducted in India and abroad, but no full fledged study

[83] M.B. Buch: "Perspectives in Education", *A Journal of the Society for Educational Research and Development,* Vol. 8, No. 2, April, 1992.

could be traced out with respect to the intelligence testing for the Khasis children in Meghalaya. Therefore, the present study has been undertaken on the following grounds:

1. Till today the state does not have any intelligence test constructed in the Khasi language and with respect to Khasi culture.
2. To have a wide coverage of the representatives from both the urban and rural areas, the present study has taken a sample of 3000 students covering all the Khasi speaking districts of Meghalaya.
3. To measure the general mental abilities of the children, the investigator has taken extra efforts to make the present test comprehensive by including different set of intellectual abilities which consists of ten different subtests. The test has included two new kind of intellectual tasks like Akin/Imitative Words and Evaluation of Relationship which could not be traced in any of the previous studies.

CHAPTER – III

RESEARCH DESIGN

3.1 : Population

3.2 : Sample

3.3 : Tools Used

3.4 : Method of the Study

3.5 : Collection of Data

3.6 : Statistical Techniques Used

CHAPTER – III

RESEARCH DESIGN

Research Design is the conceptual structure within which the research is conducted. As such it includes an outline of what the researcher will do after formatting the research. It also constitutes the blue print for the population, sample, tools, and method of study and procedures of data collection. It describes the detail of statistical techniques used. It is needed because it facilitated the smooth sailing of the various research operations.

3.1 POPULATION:

The word population is commonly used to denote a group or an aggregate of people. It refers to any well defined group or aggregate of people, animals, objects etc of a particular type. For the present study, the population comprises of both Khasi boys and girls students of the state of Meghalaya studying in classes VIII to X of the age group 14 to 16 + years. The total number of Khasi speaking students studying in classes VIII, IX and X were approximately as follows as per the information collected from the Districts Inspector of schools (year 2005):

Table 3.1: Distribution of the Khasi Speaking Students in Class VIII-X

District	VIII	IX	X	Total
East Khasi Hills	7619	6810	5033	19462
WestKhasi Hills	1896	1600	1455	4951
Jaintia Hills	2359	2196	1801	6356
Ri-Bhoi	509	460	372	1341
Total	12383	11066	8661	32110

3.2 SAMPLE:

A sample is a fraction of population drawn by using a suitable method so that it can be regarded as representative of the entire population. For the present study, the investigator has adopted the Simple Random Method which was found appropriate for the study. Simple Random Sampling may be defined as one in which each and every individual of the population has an equal chance of being included in the sample and the selection of one individual is in no way dependent upon the selection of another person.

The present study had three sets of samples for the different stages of test construction which were as follows.

(a) Sample for Preliminary Try-out:

For the preliminary try-out a very small sample of 180 Khasi students studying in classes Viii - X was taken randomly comprising of 80 boys and 100 girls.

(b) Sample for First Try-out:

For the first try-out of the test a sample of 555 Khasi students comprising of 277 boys and 278 girls was selected randomly representing each grade as follows

Table 3.2: Sample for First Try-out

Sl. No.	School	Class	B	G	Total
1	DNS.Wahlang M.H. S	VIII	28	30	50
2	Got. Boys H.S	VIII	62	-	62
3	St.Joseph's Girls H.S	VIII	-	68	68
4	Christ Church H.S.	IX	26	32	58
5	Seng Khasi H.S	IX	24	30	54
6	Sacret Heart Boys H.S.	IX	36	-	36
7	Brooke Side A. H.S.	IX	18	20	38
8	Laitumkhrah P.H.S	X	24	25	49
9	Mawlai P.H.S.	X	35	43	78
10	Presbyterian T.S.S.	X	24	30	54
		Total	277	278	555

(c) Sample for the Final Try-out:

For the final try-out, a sample of 3000 Khasi students (approximately ten percent of the total population) comprising of 1298 boys and 1702 girls were selected randomly from the Khasi speaking population of 4 districts which were as follows:

Table 3.3: District-wise Break-up of Sample taken for Final Try-out

Sl. No.	District	No. of schools	Sex	Class	Class	Class	Total	*Grand Total*
				VIII	IX	X		
1	East Khasi Hills	19	B	143	204	158	505	*1141*
			G	236	124	276	636	
2	West Khasi Hills	10	B	107	186	87	380	*920*
			G	180	240	120	540	
3	Jaintia Hills	10	B	72	93	107	272	*613*
			G	156	51	134	341	
4	Ri- Bhoi	3	B	44	47	50	141	*326*
			G	60	58	67	185	
	Total	*42*		*998*	*1003*	*999*	*3000*	*3000*

3.3 TOOLS USED:

For the present study, the investigator used the following tools:

i. Verbal Group Test of Intelligence constructed and standardized by the investigator,

ii. Ahuja's Group Test of Intelligence

iii. Cattell's Culture Fair Test of Intelligence

iv. Rating scale constructed by the investigator

(i) Verbal Group Test of Intelligence constructed by the investigator (Appendices 1 & 2):

The investigator constructed and standardized a verbal group test of intelligence in the Khasi language to assess the intelligence of school going children of the state of Meghalaya studying in classes VIII, IX and X of the age group 14 to 16 + as has been described in chapter four. In short, the test contained the following ten sub-tests:

Table 3.4: Number of Sub-test and Items retained in each Sub-test

Sl. No.	Sub-tests	No. of Items	Time limit
1	Classification	9	$1^{1}/_{2}$
2	Coding	11	4
3	General Comprehension	10	3
4	Akin/Imitative Words	12	3
5	Verbal Analogy	10	$2^{1}/_{1}$
6	General Reasoning	9	3
7	Number Series	13	4
8	Evaluation of Relationship	11	4
9	General Information	6	1
10	Arithmetic Reasoning	9	4
		Total =100	30 mins

The reliability and validity of the test has been calculated by different methods which have been given in Chapter V. The norms of the test have also been prepared for both boys and girls and for different grades which have been described in chapter V.

(ii) Ahuja's Group Test of Intelligence[1] (Appendix-3):

This test is meant for assessing the general mental ability of pupils in the age group 13 to 17 + years studying in classes VIII – XI through English Medium Secondary Schools of Greater Bombay. The Test consists of the following seven subtests with 126 items:

Table 3.5: Number of Items and Time-Limits for each Sub-test

Sl. No.	Sub-tests	Number of Items	Time-Limit
1	Classification	20	4 minutes
2	Analogy	20	4 minutes
3	Arithmetic Reasoning	6	4 minutes
4	Vocabulary	40	4 minutes
5	Comprehension	8	4 minutes
6	Series	12	4 minutes
7	Best Answers	20	4 minutes
	No. of Items =126	28	

The test also contains one additional subtest which is meant for practice only. The item difficulty was determined by taking into account the proportion of the group which could solve an item correctly. The sample of 370 testees was divided into two groups of 100 each on the basis of upper and lower 27 percentiles. The reliability of the test has been studied by two methods- (i) the test –re-test method and (ii).the split-half method. The

[1] C.G. Ahuja: "Construction and standardization of General Group Test of Intelligence (GGTI) in English for 13 to 17 years", *Ph.D. Dissertation*, 1966.

reliability coefficient by two methods was found to be 0.84 and 0.95 respectively. The validity of the test was studied with reference to school marks, teacher's judgment and other intelligence tests. The validity –coefficient with school marks was 0.53, with teacher's judgment was 0.61 and with other test of intelligence varied from 0.55 to 0.80.The internal validity and factorial validity of the test was also studied. The internal consistency correlation between the subtest and the total test scores were computed. The factorial validity was studied by Thurstone's centriod method and verified by Spearman's formula of 'g' saturation. It came out to be uni factor test.

Age norms and grade norms were worked out. Table of age-wise and grade-wise distribution of the test scores of both boys and girls were also worked out. The provision for further interpretations based on the deviation of a score from the corresponding class norm in the form of Percentile Ranks, Sigma Scores and Standard Scores have also been made. Side by side the Table of T- Score for age-wise and class-wise distributions for both boys and girls were also worked out. The Deviation IQs for the entire sample was established. Similarly tables of DIQ in age-wise and grade-wise for the entire sample were also ascertained.

(iii) Cattell's Culture Fair Test[2] (Appendix – 4):

This test is meant for measuring individual intelligence in a manner designed to reduce, as much as possible, the influence of verbal fluency, cultural climate and educational level. The test which may be administered individually or in group, are non-

[2] R.B. Cattell: *Technical Supplement for the Culture Fair Intelligence Test Scales 2 & 3, Krug, S.E, Barton K., Champaign,* Institute for Personality & Ability Testing, 1973.

verbal and require only that the examinees be able to perceive relationship in shapes and figures. The test is devised in a format of scale 1, 2 & 3 which was designed in form A & B. The scale 1 is meant for children and scale 2 & 3 for adults.

In the present study scale 2 in form A was used which contained four sub-tests as mentioned below:

Items and Time Allotted to each Sub-test in the Scale 2 & 3

SCALE 2 (FORM A & B)

Test	Sub-tests	No. of Items	Time allotted
Test 1	Series	12	3 Minutes
Test 2	Classification	14	4 minutes
Test 3	Matrix	12	3 minutes
Test 4	Conditions (Typology)	8	2½ minutes
	Total	46 items	12½ minutes

The reliability of the test in full form (A & B) and in short form (A) for scale 2 was estimated by applying three methods, viz., consistency over items, consistency over parts and consistency over times on different samples. The reliability coefficient of correlation of scale 2 in full (A & B) were found to be 0.87, 0.80 and 0.84 and 1 short form (A) were 0.76, 0.67 and 0.73 respectively. The reliability coefficient of correlation of scale 3 in full form (A& B) was found to be 0.85, 0.82 and 0.82 and in short form (A) was 0.74, 0.70 and 0.69 respectively.

The validity of the test was studied by the methods of concept validity and concrete validity. The validity coefficient of correlation of scale 2 in full form (A & B) was found to be 0.85 and 0.77 and in short form (A) was 0.81 and 0.70 respectively. The validity coefficients of correlation of scale 3 in full form (A & B) were found to be 0.92 and 0.69 and1 short form (A) were 0.85 and 0.66 respectively.

Table of norms such as standardized IQ and Percentile Ranks were established for scale 2 & 3 in form A only.

(iv) Rating Scale for Estimating the Content Validity of the Test under Construction (Appendix -5):

The investigator constructed a rating scale to estimate the content validity of the intelligence test under construction. It contained seven items as given below:

1. How far the items listed in the test are representative of intellectual abilities of children?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

2. Do you think that items listed in the test under reference would be able to measure the level of Intelligence of children?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

3. To what extent have the test items covered the various components of intellectual abilities of children under different sub-tests?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

4. Are the items suitable for school going children of the age group 14-16+ (Cl.VIII-X) in terms of the content presented?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

5. Are the items suitable for school-going children of the age group 14-16+ (Cl.VIII-X in terms of items difficulties?

2	3	4	
To a great extent	To quite an extent	To some extent	Not at all

6. Are the items suitable for school-going children of the age group 14- 16 + (Cl. VIII-X) in terms of the language used?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

7. To what extent are the test items related to the Khasi community?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

3.4 METHOD OF THE STUDY:

A well-described method provides the investigator a scientific and feasible plan for solving the problem under investigation. The selection of a method of study depends on the nature and objectives of the study. As the objective of the present study is to construct and standardize an Intelligence test, the investigator decided to use a descriptive method of research, to prepare the following materials:

A. Test Booklet –

It is a small Book which contains the final form of the test. It includes the general instructions of the whole test, the specific directions and examples of each sub-test. A test booklet is often reusable.

For the present study, the investigator has prepared a booklet, containing the general instructions of the test and ten sub-tests spreading in 100 items. In each subtest, necessary instructions and practice examples were provided. The investigator has carefully categorized the selection of items, so, as to make the present test comprehensive enough, to cover out the intellectual behaviour of the students of classes VIII –X., as follows:

1. Classification
2. Coding
3. General Comprehension
4. Akin/Imitative Words
5. Verbal Analogy
6. General Reasoning
7. Number Series
8. Evaluation of Relationship
9. General Information
10. Arithmetic Reasoning.

A. Test Manual:

Test manual is a book which gives a detailed description of the test. It guides the users about the test. The manual consists of the psychometric properties of the test, norms and references. It gives a clear indication regarding the procedures of the test administration, the scoring methods and time limits, if any, of the test. It also provides instructions as well as the details of arrangement of materials, that is, whether items have been arranged in random order or in any other order.

For the present study, the investigator has prepared a Manual of the test, which consists of the details of the following: (Appendix 1-B and 2 –B):

(1). Construction procedure

(2). Direction for Administering and Scoring the test.

(3). Sample for Standardization

(4). Reliability and validity of the Test.

(5). Different kinds of Norms in Tables

(6). Interpretation.

B. Answer Sheet

For the present Test, a compiled answer sheet of all the subtests was prepared where in the subject (student) is required to put a X cross mark at the correct answer indicated by the alphabets A, B, C, D, (Appendix 1- C and 2 –C).

C. Scoring Key

For the scoring key of the present test, the investigator has prepared a transparent stencils , where the correct answer of each item of all the ten subtest were indicated by a box in a tracing paper (Appendix1-D and 2-D).

3.5 COLLECTION OF DATA:

Based on the nature of the study, the collection of data was done in three phases:

(a) First Phase:

The first phase of collection of data for the preliminary try-out was done in the month of May 2007. The test was administered to 180 Khasi students from 6 High Schools. Data obtained from this phase was used to make a preliminary modification of the test.

(b) Second Phase:

The second phase of data collection was done in October 2007. The same procedures of administering the test were followed by the investigator in the second phase. For this try-out a sample of 555 Khasi students were taken randomly from 10 High Schools (Table 3.2).

(c) Third Phase:

The third phase of data collection for final try-out was done in the months of May to August, 2008. In this phase a large sample of 3000 Khasi students were drawn from 42 High Schools (Table 3.3) of the schools population from four districts of Meghalaya. The data was collected by administering the following three tools:

(i). Investigator's Group Test of Intelligence (in Khasi language).

(ii). Ahuja's Group Test of Intelligence.

(iii). Cattell's Culture Fair Test of Intelligence. (Scale 2 Form A)

To make the collection of data easier and faster, the investigator, approached the Director of Higher & Technical Education, Shillong, requested him to provide instructions to the Heads of selected schools, through the Districts Inspectors, to allow the investigator to conduct the tests smoothly. This had really helped the investigator to communicate with the Heads of schools, who had conveniently allowed the investigator to administer all the three mentioned tools to all the 3000 students. Data collected from the third phase was used for the standardization of the test.

3.6 STATISCAL TECHNIQUES USED:

In the present study, the investigator used the following statistical techniques

(i) *For scoring procedures:* to avoid the problems of guessing, the formula of correcting the difficulty index of an item for chance success was used as suggested by Garrett[3].

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

(ii) *For Item Analysis*: the difficulty value and discriminative power of an item was calculated by applying Davis's formula[4].

$$DV = (P_u + P_l)/2$$

$$DP = P_u - P_l$$

(iii) *For Item selections*: only the items whose difficulty values (DV) found between 0.30 to 0.70 and discriminative power (DP) equal to 0.40 and above as suggested by Stanley & Hopkins[5] were selected for the final form.

(iv) *For estimating the reliability of the test*: The (a) Split-half and (b) Kuder-Richardson reliability methods were used. For calculating the Split-half,

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[3] H.E. Garrett: *Statistics in Psychology and Education,* Valkis, Feffer and Simon Ltd, Bombay, 1981, p. 364.

[4] S.A. Sharma: *Essentials of Measurement in Education & Psychology*; Surya Publication, Meerut, 2005, p.187.

[5] J.C. Stanley & K.D. Hopkins: *Educational & Psychological Measurement and Evaluation,* Prentice Hall of India Pvt. Ltd., New Delhi, 1978, p. 270.

Pearson's Product Moment and Spearman-Brown Phrophecy formulae were used. The formulae were as follows:

(a) Pearson's Product Moment formula:

$$r = \frac{N \Sigma X'Y' - \Sigma f X' \Sigma f Y'}{\sqrt{\{N \Sigma f X'^2 - (\Sigma f X')^2\} x \{N \Sigma f Y'^2 - (\Sigma f Y')^2/\}}}$$

Spearman-Brown Phrophecy formulae:

$$r_{11} = 2 r'_{11} / (1 + r'_{11})$$

For estimating the reliability index of the present test, the following formula of (b) K-R 21 was adopted as given in Garrett[6]

$$r_{11} = \frac{n\sigma^2_t - M (n-M)}{\sigma^2_t \quad (n-1)}$$

(v) *For estimating the validity of the test*: the following three methods were adopted:

a) Content Validity of the test was rated by the expert's judgment.

b) Concurrent Validity was studied by correlating the present test scores with two external criterion tests: Ahuja Group test and Cattell"s Culture Fair Test and was calculated by Pearson's Product Moment Method.

c) *Construct validity* of the test was studied by the Inter subtest Correlation and Factorial validity was verified by Thurstone's Centroid Method. To estimate the internal consistency of the present test, the inter-subtests

[6] H.E Garrett: *Statistics in Psychology and Education,* Valkis, Feffer and Simon Ltd, Bombay, 1981, p. 341.

correlation among all ten subtests and the correlation of the sub-tests with the total were computed with the help of computer software Packages of social Sciences.

d) *For Testing the Normality age-wise and class-wise*: the normality of the distribution of the scores was calculated by the Mean, Median, Standard Deviation, P_{10}, P_{90}, Skewness and Kurtosis.

e) *For establishing the Norms*: Sigma Score or Z-Score, Percentile Score, T-Score, DIQ and Stanine score were used to derive for the test age-wise and class-wise.

CHAPTER - IV

CONSTRUCTION OF THE TEST

4.1 : Planning

4.2 : Preparation

4.3 : Preliminary Try out

4.4 : First Try-out

4.5 : Item Analysis

4.6 : Items Retained for the Final Form of the Test

4.7 : Final Form of the Test

CHAPTER – IV

CONSTRUCTION OF THE TEST

Construction of a test involves writing of items and selection of items by means of items analysis. This Chapter is primarily concerned with the steps involved in the construction of the present test. These steps were: Planning, Preparation, Preliminary try-out, Try-out, Item Analysis, Item selection, and Final form of the test

4.1 PLANNING:

The first step in the construction of a test is careful planning. Planning is an essential activity in all stages of test construction. Test planning not only involves the preparation of an outline or specifying the content or operation to be covered by the test, but it also involves decision with regards to the: Nature of the test, types of items to be included, time-limit for the test and scoring procedure

(a) Nature of the Test:

After referring to different related psychological tests, the investigator decided to develop a comprehensive test by including ten sub-tests so that the general mental abilities of students may be measured as widely as possible. For the present test, the following ten subtests were included:

I. *Akin/Imitative Words*:

This type of item is commonly used in the Khasi community and cannot be translated into English. It is used to asses the ability of relationship of a particular word with another. When speaking, an imitative word is added, like adding tags to a speech, e.g. hynmen-hynbew, here the word hynmen means an elder brother and hynbew is an akin/Imitative word. The examinee is required to choose the correct response from the given four words.

Example: Below four words are given, one of them is an akin or Imitative word. You have to find the correct response.

Khohsiew : _____

A. Khohshain B. Khohluh C. Khohnub D. Khohwah

II. *Classification:*

This type of item is used to assess the ability of seeing the relationship to form the group and the power of discrimination to isolate the correct response. In this type of item, words, terms, concepts, facts and objects are given which belong to a class or group, but one of them does not belong to the class that is to be identified by the examinee.

Example: Below four words/names are given in a row. Out of these, three are related to each other in some way, but there is one, which has no relationship with the remaining three. You have to find out the odd one.

A. Betel-nut B. Betel-leave C. Lime D. Basket

III. ***Verbal Analogy:***

An analogy is a type of item which involves two parallel or similar situations. In the first situation two words are given having some specific relationship. In the second situation, an incomplete form is given where only one word is provided. The second word is to be selected or to be recalled for establishing the same relationship by the examinees.

Example: In this Test you will find incomplete statements, in which the first two words are related to each other in some way or the other. You have to find out that word which is related in the same way to the third word from the choices given.

Turban is to a male as female is to:

A. Quiver B. Crown C. Whisk D. Sword

IV. Number Series:

In this type of items, the numbers are arranged to form a series of numbers. These numbers are related to each other to continue to form series. An examinee has to identify the relationship with the help of his number reasoning ability. In the same order, he has to provide the next number in the continuation of the series.

Example: Below some numbers series are given. In each of the series one numbe or a group of letters is missing as shown by (.). Find out the missing number or group of letters from the four given choices.

6, 12, 18, 24, (.)

A. 26 B. 28 C. 30 D. 32

V. *Arithmetic Reasoning*:

This type of test is commonly used in a general mental ability test. In this test a problem is given in one or two sentences and the examinee is required to solve the problem in numerical.

Example: In this test, problems are given in one or two sentences. You have to find out the correct answer from the choices provided.

In a classroom there are 37 benches, if 6 students sit in one bench: how many students are there in the classroom?

A. 225 B. 222 C. 227 D. 229

VI. General Information:

This is a type of mental ability test which is used to understand and grasp substantive meaning in language, thought and action. In this test the examinee is given a problem. He is required to solve the problem by selecting from the given alternatives of the best answers.

Example: In this test you have to complete the incomplete statement. Find out the correct responses from the choices provided to complete the statement.

The term 'Meghalaya' means _____.

A. Scenic beauty B. Abode of clouds

C. Land of rain D. Land of Peace

VII. General Reasoning:

This type of test is used to assess the ability to reason logically. In this sub- test, the examinee is required to find out the solution of the given problems.

Example: In this test, a problem is given in two or three sentences. Find out the answer of the problem from the choices provided.

Phyrnai's grandfather is 50 years older than Phyrnai, if Phyrnai is 15 years of age, what is the age of Phyrnai's grandfather?

A. 60 B. 65 C. 70 D. 75

VIII. Coding:

This type of items is mainly used to assess the perceptual and memory ability. The letters of a word are substituted by numbers or the numbers are substituted by the letters of a word. The examinee has to substitute by using the same code for another set of code letters. The same system of code letters can be used for substituting another word.

Example: In this test, you will find some exercises which provide a code equivalent to a group of letters or numbers. You are to find out the correct one of given group of letters or numbers of the four alternatives given.

If the word MEAI is coded as 4352, then how IAME be coded?

A. 2543 B. 2435 C. 2345 D. 2354

IX. Evaluation of Relationship:

This type of item is used to asses the ability to evaluate the relationship of people. The examinee is required to find out the correct relationship of an individual with another. This sub-test is based on the relationship of the Khasi's culture.

Example: In this test different relationship of people is given in two or three sentences. You have to find out the correct relationship of people from the choices given.

Rilang is the gran-daughter of Thom's brother's .Who is Rilang to Thom?

A. Grand-father B. Uncle C. Father D. Cousin

X. General Comprehension:

This type of item is used to asses the ability to grasp, understand and react to a given situation.In this type of sub-test, items are defined as a series of sentences in which certain important words or phrases have been omitted. The examinee is required to fill in or continue the sentence by selecting from the alternative words or phrases to complete the statement.

Example: In this test you will find an incomplete statement. You have to find out the best answer out of the four alternatives given, to complete the statement.

We keep cats at home because they:

A. Give us kitten B. Entertain the family

C. Are used for meat consumption. D. Chase away mice

(b) Type of Items to be Included:

The second step in test construction is the preparation of the type of items to be included. According to Beam (1953)[2], an 'Item' is defined as 'a single task or question that usually cannot be broken down into any smaller units'. For the present study, the investigator decided to have the multiple-choice items. "Multiple- choice items consist of two parts: a stem and number of options, or alternatives. The stem is a question or statement that is answered or completed by one of the alternatives. All incorrect or less appropriate alternatives are called distractors or foils and the student's task is to select the correct or best alternative from all options." Multiple-choice items have come to be the most popular, common, flexible and effective form for standardized testing in recent years and they are also found to have the following advantages:

i. They help to measure the student's capacity for interpretation and discrimination.
ii. They are highly objective, and can be readily scored either by hand as well as machine.
iii. They are not difficult for students to understand and use.
iv. They are not so much influenced by guessing.
v. Item-count procedures based on the results for an individual or a class has considerable diagnostic and analytic significance.
vi. They are one of the best means for testing judgement that is available. It is also regards as being practically free from 'response sets'.

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[2] A.K. Singh: *Tests, Measurement and Research Methods in Behavioural Science,* Bharati Bhawan Publishers and Distributors, Patna.1997, p. 19.

(c) Length of the Test:

For the present study the investigator decided that the length of test should be within a period of school hour i.e. 35 minutes for attempting all the 100 items of the final form including the instructions.

(d) Scoring Procedures:

For scoring, the test unit weightage procedure has been preferred over differential weightage. Hawks, Mann and Lindquist (1936) recommended that the simplest and nearly in all cases a satisfactory procedure for scoring an objective test is to give a credit of one to each correct response, the total score thus being the total number of correct responses.

To avoid the problems of guessing the investigator has decided to apply the formula of correcting the difficulty index of an item for chance success as has been suggested by Garrett (1981)[3].

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

Where,

P = the percent who actually know the right answer
R = the number who get the right answer
W = the number who get the wrong answer
N = the number of examinees in the sample.
Hr = the number of the examinees who do not reach the item (and hence do not try)
K = the number of options or choices.

[3] H.E. Garrett: *Statistic in Psychology and Education,* Valkis, Feffer and Simon Ltd, Bombay, 1981, p. 364.

Scoring was done with the help of a scoring key which was prepared by the investigator. The score, thus obtained was used for estimation of reliability and validity as well as item analysis of the test.

4.2 PREPARATION:

The next crucial task in the test construction is the preparation of the items for the test. For the present study, the preparation was based on the following steps:

(i) Writing the test items.

(ii) Test Directions for the examinees.

(iii) Reviewing and editing of the test items and

(iv) Preparing the answer-sheets and scoring key.

(i) Writing the Test Items:

While preparing the test items, the following guidelines were followed:

1. Clarity in writing test items was followed as one of the main requirements for an item to be considered good.The language was simple, appropriate and written within the understanding capacity of the pupils. The sentence was not very long.
2. Nonfuncional words were not including in the item as they tend to lower the validity of the item. (Nonfunctional words refer to those words which make no contribution towards the appropriate and correct choice of a response by the examinees).
3. Each item allowed only one answer.
4. There was no room for ambiguity.
5. There was minimum writing on the part of the students.

6. The preliminary draft included more items than needed in the final form. This facilitates deleting the inappropriate items at a later stage.
7. The items were not so easy or too difficult for the examinees. The levels of difficulty of the items were to the level of understanding of the examinees.

Writting down the test items required a rich source of ideas. While preparing the test items, the investigator has refered to all the possible common sources available. Intelligence tests prepared by researchers, books on test your IQ, related psychological tests, related dissertations available in the field, magazines, journals and books on the Khasi's culture were critically examined. In addition to these, the investigator has also consulted various subjects' experts to share their views in this matter. On the basis of all the above information collected, the investigator prepared around 400 items. These items were then tried out on 20 students of classes VIII, IX, X. After a thorough study of the responses collected from the 20 respondents, the following 200 items were retained:

Table 4.1: Total No. of Subtests & Items included for Preliminary Try-out

Sl. No.	Name of Subtests	No. of items included
1	Akin/Imitative Words	20
2	Classification	20
3	Verbal Analogy	20
4	Number Series	20
5	Arithmetic Reasoning	20
6	General Information	20
7	General Reasoning	20
8	Coding	20
9	Evaluation of Relationship	20
10	General Comprehension	20
Total		200

(b) Test Directions for the Examinees:

For the present study, the investigator has specified the directions clearly in front page of the test booklet and in all its subtests separately. Test directions contained the following information:

(i) The time allowed for completing the test.

(ii) Number of items in the tests.

(iii) Maximum marks for the test.

(iv) How and where to record the answers.

(c) Reviewing and Editing of the Test Items:

After the test items of the present study have been written, it has to be reviewed and edited; the purpose was to have a final decision concerning several matters like: length of the test, time-limits, arranging of items of the test, or any technical flaws, directions for the examinees, if any. When all these problems were sorted out, reviewed and edited, the test items were prepared in test booklet form and were made ready for a preliminary try-out.

(d) Preparing Answer - Sheet and Scoring Key:

After the test items have been assembled, the next important task of the investigator was to prepare a separate answer sheet and scoring key to facilitate objective scoring. For scoring the answers, a separate answer sheet was prepared rather using the test booklet itself, because the test booklet was prepared to be reusable whereas answer sheets were prepared to be consumable.

The answer sheet was prepared in such a way that spaces were provided for the choices A, B, C, D, against each item. The students were instructed before hand to put a (X) cross mark corresponding to the correct answer.

To make the scoring easier, the investigator used tracing paper of the same size of the answer sheet and by drawing boxes at places corresponding to the correct answer. In each page of answersheet star marks were put at the top and bottom corners at the right and left to fix the scoring key in the correct position. The correct answers was visible in a 'X' cross mark at the boxes of the scoring key which was adjusted on the page of the answer sheet. Then the total scores were then counted easily.

4.3 PRELIMINARY TRY-OUT:

When the test was prepared, the next task of the investigator was to try-out the test on the selected sample for which the test was being designed. The main purpose of this try-out was to improve and modify the language ambiguity and difficulty of the test items. It was a step to find out how pupils react to the test in terms of content and language.

The prepared test at this stage contained of 200 items which was given for preliminary try out on the sample of 180 students of six High Schools of Shillong town. The students were randomly selected from class VIII to X, comprising of 100 girls and 80 boys. The time- limit was not set at this stage. During the try-out, the investigator had briefed clearly to the testees about the nature of the test, instructions given in each sub-test and asked them to try to attempt all the items. When all doubts were cleared from the testees's mind then, they were asked to attempt the questions.

To improve the test at this stage, the investigator used all the feedback and responses collected from the testees. From the recorded responses of the testees it was found that the test on the whole was quite new and interesting to them. On the basis of the feedback collected, the items which were found vague and different were modified and re-arranged accordingly. After some modifications, it was decided that all the 200 items were to be included in the first try-out.

When the preliminary try-out was done, the data so obtained was used for calculation of the average performance of 180 testees, of each sub-test, by dividing the total score of all the students for a particular subtest by 180. On the basis of the average performance, each subtest was re-arranged in order of simple to difficult as follows (which were being used for final form of the test):

1. Classification
2. Coding
3. General Comprehension
4. Akin words
5. Verbal Analogy
6. General Reasoning
7. Number Series
8. Evaluation of Relationship
9. General Information
10. Arithmetic Reasoning.

4.4 FIRST TRY-OUT:

The main purpose of the try-out in the present study was to select the appropriate items and reject the inappropriate ones on the basis of item analysis for obtaining item indexes, viz., (i) Difficulty Value and (ii) Discriminative power and (iii) Determining the time limit of each subtest and length of the test.

For this try-out, a sample of 555 Khasi students was drawn from ten high schools of Shillong town as already described in chapter 3. The test containing of 200 items spreaded over ten sub-tests was administered to 555 students and data was collected. For the smooth administering of the test, the investigator has followed the following important measures:

i. First of all, the investigator briefed the testees about the purpose of conducting the present test and explained to them about its nature and importance.

ii. Secondly, checked the seat arrangement of the students as to allow the testees to handle the test booklet and answer sheets properly to avoid copying

iii. Thirdly, distributed the test booklet and answer sheet to the testees. Then explained to them clearly all the instructions needed about the test.

iv. Lastly, the investigator instructed the testees to note down the time taken in each subtest on the space provided on the answer sheet. To check the time-limit of the testees the investigator used the stop watch.

4.5 ITEM ANALYSIS:

When the items have been tried out, they were subjected to procedures called Item analysis. Item Analysis is a set of procedure that is applied to know the indices of the truthfulness of items. In other words, item analysis is a statistical technique which is used

for selecting and rejecting the items of a test on the basis of their difficulty values and discriminative power. The main objectives of item analysis technique were:

i. To select the appropriate items for the final draft and reject items which do not contribute in the functioning of the test. Some items are to be modified,

ii. It provides the discrimintive power to differentiate between capable and less capable examinees of all the items preliminary draft of the test. The items are classified on the basis of the indexes- positive, negative and no discrimination. The negative and no discrimination power items are rejected out rightly.

iii. It provides the basis for preparing the final draft of a test, in final draft items are arranged in difficulty order. The easiest items are given in the beginning and most difficult items are provided at the end.

(a) Difficulty Value:

'The difficulty value of an item is defined as the proportion or percentage of the examinees who have answered the item correctly'. Annastasi (2003) suggested that the difficulty of an item may be determined in several ways:

(i) By judgement of competent people who rank the items in order of difficulty,

(ii) By how quickly the item can be solved

(iii) By the number of the examinees in the group who get the item right.

(iv)

The first two procedures were considered during the preparatory stage of the test construction. The third procedure is a standard method of determination of the difficulty

value of items statistically. In this method proportion (P) of the examinee passing an item is calculated which indicates the index of item difficulty.

(b) Discriminative Power of the Items:

The term 'discriminative power' of an item is used for item reliability and item validity. Item reliability may be defined as the degree to which an item distinguishes between high and low groups; they are high and low on the basis of the same test scores. Item validity may be defined as the degree to which the items differentiate between high and low groups; they are high and low on the basis of some other criterion test score.

(c) Methods of Item Analysis:

The present study employed the Kelley's method of item analysis, where the indices of item difficulty and discriminative power were calculated by Kelley's method of 27 percent top and 27 percent bottom dichotomy[4]. This method is conveniently applied when the extreme groups are taken for comparison. Kelley has shown that the ratio of obtained difference to its standard error is maximum when we have approximately 27 percent of the population tested in each of the top and bottom groups. Thus by accepting the two tails and rejecting the middle 46 percent we can minimize our labour without scarifying the precision of our result.

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[4] R.A..Sharma: *Essentials of Measurement in Education and Psychology,* Surya Publication, Meerut, 2005, p.183.

To compute the difficulty value and discriminative power of an item of the present test, answer sheets of 555 students were arranged in descending order (i.e. from the highest to the lowest score) The three groups were formed as follows:

(i). Upper 27 percent of total sheets (i.e 150 sheets)

(ii). Middle 46 percent of total sheets (i.e.255 sheets)

(iii). Lower 27 percent of total sheets (i.e. 150 sheets)

As per Kelley's method, the middle group of 46 percent may be rejected and only the two extreme groups (i.e. upper 27 percent and lower 27 percent) may be taken into consideration for calculating the difficulty value and discriminative power of an item.

To get the corrected value for chance success the following Guildford's formula of correction as suggested by Garrett (1981)[5] was adopted:

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

Where,

Pc = the percent who actually know the right answer
R = the number who get the right answer
W = the number who get the wrong answer
N = the number of examinees in the sample.
HR = the number of the examinees who do not reach the item (and hence do not try)
K = the number of options or choices.

Now, for each item the proportion of the pupils who passed an item correctly in the upper and the lower groups was dertermined. The difficulty value and discriminative value of an item was then calculated by using the following formula as suggested by Davis[6].

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[5] H.E. Garrett: *op.cit.* p. 368.
[6] R.A. Sharma: *op. cit.* p. 187.

Difficulty value (DV) = $(P_U + P_L)/2$
Discriminative Power (DP) = $P_U - P_L$

Where,

P_U = Proportion of correct answers on the item of upper group examinees
P_L = Proportion of correct answers on the item of lower group examinees.

By using the above formulae, the difficulty value and discriminative power of all the 200 items were calculated as given in Table 4.2 to 4.11

Table 4.2: Showing the Difficulty Value and Discrimination indices for the Sub-test I (Classification) administered to 555 students

Sub test – I: Classification (CL)

Upper Group 27 percent 150 students				Lower Group 27 percent 150 students				Dv = Diff. Value 0.30 – 0.70	DP = Disc. Power Above 0.40
R	W	HR	Pu	R	W	HR	Pl	$\frac{Pu + Pl}{2}$	Pu - Pl
1. 120	30	-	.73	100	48	2	.57	.65	.16
2. 100	50	-	.56	85	62	3	.44	.50	.12
3. 125	25	-	.78	83	63	4	.42	.60	.36
4. 150	-	-	1.0	97	53	--	.53	.77	.47
5. 142	8	-	.93	78	70	2	.37	.65	.56*
6. 102	48	-	.57	85	62	3	.44	.51	.13
7. 147	3	-	.97	94	50	6	.54	.76	.43
8. 95	55	-	.51	78	71	1	.36	.43	.15
9. 75	73	2	.34	51	90	9	.15	.25	.19
10. 141	7	2	.94	63	78	9	.26	.60	.68*
11. 116	31	3	.72	98	52	--	.54	.63	.18
12. 145	4	1	.96	80	63	7	.41	.69	.55*
13. 141	9	-	.92	81	62	7	.42	.67	.50*
14. 141	9	-	.92	62	84	4	.23	.58	.69*
15. 140	9	1	.92	56	89	5	.18	.55	.74*
16. 134	16	-	.86	63	79	8	.26	.56	.60*
17. 131	18	1	.84	38	102	10	.03	.44	.81*
18. 90	60	-	.47	71	78	1	.30	.39	.17
19. 130	19	1	.83	53	96	1	.14	.49	.69*
20. 140	10	-	.91	108	32	4	.67	.79	.24

* Items retained for the final form of the test

Table 4.3: Showing the Difficulty Value and Discrimination indices for the sub-test II (Coding) administered to 555 students.

Sub test – II: Coding (CO)

Upper Group 27 percent 150 students					Lower Group 27 percent 150 students				Dv = Diff. Value 0.30 – 0.70	DP = Disc. Power Above 0.40
	R	W	HR	Pu	R	W	HR	Pl	$\frac{Pu + Pl}{2}$	Pu - Pl
1.	148	2	--	.98	129	20	1	.82	.90	.16
2.	146	4	--	.96	100	47	3	.57	.77	.39
3.	148	2	--	.98	82	65	3	.41	.70	.57*
4.	147	3	--	.97	91	55	4	.50	.74	.47
5.	146	4	--	.96	80	66	4	.40	.68	.56*
6.	147	3	--	.97	92	54	4	.51	.74	.46
7.	150	--	--	1.00	81	65	4	.41	.71	.59
8.	147	3	--	.97	87	50	13	.51	.74	.46
9.	150	--	--	1.00	89	50	11	.52	.76	.48
10.	145	5	--	.96	115	22	13	.79	. 88	.17
11.	145	5	--	.96	84	54	12	.48	.72	.48
12.	148	2	--	.98	61	67	22	.30	.64	.68*
13.	148	2	--	.98	39	82	29	.10	.54	.88*
14.	146	4	--	.96	38	73	39	.12	.54	.84*
15.	144	6	--	.95	52	52	46	.33	.64	.62*
16.	144	6	--	.95	25	83	42	- .02	.47	.97*
17.	150	--	--	1.00	42	63	45	.20	.60	.80*
18.	130	20	--	.82	28	80	42	.01	.42	.81*
19.	130	10	--	.91	50	60	40	.27	.59	.64*
20.	145	5	--	.96	29	82	39	.02	.48	.94*

* Items retained for the final form of the test

Table 4.4: Showingthe Difficulty Value and Discrimination indices for the Sub-test III (General Comprehension) administered to 555 students

Sub test – III: General Comprehension (GC)

Upper Group 27 percent 150 students					Lower Group 27 percent 150 students				Dv = Diff. Value 0.30 – 0.70	DP = Disc. Power Above 0.40
	R	W	HR	Pu	R	W	HR	Pl	$\frac{Pu + Pl}{2}$	Pu - Pl
1.	45	104	1	.07	51	98	1	.12	.10	-.05
2.	125	25		.78	64	85	1	.23	.51	.55*
3.	103	44	3	.60	53	93	4	.47	.54	.13
4.	136	14		.88	82	68		.40	.64	.48*
5.	129	21		.81	87	62	1	.45	.63	.36
6.	125	25		.78	64	86		.24	.51	.54*
7.	78	72		.36	41	106	3	.04	.20	.32
8.	109	40		.64	35	107	8	-.00	.32	.64*
9.	117	33		.71	67	79	4	.28	.50	.43*
10.	126	24		.79	61	88	1	.21	.50	.58*
11.	114	36		.68	59	83	8	.22	.45	.46*
12.	126	24		.79	35	102	13	.01	.40	.78*
13.	73	77		.32	34	105	11	- .01	.16	.33
14.	117	33		.71	72	66	12	.36	.54	.35
15.	84	66		.41	41	91	18	.08	.25	.33
16.	114	35	1	.69	36	87	27	.06	.38	.63*
17.	125	24	1	.79	53	69	29	.25	.52	.54*
18.	19	128	3	- .16	13	108	29	- .19	- .18	- .03
19.	124	24	2	.78	70	44	36	.46	.62	.32
20.	107	39	4	.64	53	63	34	.28	.46	.36

* Items retained for the final form of the test

Table 4.5: Showing the Difficulty Value and Discrimination indices for the sub-test IV (Akin Words) administered to 555 students

Sub test – IV: Akin Words (A W)

Upper Group 27 percent 150 students					Lower Group 27 percent 150 students				Dv = Diff. Value 0.30 – 0.70	DP = Disc. Power Above 0.40
	R	W	HR	Pu	R	W	HR	Pl	$\frac{Pu + Pl}{2}$	Pu - Pl
1.	30	119	1	-.06	25	119	6	-.10	.08	.04
2.	106	41	3	.63	34	110	6	-.2	.31	.65*
3.	118	31	1	.72	27	119	4	-.87	.08	1.59
4.	129	21		.81	58	90	2	.19	.50	.62*
5.	57	90	3	.18	18	130	2	- .17	.01	.35
6.	130	19	1	.83	52	95	3	.14	.49	.69*
7.	140	10		.91	58	91	1	.19	.55	.72*
8.	135	15		.87	51	98	1	.12	.50	.75*
9.	97	52	1	. 53	16	131	3	-.19	.17	.72
10.	135	15		.87	40	106	4	.03	.45	.84*
11.	119	29	2	.74	35	113	2	-.02	.36	.76*
12.	138	12		.89	29	117	4	-.07	.41	.96*
13.	134	15	1	.87	48	98	4	.11	.49	.76*
14.	135	15		.87	45	99	6	.08	.48	.79*
15.	145	5		.96	103	41	6	.62	.79	.33
16.	101	49		.56	30	115	5	-.06	.25	.62
17.	113	37		. 67	50	94	6	.13	.40	.54*
18.	95	52	3	.53	62	81	7	.24	.39	.29
19.	93	56	1	.50	17	125	8	-.17	.17	.67
20.	125	24	1	.79	45	98	7	.09	.44	.70*

* Items retained for the final form of the test

Table 4.6: The following table shows the Difficulty Value and Discrimination indices for the sub-test V (Verbal Analogy) administered to 555 students

Sub test - V: Verbal Analogy (VA)

Upper Group 27 percent 150 students					Lower Group 27 percent 150 students				Dv = Diff. Value 0.30 – 0.70	DP = Disc. Power Above 0.40
	R	W	HR	Pu	R	W	HR	Pl	$\frac{Pu + Pl}{2}$	Pu - Pl
1.	130	18	2	.84	68	66	16	.34	.59	.50*
2.	68	80	2	.28	28	113	9	-.07	.11	.35
3.	66	82	2	.26	28	107	15	-.06	.10	.32
4.	97	49	4	.55	38	99	13	.04	.30	.51*
5.	42	97	11	.07	23	107	20	-.10	-.02	.17
6.	120	27	3	.76	80	62	8	.42	.59	.34
7.	97	53		.53	49	97	4	.11	.32	.42*
8.	147	2	1	.98	88	57	5	.48	.73	.50
9.	134	16		.86	108	42		.63	.75	.23
10.	100	47	3	.57	50	97	3	.12	.35	.45*
11.	93	54	3	.51	40	96	14	.06	.29	.45
12.	132	15	3	.86	58	81	11	.22	.54	.64*
13.	124	25	1	.78	63	70	17	.30	.54	.48*
14.	78	69	3	.37	42	88	20	.10	.24	.27
15.	115	34	1	.70	52	81	17	.19	.45	.51*
16.	88	57	5	.48	47	76	27	.18	.33	.30
17.	129	20	1	.82	36	84	30	.07	.45	.75*
18.	127	22	1	.80	52	75	23	.21	.51	.59*
19.	120	23	7	.79	42	77	29	.13	.46	.66*
20.	77	70	3	.37	32	99	19	-.01	.18	.38

* Items retained for the final form of the test

Table 4.7: Showing the Difficulty Value and Discrimination indices for the Sub-test VI (General Reasoning) administered to 555 students

Sub test – VI: General Reasoning (GR)

Upper Group 27 percent 150 students					Lower Group 27 percent 150 students				Dv = Diff. Value 0.30 – 0.70	DP = Disc. Power Above 0.40
	R	W	HR	Pu	R	W	HR	Pl	$\frac{Pu - Pl}{2}$	Pu - Pl
1.	43	101	6	- .05	35	109	6	-.14	-.10	.09
2.	144	6		.94	84	62	4	.36	.65	.58*
3.	136	14		.86	77	68	5	.30	.58	.56*
4.	90	58	2	.41	27	114	9	-.21	.10	.62
5.	139	10	1	.90	99	46	5	.52	.71	.38
6.	43	107		-07	17	129	4	-.33	-.20	.26
7.	131	19		.81	89	57	4	.41	.61	.40*
8.	134	16		.84	83	63	4	.35	.60	.49*
9.	111	39		.61	54	89	7	.07	.34	.54*
10.	95	54	1	.46	57	88	5	.09	.28	.37
11.	58	91	1	.08	30	112	8	-.18	.05	.26
12.	118	32		.68	49	91	10	.03	.36	.65*
13.	113	37		.63	53	82	15	.09	.36	.54*
14.	38	111	1	-.12	49	87	14	.04	-.04	-.16
15.	100	49	1	.51	36	90	24	-.07	.22	.58
16.	53	93	4	.04	15	101	34	-.31	-.14	.35
17.	113	32	5	.67	54	61	35	.20	.44	.47*
18.	114	34	2	.66	40	76	34	.02	.34	.64*
19.	80	66	4	.32	10	103	37	-.37	-.03	.69
20.	100	45	5	.53	20	93	37	-.23	.15	.76

* Items retained for the final form of the test

Table 4.8: Showing the Difficulty Value and Discrimination indices for the Sub-test VII (Number Series) administered to 555 students

Sub test – VII: Number Series (NS)

Upper Group 27 percent 150 students					Lower Group 27 percent 150 students				Dv = Diff. Value 0.30 – 0.70	DP = Disc. Power Above 0.40
	R	W	HR	Pu	R	W	HR	Pl	$\frac{Pu + Pl}{2}$	Pu - Pl
1.	149	1		.99	121	20	9	.81	.90	.18
2.	19	119	12	-.15	15	117	18	-.18	-.17	.03
3.	140	8	2	.93	84	48	18	.52	.73	.41
4.	130	20		.82	38	87	25	.07	.45	.75*
5.	119	31		.72	45	83	22	.14	.43	.58*
6.	136	14		.88	65	58	27	.37	.63	.51*
7.	22	105	23	-.10	18	86	46	-.10	-.10	.00
8.	146	4		.96	34	83	33	.05	.51	.91*
9.	133	16	1	.86	37	71	42	.12	.49	.74*
10.	117	30	3	.73	29	88	33	-.00	.37	.73*
11.	26	124		-.10	41	86	23	.10	.00	-.20
12.	142	8		.93	43	75	32	.15	.54	.78*
13.	139	11		.90	45	77	28	.16	.53	.74*
14.	132	17	1	.85	20	72	58	-.04	.41	.89*
15.	142	8		.93	34	61	55	.14	.54	.79*
16.	124	25	1	.78	16	76	58	-.10	.34	.88*
17.	26	124		-.10	18	85	47	-.10	-.10	.00
18.	143	7		.94	34	70	46	.10	.52	.84*
19	142	8		.93	40	65	45	.17	.55	.76*
20.	142	7	1	.94	81	23	46	.71	.23	.83

* Items retained for the final form of the test

Table 4.9: Showing the Difficulty Value and Discrimination indices for the Sub-test VIII (Evaluation of Relationship) administered to 555 students.

Sub test – VIII: Evaluation of Relationship (ER)

Upper Group 27 percent 150 students					Lower Group 27 percent 150 students				Dv = Diff. Value 0.30 – 0.70	DP = Disc. Power Above 0.40
	R	W	HR	Pu	R	W	HR	Pl	$\frac{Pu + Pl}{2}$	Pu - Pl
1.	122	27	1	.76	83	52	15	.49	.63	.27
2.	100	47	3	.57	61	72	17	.28	.43	.29
3.	105	45	_	.60	34	97	19	.01	.31	.59*
4.	120	29	1	.74	49	77	24	.19	.47	.55*
5.	131	19	_	.83	73	57	20	.42	.63	.41*
6.	113	37	_	.67	39	92	19	.06	.37	.61*
7	76	73	1	.35	28	97	25	-.03	.16	.38
8.	137	13	_	.88	105	24	21	.75	.82	.13
9.	107	42	1	.62	37	87	26	.06	.34	.56*
10.	128	21	1	.81	47	76	27	.18	.50	.63*
11.	43	104	3	.06	15	94	41	-.15	-.05	.21
12.	101	49	_	.56	20	90	40	-.09	.24	.65
13.	121	25	4	.77	27	74	49	.02	.40	.75*
14.	140	10	_	.91	33	69	48	.10	.51	.81*
15	138	12	_	.89	39	60	51	.19	.54	.70*
16.	86	62	2	.44	26	68	56	.04	.24	.40
17.	121	28	1	.75	33	65	52	.12	.44	.63*
18.	115	31	4	.72	13	80	57	-.15	.29	.87
19.	96	45	9	.57	18	78	54	-.08	.25	.65
20.	116	20	14	.80	31	66	53	.09	.45	.71*

* Items retained for the final form of the test

Table 4.10: The following table shows the Difficulty Value and Discrimination indices for the Sub-test IX (Evaluation of Relationship) administered to 555 students

Sub test – IX: General Information (GI)

Upper Group 27 percent 150 students				Lower Group 27 percent 150 students				Dv = Diff. Value 0.30 – 0.70	DP = Disc. Power Above 0.40
R	W	HR	Pu	R	W	HR	Pl	$\frac{Pu + Pl}{2}$	Pu - Pl
1. 83	61	6	.43	30	92	28	.01	.22	.42
2. 90	50	10	.52	40	80	30	.11	.32	.41*
3. 142	8		.93	90	42	18	.58	.76	.35
4. 140	10		.91	97	42	11	.60	.76	.31
5. 27	119	4	-.09	9	125	16	-.24	-.17	.15
6. 120	26	4	.76	52	84	14	.18	.47	.58*
7. 75	70	5	.36	29	99	22	.03	.17	.39
8. 121	28	1	.75	62	75	13	.27	.51	.48*
9. 136	14	-	.88	56	76	18	.23	.56	.65*
10. 48	99	3	.10	42	90	18	.09	.10	.01
11. 140	9	1	.92	89	42	19	.57	.75	.35
12. 105	41	4	.63	70	61	19	.38	.51	.25
13. 108	39	3	.65	43	90	17	.10	.38	.55*
14. 22	126	2	-.14	13	122	15	-.20	-.17	.06
15. 94	55	1	.51	121	14	15	.86	.69	-.35
16. 94	53	3	.52	38	83	29	.09	.31	.43*
17. 89	59	2	.47	51	76	23	.20	.34	.27
18. 44	101	5	.07	22	102	26	-.10	-.02	.17
19. 149		1	1.00	116	20	14	.80	.90	.20
20. 50	98	2	.12	29	105	16	-.04	.04	.16

* Items retained for the final form of the test

Table 4.11: Showing the Difficulty Value and Discrimination indices for the Sub-test X (Arithmetic Reasoning) administered to 555 students

Sub test – X: Arithmetic Reasoning (AR)

Upper Group 27 percent 150 students					Lower Group 27 percent 150 students				Dv = Diff. Value 0.30 – 0.70	DP = Disc. Power Above 0.40
	R	W	HR	Pu	R	W	HR	Pl	$\frac{Pu + Pl}{2}$	Pu - Pl
1.	136	14		.88	58	66	26	.29	.59	.59*
2.	120	29	1	.74	31	87	32	.02	.38	.72*
3.	123	26	1	.77	47	73	30	.19	.48	.58*
4	139	11		.90	90	38	22	.60	.75	.30
5.	126	23	1	.79	37	69	44	.13	.46	.66*
6	101	46	3	.58	22	71	57	-.02	.28	.60
7.	33	112	5	-.03	15	91	44	-.14	.09	.11
8.	56	91	3	.17	17	87	46	-.12	.03	.29
9.	81	68	1	.39	39	78	33	.11	.25	.28
10.	90	59	1	.47	14	86	50	-.15	.16	.62
11.	74	71	5	.35	19	74	57	-.06	.15	.41
12.	135	14	1	.87	44	54	52	.27	.57	.60*
13.	91	55	4	.50	37	70	43	.13	.32	.37
14.	122	27	1	.76	42	57	51	.23	.50	.53*
15.	109	39	2	.65	20	70	60	-.04	.31	.69*
16.	123	26	1	.77	14	76	60	-.13	.32	.90*
17.	70	76	4	.31	8	76	66	-.21	.05	.52
18.	127	21	2	.81	38	.55	57	.21	.51	.60*
19.	124	21	5	.81	05	93	52	-.27	.27	1.08
20.	47	99	4	.10	08	95	47	-.23	-.07	.33

* Items retained for the final form of the test

4.6 ITEMS RETAINED FOR THE FINAL FORM OF THE TEST:

The data obtained with regards to the item difficulty and discriminative power facilited the final selection of the items. The items whose difficulty value found in between 0.30 and 0.70 and discrimininative power 0.40 and above were retained as suggested by

Stanley and Hopkin[7]. The items with negative discriminative power were not included in the test. However, items which did not fall under the said difficulty value and discriminative power were omitted. As a result, out of 200 items, 100 items were rejected who's item difficulty and discriminative power did not fall in the range as mentioned above. The total 100 items were then retained for the final test was given in Table 4.12. The following table shows the difficulty value and discriminative power of an item in ten subtests retained for the final form of the test.

Table 4.12: Showing the number of items retained in each subtests having DV 0.30 - 0.70 and DP above 0.40

Test No.		Items retained having DV .30-.70 and DP above .40	Total No. of Items retained in each subtests
1	CL	5, 10, 12, 13, 15, 16, 17, 19	9
2	CO	3, 5, 12, 13, 14, 15, 16, 17, 18, 19, 20,	11
3	GC	2, 4, 6, 8, 9, 10, 11, 12, 16, 17	10
4	AW	2, 4, 6, 7, 8, 10, 11, 12, 13, 14, 17, 20	12
5	VA	1, 4, 7, 10, 12, 13, 15, 17, 18, 19	10
6	GR	2, 3, 7, 8, 9, 12, 13, 17, 18	9
7	NS	4, 5, 6, 8, 9, 10, 12, 13, 14, 15, 16, 18, 19	13
8	ER	3, 4, 5, 6, 9, 10, 13, 14, 15, 17, 20	11
9	GI	2, 6, 8, 9, 13, 16	6
10	AR	1, 2, 3, 5, 12, 14, 15, 16, 18	9
Total			100

[7] J.C..Stanley and K.D. Hopkins: *Educational & Psychological Measurement and Evaluation,* Prentice Hall of India Pvt. Ltd., New Delhi, 1978, p. 270.

Table 4.13: Showing the Difficulty value and Discriminative indices of the items retained for final form in subtest wise in order of increasing difficulty values

Sub Test – 1: Classification (CL)

Sl. No.	No. of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	12	.69	.55
2	13	.67	.50
3	5	.65	.56
4	10	.60	.68
5	14	.58	.69
6	16	.56	.60
7	15	.55	.74
8	19	.49	.69
9	17	.44	.81

Sub Test – II: Coding (CO)

Sl.No	No. of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	3	.70	.57
2	5	.68	.56
3	12	.64	.68
4	15	.64	.62
5	19	.59	.64
6	17	.60	.80
7	13	.54	.88
8	14	.54	.84
9	20	.48	.94
10	16	.47	.97
11	18	.42	.81

Sub Test – III: General Comprehension (GC)

Sl. No.	No. of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	4	.64	.48
2	17	.52	.54
3	2	.51	.55
4	6	.51	.54
5	9	.50	.43
6	10	.50	.58
7	11	.45	.46
8	12	.40	.78
9	16	.38	.63
10	17	.52	.54

Sub Test – IV: Akin/Imitative Words (A/IW)

Sl. No	No. of Items	Difficulty Indices .30 -.70	Disc. Indices .40 and above
1	7	.55	.72
2	4	.50	.62
3	8	.50	.75
4	6	.49	.69
5	13	.49	.76
6	14	.48	.79
7	10	.45	.84
8	20	.44	.70
9	12	.41	.96
10	17	.40	.54
11	11	.36	.74
12	2	.31	.65

Sub Test – V: Verbal Analogy (VA)

Sl.No	No. of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	1	.59	.50
2	12	.54	.64
3	13	.54	.48
4	18	.51	.59
5	19	.46	.66
6	17	.45	.75
7	15	.45	.51
8	10	.35	.45
9	7	.32	.42
10	4	.30	.51

Sub Test – VI: General Reasoning (GR)

Sl. No.	No. of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	2	.65	.58
2	7	.61	.40
3	8	.60	.49
4	3	.58	.56
5	17	.44	.47
6	13	.36	.54
7	12	.36	.65
8	9	.34	.54
9	18	.34	.64

Sub Test – VII: Number Series (NS)

Sl.No.	No.of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	6	.63	.51
2	19	.55	.76
3	15	.54	.79
4	12	.54	.78
5	13	.53	.74
6	18	.52	.84
7	8	.51	.91
8	9	.49	.74
9	4	.45	.75
10	5	.43	.58
11	14	.41	.89
12	10	.37	.73
13	16	.34	.88

Sub Test – VIII: Evaluation of Relationship (ER)

Sl.No.	No.of Items	Difficulty Indices .30 - .70	Disac. Indices .40 and above
1	5	.63	.41
2	15	.54	.70
3	14	.51	.81
4	10	.50	.63
5	4	.47	.55
6	20	.45	.71
7	17	.44	.63
8	13	.40	.75
9	6	.37	.61
10	9	.34	.56
11	3	.31	.59

Sub Test – IX: General Information (GI)

Sl.No.	No.of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	9	.56	.65
2	8	.51	.48
3	6	.47	.58
4	13	.38	.55
5	2	.32	.41
6	16	.31	.43

Sub Test – X: Arithmetic Reasoning (AR)

Sl.No.	No.of Items	Difficulty Indices .30 - .70	Disc. Indices .40 and above
1	1	.59	.59
2	12	.57	.60
3	18	.51	.60
4	14	.50	.53
5	3	.48	.58
6	5	.46	.66
7	2	.38	.72
8	16	.32	.90
9	15	.31	.69

4.7 FINAL FORM OF THE TEST:

For determining the time taken for each subtest, the investigator has instructed the testees during the first try out to record their time taken for each sub-test. On the basis of their recorded time in the answer-sheet, average time taken by 555 students was calculated for each sub-test. Thus the final form of the test after item analysis and time taken in each subtest was given as follows:

Table 4.14: Number of Items retained & Time taken in each Subtest

Sl. No.	Sub-Test	No. of Items retained	Time- taken (in Minutes)
1	Classification	9	$1^{1}/_{2}$
2	Coding	11	4
3	General Comprehension	10	3
4	Akin Words	12	3
5	Verbal Analogy	10	$2^{1}/_{1}$
6	General Reasoning	9	3
7	Number Series	13	4
8	Evaluation of Relationship	11	4
9	General Information	6	1
10	Arithmetic Reasoning	9	4
Total		100	30 mins

Chapter – V

STANDARDIZATION OF THE TEST

5.1 : Estimation of Reliability

5.2 : Estimation of Validity

5.3 : Establishment of Norms

5.4 : Studying the Level of Intelligence

CHAPTER - V

STANDARDIZATION OF THE TEST

Standardization means preparing the uniform procedures of administering, scoring and establishing the reliability, validity and norms of the test. This Chapter is devoted to the standardization of the present test.

5.1 ESTIMATION OF RELIABILITY:

A test to be called sound must be reliable. Reliability means the extent to which a test is dependable, stable and consistent, when given to different people or administered on different occasions. For estimating the reliability of the present test, the investigator used three types of tests viz. Ahuja's Group Test of Intelligence, Cattell's Culture Fair Test of Intelligence and the Investigator's Group Test of Intelligence. These intelligence tests were administered one by one on the sample of 3000 students (described in chapter 3) and the data collected was used for estimating the reliability.

For computing the reliability of the present test, Split-half and Kuder-Richardson reliability were used. The former is concerned with internal consistency of the test and the latter with the inter-correlations of the items with the test as a whole.

(a) Split-half Reliability:

In the present study the scores of the entire sample 3000 were divided into two equivalent halves of odd and even items. When the two sets of scores were obtained from the two halves tests, the obtained scores were then presented in the form of a scattergram to ensure the rectilinearity of two-half scores, as shown in Fig.5.1 (for the two sets of data). The frequency polygon (Fig.5.2) was also plotted to ensure that they represent the normal curve.

Second Half of the Test (X-Variable) Even Number	First Half of the Test (Y-Variable) Odd Number									
	6 - 10	11 - 15	16- 20	21- 25	26- 30	31- 35	36- 40	41- 45	46- 50	fy
46-50					4	5	15	14	1	39
41-45			1	4	14	34	51	48	6	158
36-40		1	8	21	46	84	101	44	10	315
31-35			32	68	116	182	104	46	8	556
26-30	1	10	56	100	232	110	45	13	5	572
21-25	1	8	89	229	161	87	34	6	4	619
16-20	5	39	229	136	104	48	23	5	3	592
11 -15	4	50	49	23	5	4				135
6 - 10	6	2	3	1	1	1				14
0 - 5										
fx	17	110	467	582	683	555	373	176	37	3000

Fig. 5.1: Scattergram of Scores obtained for Estimation of Split-half Reliability of the Present Test (N=3000).

The coefficient of correlation (r'_{11}) between the two sets of scores obtained from the two halves was computed by Product Moment Method and was found to be 0.76. From the reliability of the half test, the self correlation of the whole test was then estimated by Spearman-Brown Prophecy formula. The coefficient of correlation was found to be 0.86. as given in Table 5.1.

Formulae:

(i) Product Moment Method:

$$r = \frac{N \Sigma X'Y' - \Sigma f X' \Sigma f Y'}{\sqrt{\{N \Sigma f X'^2 - (\Sigma f X')^2\} x \{N \Sigma f Y'^2 - (\Sigma f Y')^2/\}}}$$

$r = 0.76$

(ii) Spearman-Brown Prophecy formulae:

$r_{11} = 2 r'_{11} / (1 + r'_{11})$

$r_{11} = 0.86$

Table 5.1: Split-half Reliability Coefficient of the Present Test

N	r_{11}	P
3000	0.86	.01*

The obtained split-half reliability coefficient was significant at .01* level. 'It is clear that even a small r may be significant if computed from a very large sample' (Garrett)[1]. This indicates a very high degree of positive correlation between the two sets of half scores.

[1] H.E. Garrett: *Statistics in Psychology and Education*; Valkis, Feffer and Simons Ltd., Bombay, 1981, p.202

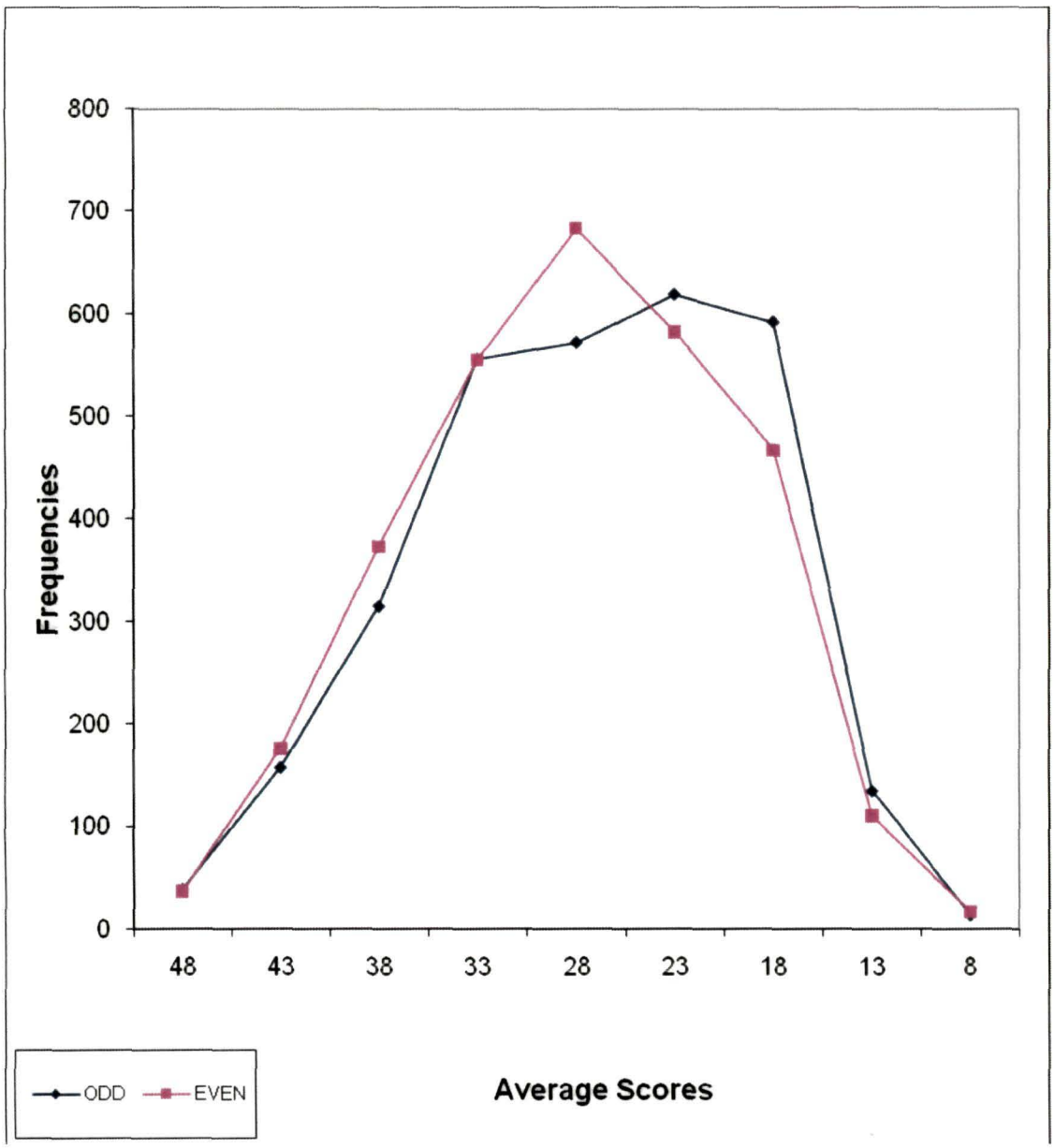

Fig. 5.2: Frequency Polygon of Scores obtained for Estimation of Split-half Reliability

(b) Kuder-Richardson Reliability:

For estimating the reliability index of the present study, the investigator adopted the following formula of K-R 21 as given in Garrett[2]. The method adopted is known as Kuder-Richardson (K-R) Reliability. This method of rational equivalence, stresses on the inter-correlation of the items in the test and the correlations of the items with the test as a whole. The assumption is made in the Kuder-Richardson formula that all items have the same or equal difficulty-value, but not necessarily the same persons solving each item correctly. The following formula was adopted:

$$r_{11} = \frac{n\sigma^2_t - M(n-M)}{\sigma^2_t \quad (n-1)}$$

Where

r_{11} = reliability of the whole test
n = number of items in the test
σ_t = the S D of the test scores
M = the mean of the test scores.

The K-R reliability of the present test was calculated by the above formula. The Kuder-Richardson reliability coefficient of the present test was found to be 0.89 as given in Table 5.2

Table 5.2: Kuder-Richardson Reliability of the Present Test

N	r_{11}	P
3000	0.89	.01*

[2] *Ibid.*, p. 341.

The obtained K-R reliability coefficient was significant at .01* level. It is clear that 'even a small r may be significant if computed from a very large sample' (Garrett)[6]. This indicates a very high degree of positive correlation

5.2 ESTIMATION OF VALIDITY:

Validity is another prerequisite for a test to be sound. "The Validity of a test concerns with what the test measures and how well it does so". For estimating the validity of the present test, the investigator used the following methods:

(a). Content Validity

(b). Concurrent Validity

(c). Construct Validity

(a) Content Validity:

Content validity is the degree to which a test measures an intended content area. According to Annastasi "Content Validity involves essentially the systematic examination of the test content to determine whether it covers a representative sample of the behaviour domain to be measured". The content-validity of the present test was rated by the expert's judgment. For rating the present test, the investigator constructed a rating scale consisting of seven questions.

The constructed rating scale was then, given to 20 experts .The experts consisted of 13 doctorate degree holders, 4 senior lecturers, 1 joint Director of Mass and Elementary Education, 1 District Inspectress of Education and 1 Research scholar. According to them the items by and large were representative of the mental ability of the school going children

of age-group 14 to 16 + to a great extent and the test was able to measure the level of intelligence. Further, the test covered the various components of intellectual abilities to a great extent and items were suitable for school going children in terms of content, difficulty and language.

The items-wise opinions given by the experts were as follows:

Table 5.3: Showing the content-validity of rating scale obtained from 20 experts

The investigator constructed a rating scale to estimate the content validity of the intelligence test under construction. It contained seven items as given below:

1. How far the items listed in the test are representative of intellectual abilities of children?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all
12(60%)	8 (40%)	0	0

2. Do you think that items listed in the test under reference would be able to measure the level of Intelligence of children?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all
(9) 45%	(9) 45%	(2) 10 %	0

3. To what extent have the test items covered the various components of intellectual abilities of children under different sub-tests?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all
(9) 45 %	(10) 50 %	(1) 5 %	0

4. Are the items suitable for school going children of the age group 14-16 + (Cl.VIII-X) in terms of the content presented?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all
(10) 50 %	(8) 40 %	(2) 10 %	0

5. Are the items suitable for school-going children of the age group 14-16 + (Cl. VIII-X) in terms of items -difficulties?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all
(8) 40 %	(12) 60 %	0	0

6. Are the items suitable for school-going children of the age group 14-16 + (Cl. VIII-X) in terms of the language used?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all
(10) 50 %	(9) 45 %	(1) 5 %	0

7. To what extent are the test items related to the Khasi culture?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all
(11) 55 %	(9) 45 %	0	0

With regards to the representativeness of the mental ability of items, 60% of the experts were of the opinion that the test items represent the mental ability of intellectual functioning to a great extent; and 40 % were of the view that it was to quite an extent. On the whole, the test items were found to be quite satisfactory as representative of the mental ability.

As far as the ability of the test items as to measure the level of intelligence is concerned, 45% of the experts were of the opinion that the items were able to measure the level of intelligence to a great extent, 45% said to quite an extent; 10% stated to some extent. On the whole, the test items were able to measure the level of intelligence to quite an extent.

With regards to the coverage of the various components of intellectual abilities, 45% of the experts expressed their opinions that the test items were able to cover the various components of intellectual abilities to a great extent, 50 % expressed their views to quite an

extent; and 5% expressed to some extent. On the whole, the test items were found to cover the various components of mental abilities to a greater extent.

As far as the suitability of items in terms of the content presented is concerned, 50% were of the opinion that the items were suitable to a great extent; 40% stated to quite an extent; 10% viewed that the items were suitable to some extent. On the whole, the test items were found suitable to measure the intelligence of school going children in terms of content presented.

With regards to the suitability of items in terms of item difficulty, 40% viewed that the test items were suitable in terms of difficulty to a great extent; and 60% stated to quite an extent. On the whole, the test-items were found quite satisfactory to measure the intelligence of school children of age group 14 to 16 + in terms of item difficulty.

As far as the suitability of items in terms of language is concerned, 50% are of the opinion that test items were suitable in terms of language to a great extent; and 45% said to quite an extent; 5% stated to some extent. On the whole, the test-items were found suitable to measure the intelligence of school children of age group 14 to 16 + in terms of language to a great extent.

With regards to the suitability of test items in relation to the Khasi culture, 55 % of the experts expressed their opinions to a great extent; and 45 % stated to quite an extent. On the whole, the test-items were found suitable to the Khasi culture quite satisfactorily.

(b) Concurrent Validity:

Concurrent validity is the extent to which the test performance is related to some other independent criterion of performance. It is determined experimentally by finding out

the correlation between the test and some independent criteria. To find the concurrent validity of the present test, it was correlated with the external criterion test viz. Ahuja's Group Test of Intelligence and Cattell's Culture Fair Test of Intelligence. For this purpose, the correlation was calculated by using Pearson's Product Moment method.

(i) The Concurrent Validity of the present test with respect to Ahuja's Test

The concurrent validity of the test was determined by correlating the present test scores with the external criterion scores obtained from the Ahuja's test. These were tabulated and presented in the form of a scattergram (Fig.5.3), to ensure the rectilinearity of score. For the two sets of data frequency polygon were also plotted to ensure that they represent the normal curve (Fig.5.4).

		AHT	Y – Variable (Scores in Ahuja's test)											
X-Variable (Score in Present Test)	Present Test	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	fy
	91-100	0	0	0	0	0	0	0	0	3	1	0	0	4
	81-90	0	0	0	0	1	14	22	55	28	11	9	0	140
	71-80	0	0	0	1	20	86	125	73	29	8	2	0	344
	61-70	0	0	0	13	108	244	125	64	29	7	2	0	592
	51-60	0	0	2	56	329	226	96	36	15	3	0	0	763
	41-50	0	0	11	223	244	108	67	17	4	0	0	0	674
	31-40	0	2	58	203	95	27	9	6	2	0	0	0	402
	21-30	0	3	35	26	7	4	0	0	0	0	0	0	75
	11- 20	0	3	2	1	0	0	0	0	0	0	0	0	6
	1 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fx	0	8	108	523	804	709	444	251	110	30	13	0	3000

Fig. 5.3: Scattergram of Scores obtained in the Present Test and Ahuja's Test for Estimation of Concurrent Validity of Present Test (N=3000)

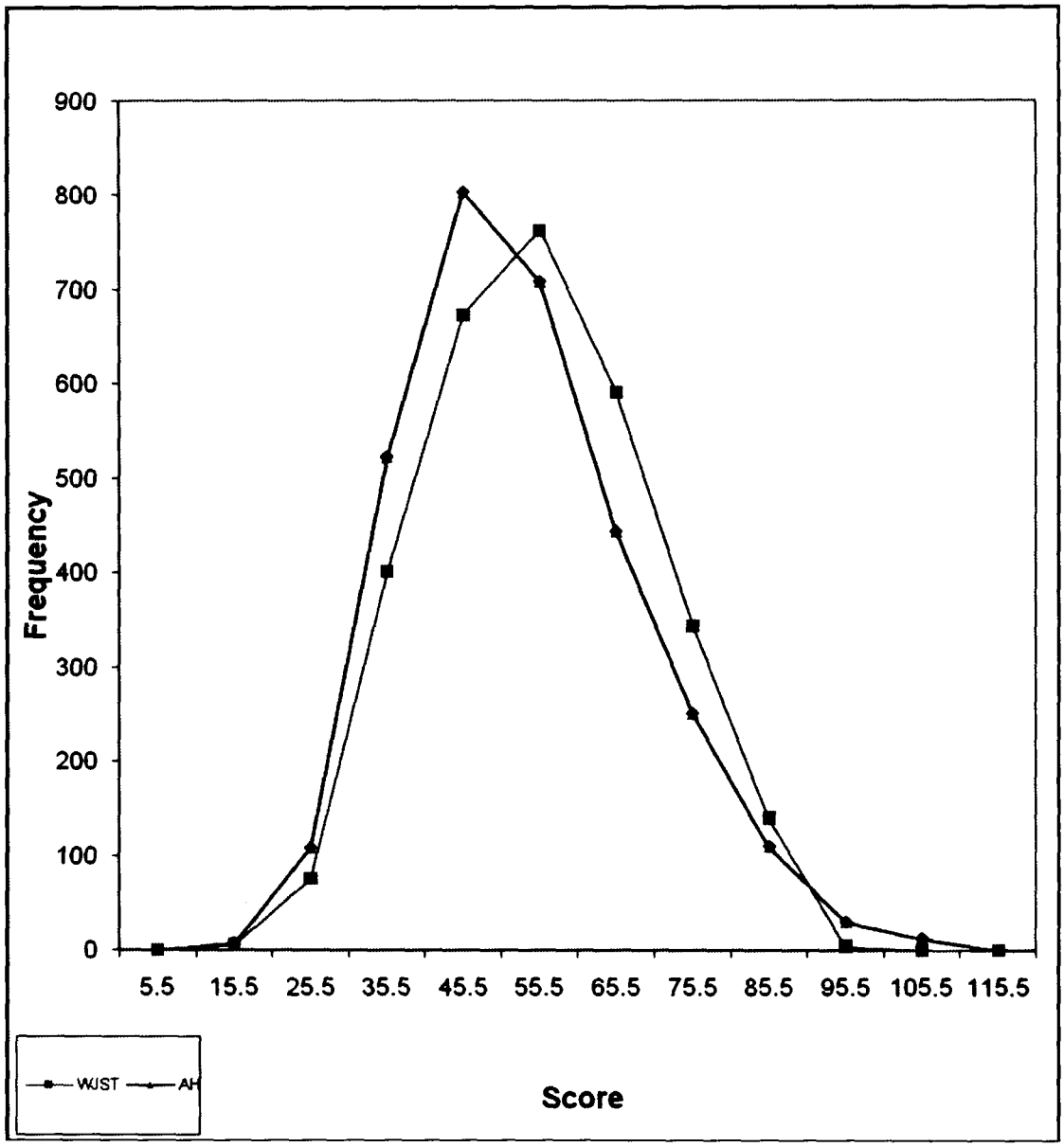

Fig. 5.4: Frequency Polygon of Scores obtained in Present Test and Ahuja's Test for estimation of Concurrent Validity.

The coefficient of correlation between the two tests was calculated by Pearson's Product Moment method. The formula is as follows:

$$r = \frac{N \Sigma X'Y' - \Sigma f X' \Sigma f Y'}{\sqrt{\{N \Sigma fX'^2 - (\Sigma f X')^2\} x \{N \Sigma f Y'^2 - (\Sigma f Y')^2/\}}}$$

Table 5.4: Coefficient of Correlation of the present test with respect to Ahuja's Test

N	r	P
3000	0.80	.01*

The obtained concurrent validity coefficient of correlation of the present test with respect to Ahuja's test was significant at .01* level. 'It is clear that even a small r may be significant if computed from a very large sample' (H.E. Garrett)[3]. This indicates a very high degree of positive correlation.

(ii) The concurrent validity of the test with respect to Cattell's Culture Fair Test.-

The concurrent validity of the present test was also determined by correlating the present test scores with the external criterion scores obtained from the Cattell's Culture Fair test. These were tabulated and presented in the form of a scattergram (Fig.5.5), to ensure the rectilinearity of score. For the two sets of data frequency polygon were also plotted to ensure that they represent the normal curve (Fig.5.6).

[3] *Ibid.*, p. 341.

	Y Variable (Culture Fair Test)						
X-Variable (Present Test)		CFT					
	Present Test	1-10	11- 20	21 - 30	31 - 40	41-50	fy
	91 - 100	0	0	4	0	0	4
	81-90	0	1	37	96	6	140
	71-80	0	1	214	129	0	344
	61-70	0	18	465	109	0	592
	51-60	0	49	696	17	1	763
	41-50	2	223	440	9	0	674
	31-40	2	301	98	1	0	402
	21-30	1	63	10	1	0	75
	11 to 20	2	4	0	0	0	6
	1 to 10	0	0	0	0	0	0
	fx	7	660	1964	362	7	3000

Fig. 5.5: Scattergram of scores obtained in present test and Culture Fair Test for estimation of concurrent validity of the present test (N = 3000)

The coefficient of correlation between the two tests was calculated by Pearson's Product Moment method. The formula is as follows

$$r = \frac{N \Sigma X'Y' - \Sigma f X' \Sigma f Y'}{\sqrt{\{N \Sigma f X'^2 - (\Sigma f X')^2\} x \{N \Sigma f Y'^2 - (\Sigma f Y')^2/\}}}$$

Table 5.5: Coefficient of correlation of the present test with respect to Cattell's Culture Fair Test was as follows:

N	R	P
3000	0.66	.01*

The obtained concurrent validity coefficient of correlation of the test with respect to Cattell's Culture Fair test was significant at .01* level. 'It is clear that even a small r may be significant if computed from a very large sample' (H.E.Garrett)[4]. This indicates a very high degree of positive correlation

[4] *Ibid.*, p. 341.

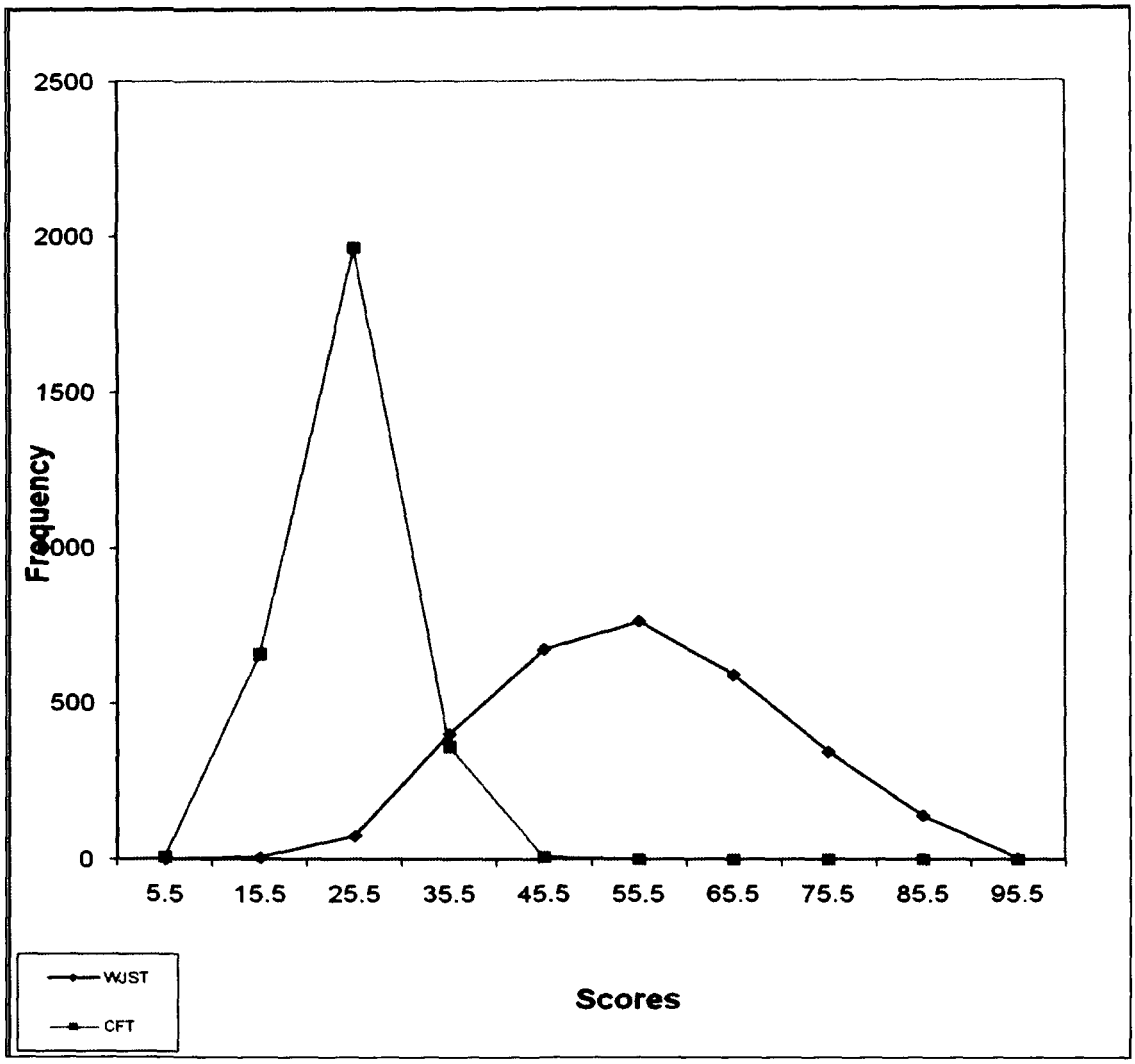

Fig. 5.6: Frequency Polygon of Scores obtained in Present Test and Cattell's Culture Test for estimation of Concurrent Validity

(c) Construct Validity:

Construct validity of a test is the extent to which the test measures a theoretical construct or trait. To compute the construct validity of the present study, the following methods were adopted:

(i) Inter-subtest correlation

(ii) Factorial Validity

(i) Inter-subtest Correlation:

To estimate the internal consistency of the present test, the inter-subtests correlation among all ten subtests and the correlation of the sub-tests with the total were computed with the help of a Computer Software Packages of Social Science (SPSS). On computation it was found that all the ten subtests were inter-correlated and significant at .01 level as given in Table 5.6.

The internal consistency of the present test was further verified by using Thurstone's Centriod Method. On computation it was found to be a unifactor test. Table 5.7 Showing the first Cantroid method of factor analysis correlation r 1 to 10 Tests and Table 5.8 Showing the Internal Validity and Factorial Validity of the present test.

Table 5.6: Showing Inter-Sub Test Correlation and Total (Test 1 – 10) No. 3000

	CL	CO	GC	A/IW	VA	GR	NS	ER	GI	AR	Total
CL	1.000	.327	.334	.298	.299	.290	.215	.230	.130	.210	0.527
P=		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CO	0.327	1.000	0.311	0.248	0.325	0.384	0.395	0.249	0.087	0.350	0.661
P=	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GC	0.334	0.311	1.000	0.290	0.349	0.306	0.239	0.304	0.179	0.248	0.574
P=	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A/IW	0.298	0.248	0.290	1.000	0.337	0.249	0.206	0.207	0.172	0.213	0.555
P=	0.000	0.000			0.000	0.000	0.000	0.000	0.000	0.000	0.000
VA	0.299	0.325	0.349	0.337	1.000	0.392	0.349	0.314	0.215	0.302	0.632
P=	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000
GR	0.290	0.384	0.306	0.249	0.392	1.000	0.414	0.346	0.164	0.328	0.643
P=	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000
NS	0.215	0.395	0.239	0.206	0.341	0.414	1.000	0.306	0.172	0.421	0.680
P=	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000
ER	0.230	0.249	0.304	0.207	0.314	0.346	0.306	1.000	0.255	0.373	0.602
P=	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000
GI	0.130	0.087	0.179	0.172	0.215	0.164	0.172	0.255	1.000	0.239	0.363
P=	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000
AR	0.210	0.350	0.248	0.213	0.302	0.328	0.421	0.373	0.239	1.000	0.616
P=	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000
Total	0.527	0.661	0.574	0.555	0.632	0.643	0.680	0.602	0.363	0.616	1.000
P=	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

Note: 0.00 – 0.05 Level of Significance
0.000 – 0.01 Level of Significance
N.B. = All relationship (Correlation of Coefficients) among different tests are significant at .01 level.

(ii) Factorial Validity:

The internal consistency of the present test was further verified by using factor analysis method. In this method, factor loadings were calculated by using the original matrix of inter-correlations of subtests as obtained in earlier method. This type of validity is known as factor validity. It takes the use of Thurstone's Centriod Method of factor analysis of subtests.

Centroid Method of Factor Analysis of subtests

The first centroid factor is determined as under:

(a) The sum of the coefficient (including the diagonal unities) in each column of the correlation matrix was worked out. For this the original matrix of coefficient of correlation computed in the inter-subtests correlation was used.

(b) Secondly, the sums of these column sums (T) was obtained

(c) Thirdly, the sum of each column obtained as per (a) above was divided by the square root of T obtained in (b) above, resulting in what was called as Centroid loadings. The full sets of loadings so obtained constitute the first centroid factor (A). The first centroid method of factor analysis was presented in Table 5.7

Table 5.7: Showing the first Cantroid method of factor analysis correlation r 1 to 10 Tests (Variables)

	CL	CO	GC	AW	V A	GR	NS	ER	GK	AR
	1	2	3	4	5	6	7	8	9	10
CL -1	1.000	0.3274 **	0.3343**	0.2978**	0.2991**	0.2903**	0.2146**	0.2304**	0.1302**	0.2105**
CO - 2	3274	1.000	0.3114	0.2482	0.3254	0.3841	0.3942	0.2490	0.0866	0.3499**
GC - 3	3343	3114	1.000	0.2897	0.3485	0.3062	0.2392	0.3042	0.1788	0.2484
AW - 4	2978	2482	2897	1.000	0.3367	0.2488	0.2056	0.2069	0.1719	0.2126
VA - 5	2991	3254	3485	3367	1.000	0.3923	0.3408	0.3135	0.2153	0.3020
GR - 6	2903	3841	3062	2488	3923	1.000	0.4134	0.3461	0.1637	0.3284
NS - 7	214 6	3942	2392	2056	3408	4134	1.000	0.3055	0.1722	0.4217
ER - 8	2304	2490	3042	2069	3135	3461	3055	1.000	0.2547	0.3730
GK - 9	1302	0866	1788	1719	2153	1637	1722	2547	1.000	0.2389
AR - 10	2105	3499	2484	2126	3020	3284	4217	3730	2389	1.000
Sums	3.3346	3.6762	3.5607	3.2182	3.8736	3.8733	3.7072	3.5833	2.6123	3.6854

Sum of the columns sums (T) = 35.1248 $T = \sqrt{35.1248} = 5.927$

First Cantroid:	3.3346	3.6762	3.5607	3.2182	3.8736	3.8733	3.7072	3.5833	2.6123	3.6854
	5.927	5.927	5.927	5.927	5.927	5.927	5.927	5.927	5.927	5.927
Factor A=	.563	.620	.601	.543	.653	.653	.625	.604	.441	.621

Table 5.8: Showing the Internal Validity and Factorial Validity of the present test

Sl. No.	Sub-test	Internal consistency r with the total test	First Common factor (Thurstone's Cantroid method)	Ranks order of the sub-test
1	Classification	.527	.563	8
2	Coding	.661	.620	5
3	General Comprehension	.574	.601	7
4	Akin Words	.555	.543	9
5	Verbal Analogy	.632	.653	2
6	General Reasoning	.643	.654	1
7	Number Series	.680	.625	3
8	Evaluation of Relationship	.602	.604	6
9	General Knowledge	.363	.441	10
10	Arithmetic_Reasoning	.616	.621	4

5.3 ESTABLISHMENT OF NORMS:

Setting up of Norms is an important step in the standardization of the test. Norms refer to the average performance of a representative sample on a test. The raw scores obtained by an individual on a test do not in itself have much significance unless the tables of norms are provided to facilitate its interpretation. "Norms are tables of information necessary for the interpretation of test scores and are obtained by giving particular test to a large and representative sample of pupils in the same grades and of a type similar to the group with which the teachers will use the test"

A raw score has little or no meaning unless it is interpreted with respect to norms. A meaning can be attached to a raw score only when it is compared with the other scores in the group. For this purpose, raw scores are converted into some derived scores. Such norms indicate not only the average performance but also the relative frequency of varying degree of deviation above and below the average. It is thus possible to evaluate different degree of superiority and inferiority in the performance of students.

The data collected from the sample of 3000 students (1298 boys and 1702 girls) was used for derivation of norms. Before deriving the norms, the normality of the frequency distribution was tested age-wise and grade-wise as given below:

(i) Testing the Normality of Sample Distribution:

The raw scores thus obtained from 3000 students were presented age-wise and grade-wise in Table 5.9 to 5.14. In order to judge the normality of the distribution of the scores, the value of Mean, Median, S D, P_{10}, P_{90}, Skewness and Kurtosis that were calculated was presented in Table 5.15 and 5.17.

Table 5.9: Age-Wise distribution of total sample No. 3000

Test score	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	Total
6 to 10	0	0	0	0	0	0
11 to 15	0	0	0	0	0	0
16 to 20	0	3	1	2	0	6
21 to 25	3	5	3	1	1	13
26 to 30	5	14	15	25	4	63
31-35	27	50	45	49	7	178
36-40	31	61	59	52	20	223
41-45	36	99	86	60	21	302
46-50	51	106	105	89	21	372
51-55	56	120	120	75	22	393
56-60	40	113	108	83	24	368
61-65	21	99	109	84	17	330
66-70	17	77	104	52	13	263
71-75	16	72	69	29	8	194
76-80	5	55	58	26	8	152
81-85	2	47	40	16	1	106
86-90	0	10	14	8	1	33
91-95	0	0	4	0	0	4
96-100	0	0	0	0	0	0
Total	310	931	940	651	168	3000
Mean	50.86	56.49	57.47	53.76	53.15	55.43
Median	51.14	56.27	57.33	53.53	52.82	54.86
SD	12.09	14.65	14.49	14.26	13.11	14.34
Skew	0.069	0.045	0.028	0.048	0.075	0.117
Kur	0.238	0.268	0.267	0.26	0.282	0.281

Table 5.10: Age-Wise Distribution of Test Score: Boys No. 1298

Test score	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	Total
6 to 10	0	0	0	0	0	0
11 to 15	0	0	0	0	0	0
16 to 20	0	2	1	1	0	4
21 to 25	0	0	3	0	1	4
26 to 30	4	8	5	14	2	33
31-35	13	20	23	25	4	85
36-40	15	18	16	24	8	81
41-45	9	38	44	34	9	134
46-50	18	35	33	53	10	149
51-55	26	45	55	34	11	171
56-60	14	42	44	37	13	150
61-65	8	49	48	39	7	151
66-70	7	40	41	28	4	120
71-75	2	32	27	12	6	79
76-80	3	33	17	16	4	73
81-85	2	23	15	9	1	50
86-90	0	4	4	3	1	12
91-95	0	0	2	0	0	2
96-100	0	0	0	0	0	0
Total	121	389	378	329	81	1298
Mean	50.23	58.4	56.69	53.49	53.74	55.60
Median	51.23	58.41	56.82	52.59	53.36	54.72
SD	12.43	14.94	14.37	14.35	13.88	14.57

Table 5.11: Age-Wise Distribution of Test Score: Girls No. 1702

Test Score	13 yrs	14 yrs	15 yrs	16 yrs	17 yrs	Total
6-10	0	0	0	0	0	0
11-15	0	0	0	0	0	0
16-20	0	1	0	1	0	2
21-25	3	5	0	1	0	9
26- 30	1	6	10	11	2	30
31 – 35	14	30	22	24	3	93
36 – 40	16	43	43	28	12	142
41 – 45	27	61	42	26	12	168
46 – 50	30	71	72	36	11	223
51 – 55	33	75	65	41	11	222
56 – 60	26	71	64	46	11	218
61 – 65	13	50	61	45	10	179
66 – 70	10	37	63	24	9	143
71 – 75	40	40	42	17	2	115
76 – 80	2	22	41	10	4	79
81 – 85	0	24	25	7	0	56
86 – 90	0	6	10	5	0	21
90 – 95	0	0	2	0	0	2
96 – 100	0	0	0	0	0	0
Total	189	542	562	322	87	1702
Mean	51.25	55.11	57.99	54.04	52.60	55.30
Median	51.07	53.88	57.86	54.32	52.27	54.32
SD	11.85	14.27	14.55	14.16	12.32	14.18

Table 5.12: Class-Wise Distribution of Test Score of Total Sample No. 3000

Test Score	Class VIII	Class IX	Class X	Total
6 - 10	0	0	0	0
11 – 15	0	0	0	0
16 – 20	2	1	3	6
21 – 25	8	4	1	13
26 – 30	33	13	16	62
31 – 35	87	44	46	177
36 – 40	106	59	60	225
41 – 45	136	92	74	302
46 – 50	152	118	102	372
51 – 55	157	142	95	394
56 – 60	117	127	125	369
61 – 65	83	119	126	328
66 – 70	59	104	101	264
70 – 75	34	65	94	193
76 – 80	22	48	81	151
81 – 85	2	50	55	107
86 – 90	0	15	18	33
91 – 95	0	2	2	4
96 – 100	0	0	0	0
Total	998	1003	999	3000
Mean	50.00	57.22	59.07	55.43
Median	49.34	56.90	59.28	54.86
SD	12.30	14.09	14.88	14.34
Skewness	0.169	0.068	0.042	0.198
Kurtosis	0.252	0.259	0.285	0.282

Table 5.13: Class-Wise Distribution of Test Score: Boys No. 1298

Test Score	VIII	IX	X	Total
6 to 10	0	0	0	0
11 to 15	0	0	0	0
16 to 20	1	0	3	4
21 to 25	2	1	0	3
26 to 30	14	7	11	32
31-35	36	24	25	85
36-40	31	20	33	84
41-45	51	49	36	136
46-50	48	57	44	149
51-55	61	78	38	177
56-60	39	66	43	148
61-65	37	61	50	148
66-70	28	59	34	121
71-75	6	38	33	77
76-80	11	35	26	72
81-85	1	29	19	49
86-90	0	5	6	11
91-95	0	1	1	2
96-100	0	0	0	0
Total	366	530	402	1298
Mean	50.35	55.40	56.48	55.48
Median	50.00	57.76	57.02	54.54
SD	12.59	13.94	15.54	14.48

Table 5.14: Class-Wise Distribution of Test Score of Girls No. 1702

Test Score	VIII	IX	X	Total
6-10	0	0	0	0
11-15	0	0	0	0
16-20	1	1	0	2
21-25	6	3	1	10
26-30	19	6	5	30
31-35	51	20	21	92
36-40	75	39	27	141
41-45	85	43	38	166
46-50	104	61	58	223
51-55	96	64	57	217
56-60	78	61	82	221
61-65	46	58	76	180
66-70	31	45	67	143
71-75	28	27	61	116
76-80	11	13	55	79
81-85	1	21	36	58
86-90	0	10	12	22
91-95	0	1	1	2
96-100	0	0	0	0
Total	632	473	597	1702
Mean	49.8	56.07	60.81	55.4
Median	49.04	54.97	61.5	57.6
SD	12.12	14.17	14.15	14.24

Table 5.15: Details of the statistics of the test for normality (Age-wise)

	13 years	14 years	15 years	16 years	17 years	Total
Mean	50.80	56.49	57.47	53.76	53.15	55.43
Median	51.14	56.27	57.33	53.53	52.82	54.86
SD	12.09	14.65	14.49	14.26	13.11	14.34
P_{10}	34.41	37.38	38.03	34.03	36.96	36.72
P_{90}	68.12	77.37	77.52	72.92	71.60	74.90
Skewness	0.069	0.045	0.028	0.048	0.075	0.196
Kurtosis	0.238	0.268	0.267	0.260	0.282	0.281

Table 5.16: Details of the statistics of the test for Normality (Class-wise)

	VII	IX	X	Total
Mean	50.00	57.22	59.07	55.43
Median	49.34	56.90	59.28	54.86
SD	12.30	14.09	14.88	14.34
P_{10}	33.61	38.60	38.26	36.75
P_{90}	67.17	77.23	78.77	74.90
Skewness	0.160	0.068	0.042	0.198
Kurtosis	0.252	0.259	0.285	0.282

The above statistics (Tables 5.15 & 5.16) revealed that the Mean, Median, SD, Percentiles, Skewness, and Kurtosis of the scores of each Age-group and Grade lie very closely to one another, which is required for normal distribution. It shows that the distribution of the sample was approximately normal.

Table 5.17: Statistics of Test for Normality (Class-wise and age-wise) of the entire Sample 3000

No.	Mean	Median	SD	SK	Ku
3000	55.43	54.86	14.34	0.198	0.282

The above statistics revealed that the mean, median of the data fall nearly at the same point, skewness is 0.198 and kurtosis is .282 as required for normal distribution. It shows that the distribution of the sample was approximately normal

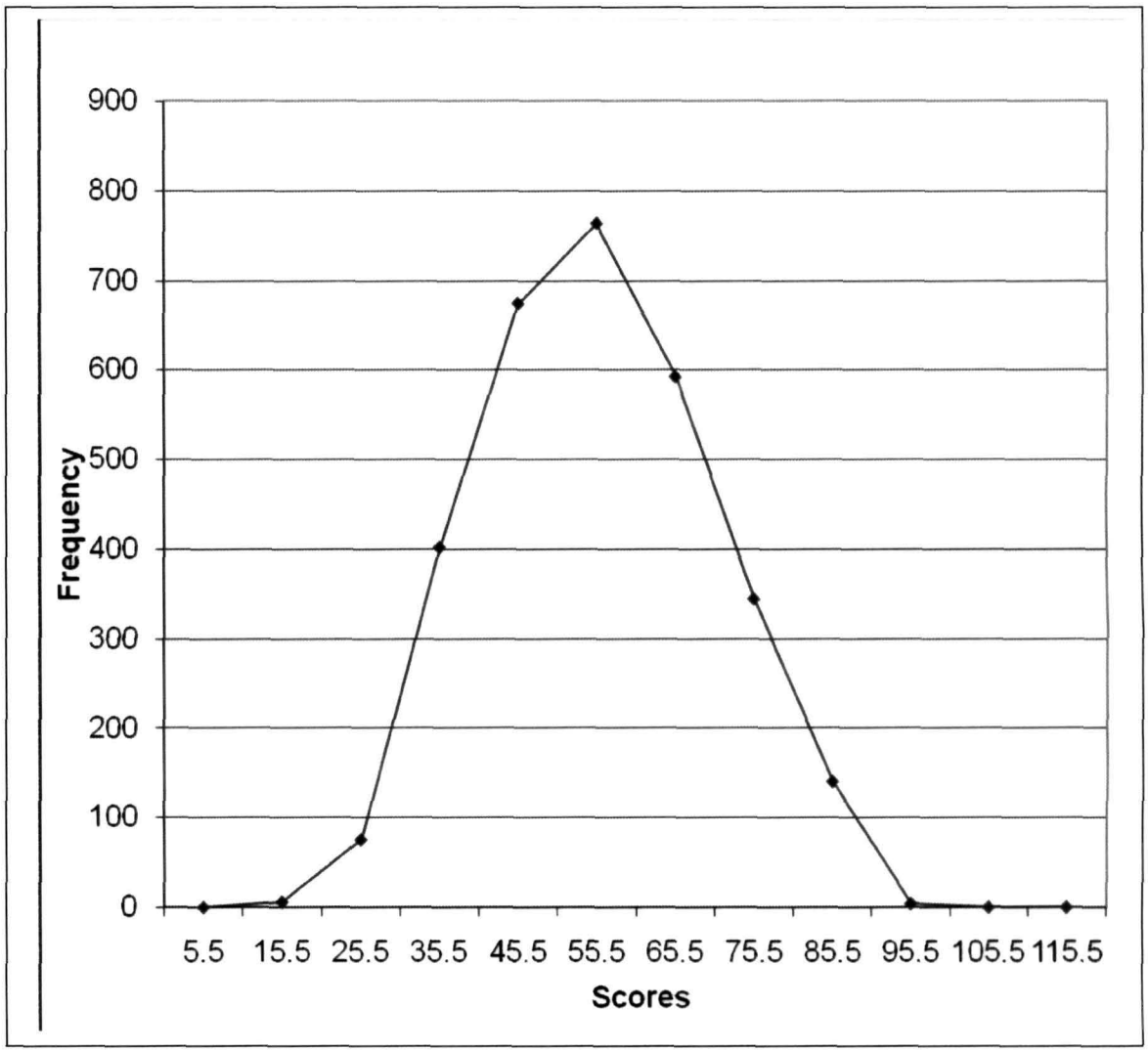

Fig. 5.7: Frequency Polygon of Scores obtained for Derivation of Norms of the Test (N = 3000)

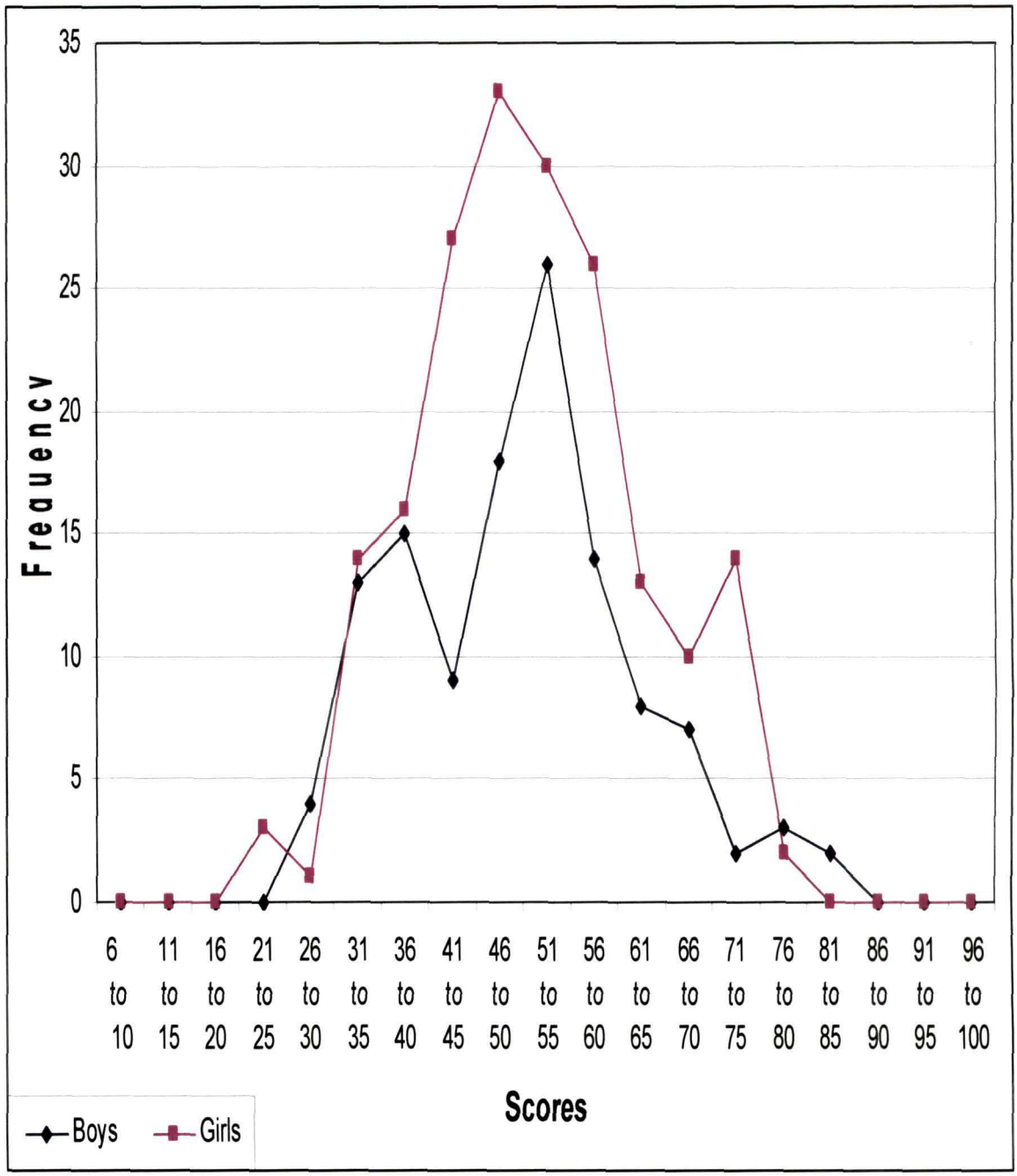

Fig. 5.8: Frequency Polygon of scores obtained for Boys and Girls of age 13

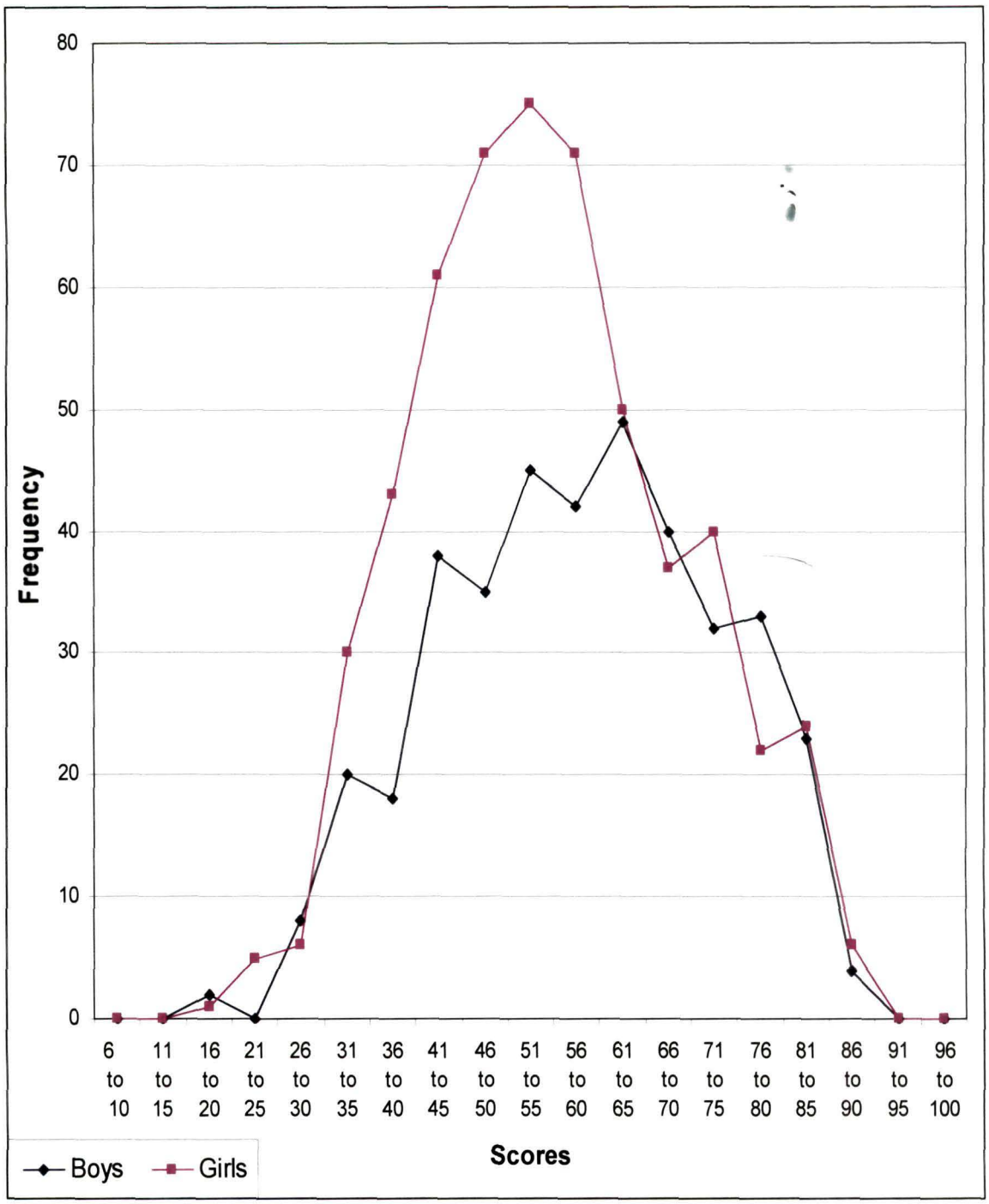

Fig.5.9: Frequency Polygon of scores obtained for Boys and Girls of age 14

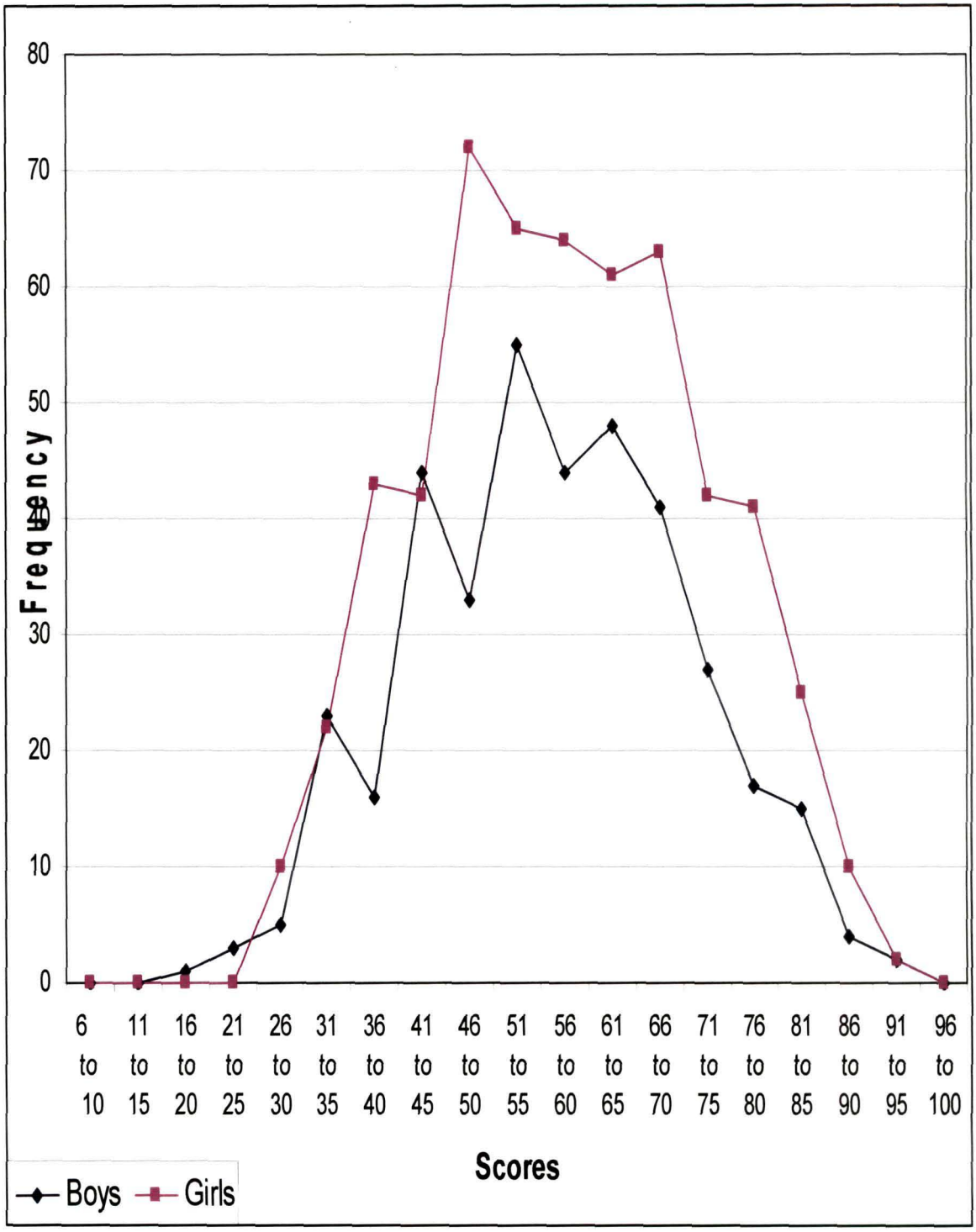

Fig.5.10: Frequency Polygon of scores obtained for Boys and Girls of age 15

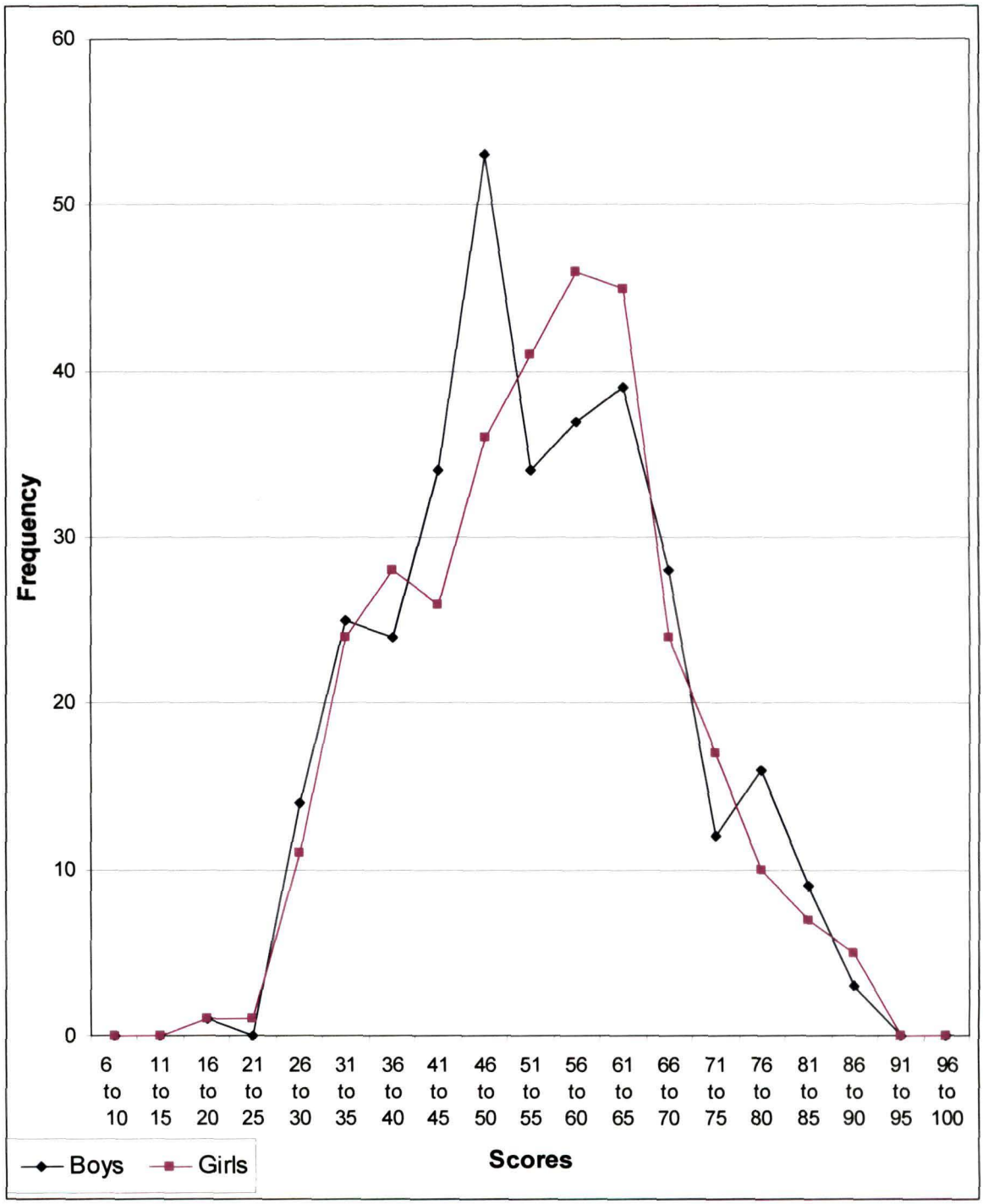

Fig.5.11: Frequency Polygon of scores obtained for Boys and Girls of age 16

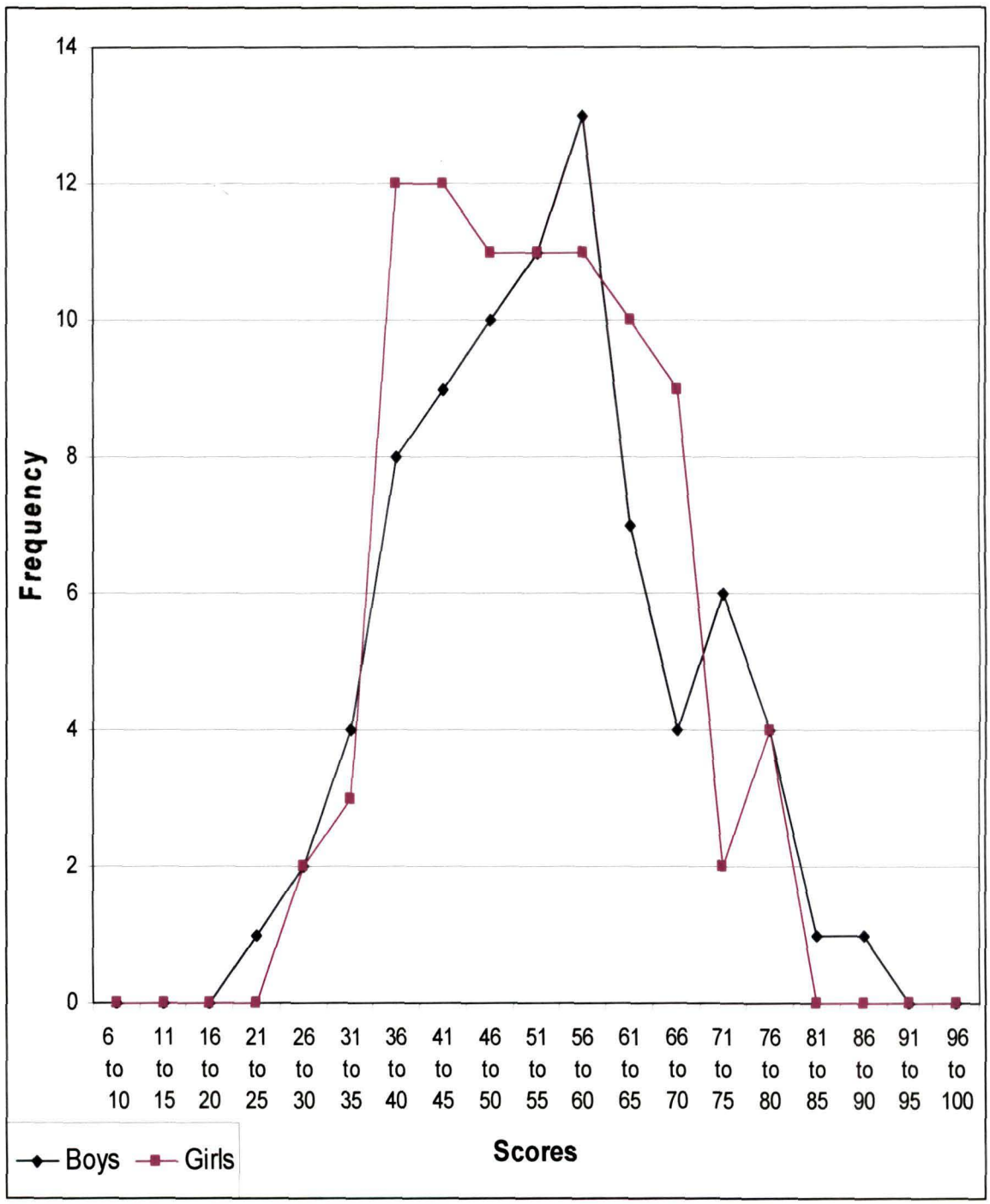

Fig. 5.12: Frequency Polygon of scores obtained for Boys and Girls of age 17

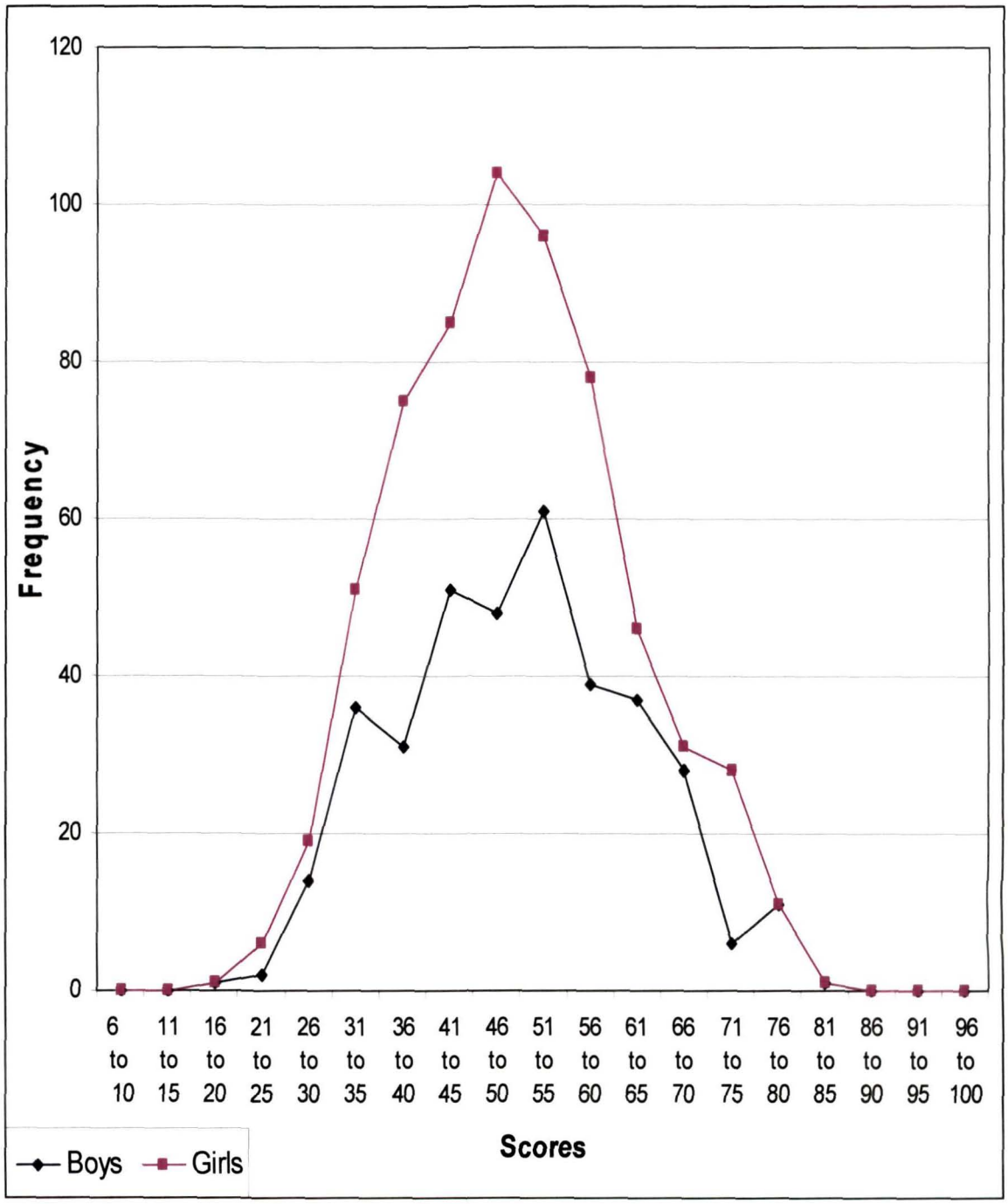

Fig.5 13: Frequency Polygon of Scores obtained for Boys and Girls of Class VIII

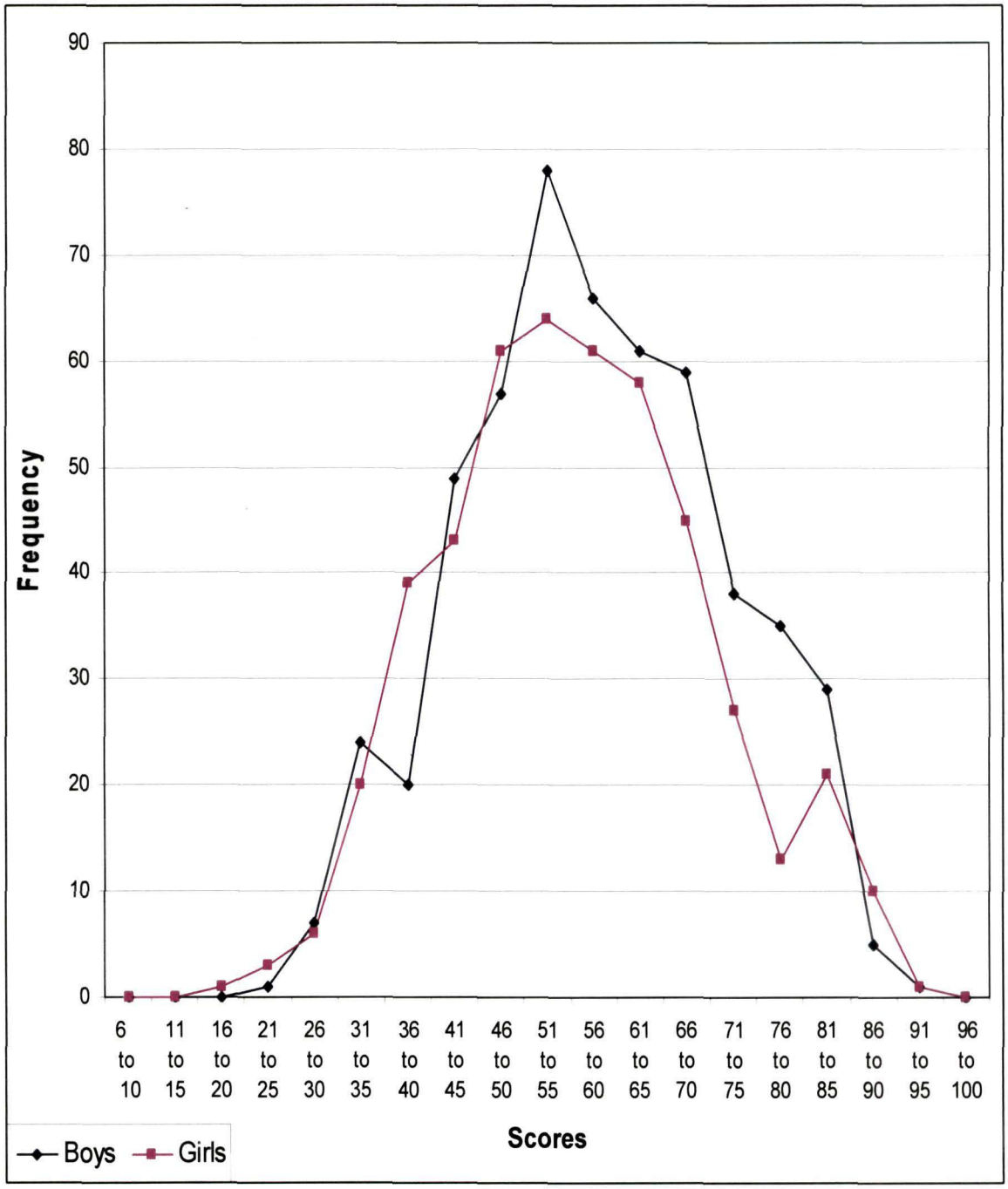

Fig.5.14: Frequency Polygon of Scores obtained for Boys and Girls of Class IX

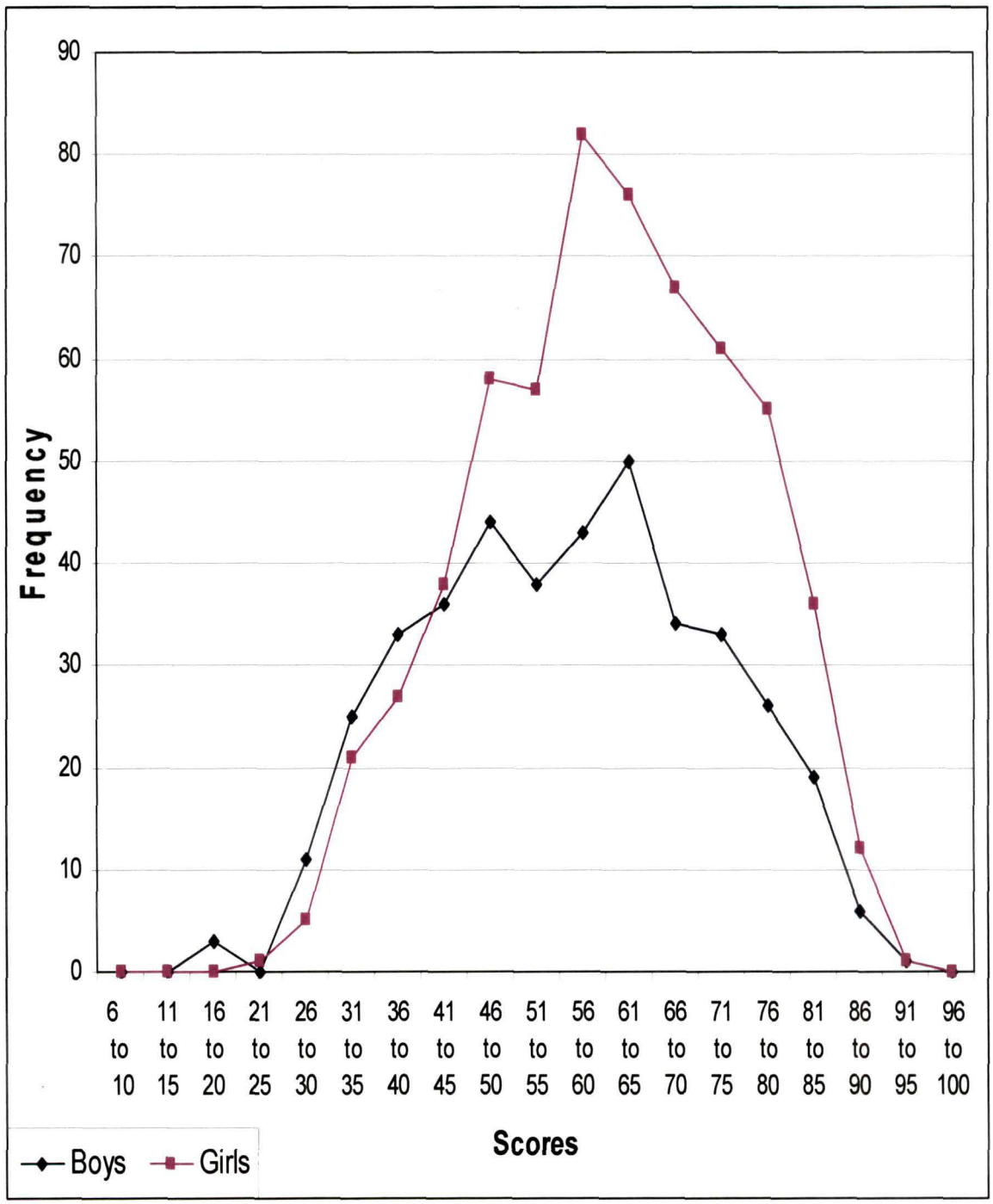

Fig.5.15: Frequency Polygon of Scores obtained for Boys and Girls of Class X

(ii) Derivation of Norms:

For the present test, Sigma score norms, Percentile norms, T-score norms, DIQ and Stanine scores have been derived. Age norms and grade norms have not been established simply because of the views of psychometricians, for example, Thorndike and Hagen 1979 pointed out that "age norms are more appropriate for the elementary schools years and for abilities that grow as part of the general development of individual"[5]. Regarding the use of grade norms Lemke and Weirsma 1976 suggested that "grade norms are commonly used for performance in school subjects that have continuous instruction over a span of several grade".[6]

SIGMA SCORE (Z):

Sigma scores are a kind of standard measure which indicate how many standard deviation the given score deviates from the mean of the distribution. In other words, deviations from the mean expressed in SD units are called Sigma Scores. Sigma Scores are also called as 'Z-Score'. The Sigma Scores or Z-Scores were calculated by applying the following formula:

$$Z = (X-M)/\sigma$$

Where

Z = Standard score in σ units
X = Raw score of an individual
M = Mean of test score
σ = Standard Deviation of the test scores.

[5] L. Robert: *Measurement and Evaluation in Psychology and Education,* Wiley et al Eastern Ltd., New Delhi, p. 124.

[6] Elmer Lemke: *Principles of Psychological Measurement,* Rand McNally College Publishing Company, Chicago, 1976, p. 36.

The sigma score for each raw score of the present test were given in Table 5.18-5.33

PERCENTILE NORMS:

Percentile Norms are expressed in percentile ranks. A Percentile Rank indicates a pupil relative's position in a group in terms of percentage of pupils scoring below him. Percentile norms are very widely adaptable and applicable. Annastasi (1976)[7] emphasized that "they are easy to compute and can be readily understood, even by relatively untrained persons. Moreover, percentiles are universally applicable. They can be used equally well with adults and children and are suitable fro any type of test, whether it measures aptitude or personality variable."

To calculate the individual's percentile norms on a test, the deviation of scores were first expressed in sigma score as already described above. With the help of these scores percentage of deviation from mean was obtained by seeing area under the normal probability curve from Garrett's Table A[8]. The percentile norms were then established by adding or subtracting 50 to this value. The percentile norms for each raw score were given in Table 5.18-5.33

T-SCORE NORMS:

T. Score are normalized standard scores converted into the distribution with a mean of 50 and SD of 10 (Garrett)[6]. If normalized standard score is multiplied by 10 and added to or subtracted from 50, it is converted into T-Score. On this scale a score of 50 corresponds to

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[7]A. Annastasi: *Psychological Testing*, The Macmillian Company New York, 1961, p. 89.
[8] H.E. Garrett: *Statistics in Psychology and Education,* Valkis, Feffer and Simons Ltd., Bombay, 1981, p.458

the mean, a score of 60 to 1σ above the mean, and so forth. Thus the formula used for calculating T-Score is as follows:

$$\text{T-Score} = 50 \pm 10 \text{ (Z score)}.$$

For conversion of raw scores into T-scores, Garrett (1976)[9] warned that "T scaling forces normality upon the scores of a frequency distribution and is unwarranted if the distribution of the population is not normal."[17]

The values of T-scores for each raw score were calculated for different age groups of both the sexes and class group separately and presented in separate Tables 5.18-5.33

DEVIATION INTELLIGENCE QUOTIENT (DIQ):

Deviation Intelligence Quotient is a normalized standard score which does not involve the mental age of a child. It is not the ratio of mental and chronological ages. The standardized sample mean is 100 and S.D is usually 16. The deviation IQs unlike regular IQs are based entirely upon the performance of the children of similar chronological ages and experiences. The raw scores of an intelligence test are transformed into the DIQs. The procedure of transformation is based upon the principle of standard scores. The raw scores were transformed into DIQs with the help of the following formula:

$$\text{DIQ} = 100 + 16\,(\sigma)$$

The DIQ scores for each raw score were calculated and presented for different age groups of both the sexes and class group in Table 5.18-5.33. The separate Tables for DIQ scores in classified forms for all age groups and sex-wise were also worked out and presented in Table 5.34 - 5.41.

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[9] *Ibid.* p. 318.

Interpretation Table for Deviation Intelligence Quotient (DIQ):

The DIQs for the entire sample was classified in the following 7 groups as suggested classification of revised Stanford Binet test[10] for interpreting the DIQ of the children.

Classification for interpreting DIQs of the entire sample No.= 3000

DIQ Scores	Total	%	Classification
Below 70	55	1.83	Mentally Defective
70 -79	285	9.50	Borderline Defective
80 -89	512	17.07	Low Average
90 – 109	1327	44.23	Normal/Average
110 – 119	455	15.17	High Average
120 – 139	361	12.17	Superior
140 & above	1	0.03	Very Superior
Total	3000	100.00	

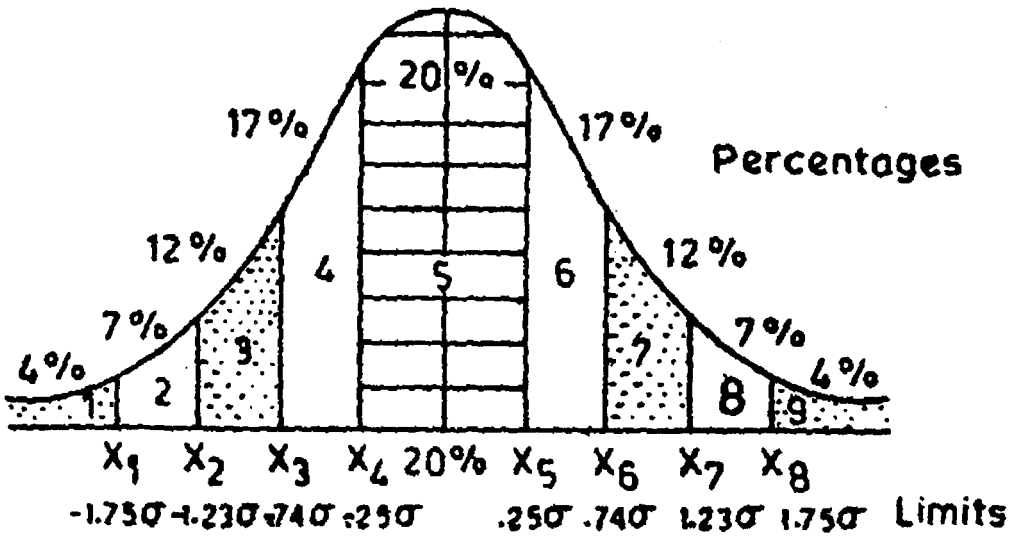
STANINE SCORE:

In Stanine scale, raw scores are converted to a nine points scale (ranging from 1-9) with a mean of 5 and SD of 1.96 (approximately 2).

A Stanine 5 is located at the centre of the distribution and includes all the cases within 0.25, on either side of the mean. The remaining Stanine are evenly distributed above and below Stanine 5. Each Stanine with the exception of 1 & 9 (which covers the tails of the distribution) includes a band of raw scores with a width of 0.5.

[10] S.S. Chauhan: *Advanced Educational Psychology,* Vikas Publishing House Pvt. Ltd., New Delhi, 1982, p.294.

While computing Stanine norms, it is assumed that the raw scores of the test are normally distributed. The area of normal probability curve has been divided into nine standards with fixed percentages (Sharma)[11].



The detail distribution of Stanine scale was given below:

Distribution of Stanine Scale

Stanine	Description	Percentage			Limits in σ
1,9	Bottom and Top	4 %	Each	(1)	(-1.75 σ and below)
				(9)	(+ 1.75 σ and above)
2,8	Above bottom And below top	7 %	Each	(2)	(- 1.25 σ to – 1.75 σ)
				(8)	(+ 1.25 σ to – 1.75 σ)
3,7	Near to second or eight	12 %	Each	(3)	(- .75 σ to 1.25 σ)
				(7)	(+ .75 σ to 1.25 σ)
4,6	Above or below Mean	17 %	Each	(4)	(-.25 σ to - .75 σ)
				(6)	(+ .25 σ to + .75 σ)
5	Middle or Mean	20 %	Each	(5)	(- .25 σ to + .25 σ)
	Total	100			

[11] R.A. Sharma: *Essential of Measurement in Education & Psychology*, Surya Publication, Meerut, 1995, p.306.

The raw scores were transformed into the Stanine scale by organizing them in frequency distribution and then giving the percentage of each Stanine score points according to the normal distribution curve as shown above figure. The first Stanine includes 4 %, second scores 7 %, third Stanine includes 12 % and fourth Stanine covers 17 %, the middle or fith Stanine includes 20 %, sixth Stanine covers 17 %, seventh 12 %, eighth 7 % and the top or nith 4 % of the total cases.

The limits of the Stanine were calculated by using the following formula probability curve (Sharma). For example, Mean was 55.43 and SD 14.34 in the total sample of the present test.

$X_5 = M + .25 = 55.43 + .25 \times 14.34 = 59.$
$X_4 = M - .25 = 55.43 - .25 \times 14.34 = 52.$
$X_6 = M + .75 = 55.43 + .75 \times 14.34 = 66.$
$X_3 = M - .75 = 55.43 - .75 \times 14.34 = 55.$
$X_7 = M + .25 = 55.43 + 1.25 \times 14.34 = 73.$
$X_2 = M - .25 = 55.43 - 1.25 \times 14.34 = 38.$
$X_8 = M + .75 = 55.43 + 1.75 \times 14.34 = 81.$
$X_1 = M - .75 = 55.43 - 1.75 \times 14.34 = 30.$

By using the above formula, Stanine norms for each raw score were calculated and presented in Table No. 5.18 to 5.33.

Table 5.18: Boys Age 13 Years

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-3.96	0.0030	10.394	36.631	1	51	0.06	52.3900	50.619	100.99	5
2	-3.88	0.0050	11.199	37.918	1	52	0.14	55.5700	51.424	102.28	5
3	-3.80	0.0070	12.003	39.205	1	53	0.22	58.7100	52.228	103.57	5
4	-3.72	0.0110	12.808	40.492	1	54	0.30	61.7900	53.033	104.85	6
5	-3.64	0.0160	13.612	41.78	1	55	0.38	64.8000	53.837	106.14	6
6	-3.56	0.0220	14.417	43.067	1	56	0.46	67.7200	54.642	107.43	6
7	-3.48	0.0230	15.221	44.354	1	57	0.54	70.5400	55.447	108.71	6
8	-3.40	0.0340	16.026	45.641	1	58	0.63	73.5700	56.251	110	6
9	-3.32	0.0480	16.83	46.928	1	59	0.71	76.1100	57.056	111.29	6
10	-3.24	0.0690	17.635	48.216	1	60	0.79	78.5200	57.86	112.58	7
11	-3.16	0.0790	18.439	49.503	1	61	0.87	80.7800	58.665	113.86	7
12	-3.08	0.1030	19.244	50.79	1	62	0.95	82.9000	59.469	115.15	7
13	-3.00	0.1350	20.048	52.077	1	63	1.03	84.8500	60.274	116.44	7
14	-2.91	0.1800	20.853	53.364	1	64	1.11	86.4300	61.078	117.72	7
15	-2.83	0.2300	21.657	54.652	1	65	1.19	88.3000	61.883	119.01	7
16	-2.75	0.3000	22.462	55.939	1	66	1.27	89.8000	62.687	120.3	8
17	-2.67	0.3800	23.266	57.226	1	67	1.35	91.1500	63.492	121.59	8
18	-2.59	0.4800	24.071	58.513	1	68	1.43	92.3600	64.296	122.87	8
19	-2.51	0.6000	24.875	59.8	1	69	1.51	93.4500	65.101	124.16	8
20	-2.43	0.7500	25.68	61.088	1	70	1.59	94.4100	65.905	125.45	8
21	-2.35	0.9400	26.484	62.375	1	71	1.67	95.2500	66.71	126.74	8
22	-2.27	1.1600	27.289	63.662	1	72	1.75	95.9900	67.514	128.02	8
23	-2.19	1.4300	28.093	64.949	1	73	1.83	96.6400	68.319	129.31	9
24	-2.11	1.7400	28.898	66.237	1	74	1.91	97.1900	69.123	130.6	9
25	-2.03	2.1200	29.702	67.524	1	75	1.99	97.6700	69.928	131.88	9
26	-1.95	2.5600	30.507	68.811	1	76	2.07	98.0800	70.732	133.17	9
27	-1.87	3.0700	31.311	70.098	1	77	2.15	98.4200	71.537	134.46	9
28	-1.79	3.6700	32.116	71.385	1	78	2.23	98.7100	72.341	135.75	9
29	-1.71	4.3600	32.92	72.673	2	79	2.31	98.9600	73.146	137.03	9
30	-1.63	5.1600	33.725	73.96	2	80	2.40	99.1800	73.95	138.32	9
31	-1.55	6.0600	34.529	75.247	2	81	2.48	99.3400	74.755	139.61	9
32	-1.47	7.0800	35.334	76.534	2	82	2.56	99.4800	75.559	140.89	9
33	-1.39	8.2300	36.138	77.821	2	83	2.64	99.5900	76.364	142.18	9
34	-1.31	9.5100	36.943	79.109	2	84	2.72	99.6700	77.168	143.47	9
35	-1.23	10.9300	37.747	80.396	3	85	2.80	99.7400	77.973	144.76	9
36	-1.14	12.7100	38.552	81.683	3	86	2.88	99.8000	78.777	146.04	9
37	-1.06	14.4600	39.356	82.97	3	87	2.96	99.8500	79.582	147.33	9
38	-0.98	16.3500	40.161	84.257	3	88	3.04	99.8820	80.386	148.62	9
39	-0.90	18.4100	40.965	85.545	3	89	3.12	99.9100	81.191	149.91	9
40	-0.82	20.6100	41.77	86.832	3	90	3.20	99.9310	81.995	151.19	9
41	-0.74	22.9600	42.574	88.119	4	91	3.28	99.9520	82.8	152.48	9
42	-0.66	25.4600	43.379	89.406	4	92	3.36	99.9600	83.604	153.77	9
43	-0.58	28.1000	44.183	90.693	4	93	3.44	99.9660	84.409	155.05	9
44	-0.50	30.8500	44.988	91.981	4	94	3.52	99.9770	85.213	156.34	9
45	-0.42	33.7200	45.792	93.268	4	95	3.60	99.9840	86.018	157.63	9
46	-0.34	36.6900	46.597	94.555	4	96	3.68	99.9890	86.822	158.92	9
47	-0.26	39.7400	47.401	95.842	4	97	3.76	99.9910	87.627	160.2	9
48	-0.18	42.8600	48.206	97.13	5	98	3.84	99.9930	88.431	161.49	9
49	-0.10	46.0200	49.01	98.417	5	99	3.92	99.9950	89.236	162.78	9
50	-0.02	49.2000	49.815	99.704	5	100	4.00	99.9970	90.04	164.06	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviation of Intelligence Quotient, S-Stanine Score)

Table 5.19: Boys Age 14 Years

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-3.84	0.0070	11.58	38.527	1	51	-0.50	30.8500	45.047	92.075	4
2	-3.78	0.0090	12.249	39.598	1	52	-0.43	33.3600	45.716	93.146	4
3	-3.71	0.0110	12.918	40.669	1	53	-0.36	35.9400	46.386	94.217	4
4	-3.64	0.0160	13.588	41.74	1	54	-0.29	38.5900	47.055	95.288	4
5	-3.57	0.0170	14.257	42.811	1	55	-0.23	40.9000	47.724	96.359	5
6	-3.51	0.0230	14.926	43.882	1	56	-0.16	43.6400	48.394	97.43	5
7	-3.44	0.0320	15.596	44.953	1	57	-0.09	46.4100	49.063	98.501	5
8	-3.37	0.0330	16.265	46.024	1	58	-0.03	48.8000	49.732	99.572	5
9	-3.31	0.0480	16.934	47.095	1	59	0.04	51.6000	50.402	100.64	5
10	-3.24	0.0690	17.604	48.166	1	60	0.11	54.3800	51.071	101.71	5
11	-3.17	0.0760	18.273	49.237	1	61	0.17	56.7500	51.74	102.78	5
12	-3.11	0.0940	18.942	50.308	1	62	0.24	59.4800	52.41	103.86	5
13	-3.04	0.1180	19.612	51.379	1	63	0.31	62.1700	53.079	104.93	6
14	-2.97	0.1500	20.281	52.45	1	64	0.37	64.4300	53.748	106	6
15	-2.90	0.1900	20.95	53.521	1	65	0.44	67.0000	54.418	107.07	6
16	-2.84	0.2300	21.62	54.592	1	66	0.51	69.5000	55.087	108.14	6
17	-2.77	0.2800	22.289	55.663	1	67	0.58	71.9000	55.756	109.21	6
18	-2.70	0.3500	22.959	56.734	1	68	0.64	73.8900	56.426	110.28	6
19	-2.64	0.4100	23.628	57.805	1	69	0.71	76.1100	57.095	111.35	6
20	-2.57	0.5100	24.297	58.876	1	70	0.78	78.2300	57.764	112.42	7
21	-2.50	0.6200	24.967	59.946	1	71	0.84	79.9500	58.434	113.49	7
22	-2.44	0.7300	25.636	61.017	1	72	0.91	81.8600	59.103	114.56	7
23	-2.37	0.8900	26.305	62.088	1	73	0.98	83.6500	59.772	115.64	7
24	-2.30	1.0700	26.975	63.159	1	74	1.04	85.0800	60.442	116.71	7
25	-2.24	1.2500	27.644	64.23	1	75	1.11	86.4300	61.111	117.78	7
26	-2.17	1.5000	28.313	65.301	1	76	1.18	88.1000	61.78	118.85	7
27	-2.10	1.7900	28.983	66.372	1	77	1.24	89.2500	62.45	119.92	7
28	-2.03	2.1200	29.652	67.443	1	78	1.31	90.4900	63.119	120.99	8
29	-1.97	2.4400	30.321	68.514	1	79	1.38	91.6200	63.788	122.06	8
30	-1.90	2.8700	30.991	69.585	1	80	1.45	92.6500	64.458	123.13	8
31	-1.83	3.3600	31.66	70.656	1	81	1.51	93.4500	65.127	124.2	8
32	-1.77	3.8400	32.329	71.727	1	82	1.58	94.2900	65.797	125.27	8
33	-1.70	4.4600	32.999	72.798	2	83	1.65	95.0500	66.466	126.35	8
34	-1.63	5.1600	33.668	73.869	2	84	1.71	95.6400	67.135	127.42	8
35	-1.57	5.8200	34.337	74.94	2	85	1.78	96.2500	67.805	128.49	9
36	-1.50	6.6800	35.007	76.011	2	86	1.85	96.7800	68.474	129.56	9
37	-1.43	7.6400	35.676	77.082	2	87	1.91	97.1900	69.143	130.63	9
38	-1.37	8.5300	36.345	78.153	2	88	1.98	97.6100	69.813	131.7	9
39	-1.30	9.6800	37.015	79.224	2	89	2.05	97.9800	70.482	132.77	9
40	-1.23	10.9300	37.684	80.295	3	90	2.12	98.3000	71.151	133.84	9
41	-1.16	12.3000	38.353	81.365	3	91	2.18	98.5400	71.821	134.91	9
42	-1.10	13.5700	39.023	82.436	3	92	2.25	98.7800	72.49	135.98	9
43	-1.03	15.1500	39.692	83.507	3	93	2.32	98.9800	73.159	137.05	9
44	-0.96	16.8500	40.361	84.578	3	94	2.38	99.1300	73.829	138.13	9
45	-0.90	18.4100	41.031	85.649	3	95	2.45	99.2900	74.498	139.2	9
46	-0.83	20.3300	41.7	86.72	3	96	2.52	99.4100	75.167	140.27	9
47	-0.76	22.3600	42.369	87.791	3	97	2.58	99.5100	75.837	141.34	9
48	-0.70	24.2000	43.039	88.862	4	98	2.65	99.6000	76.506	142.41	9
49	-0.63	26.4300	43.708	89.933	4	99	2.72	99.6700	77.175	143.48	9
50	-0.56	28.7700	44.378	91.004	4	100	2.78	99.7300	77.845	144.55	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviation of Intelligence Quotient, S-Stanine Score)

Table 5.20: Boys Age 15 Years

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-3.88	0.0050	11.246	37.993	1	51	-0.40	34.4600	46.04	93.665	4
2	-3.81	0.0070	11.942	39.106	1	52	-0.33	37.0700	46.736	94.778	4
3	-3.74	0.0100	12.637	40.22	1	53	-0.26	39.7400	47.432	95.891	4
4	-3.67	0.0120	13.333	41.333	1	54	-0.19	42.4700	48.128	97.005	5
5	-3.60	0.0160	14.029	42.447	1	55	-0.12	45.2200	48.824	98.118	5
6	-3.53	0.0220	14.725	43.56	1	56	-0.05	48.0100	49.52	99.232	5
7	-3.46	0.0300	15.421	44.674	1	57	0.02	50.8000	50.216	100.35	5
8	-3.39	0.0340	16.117	45.787	1	58	0.09	53.5900	50.912	101.46	5
9	-3.32	0.0470	16.813	46.9	1	59	0.16	56.3600	51.608	102.57	5
10	-3.25	0.0600	17.509	48.014	1	60	0.23	59.1000	52.303	103.69	5
11	-3.18	0.0740	18.205	49.127	1	61	0.30	61.7900	52.999	104.8	6
12	-3.11	0.0940	18.9	50.241	1	62	0.37	64.4300	53.695	105.91	6
13	-3.04	0.1180	19.596	51.354	1	63	0.44	67.0000	54.391	107.03	6
14	-2.97	0.1500	20.292	52.468	1	64	0.51	69.5000	55.087	108.14	6
15	-2.90	0.1900	20.988	53.581	1	65	0.58	71.9000	55.783	109.25	6
16	-2.83	0.2300	21.684	54.695	1	66	0.65	74.2200	56.479	110.37	6
17	-2.76	0.2900	22.38	55.808	1	67	0.72	76.4200	57.175	111.48	6
18	-2.69	0.3600	23.076	56.921	1	68	0.79	78.5200	57.871	112.59	7
19	-2.62	0.4400	23.772	58.035	1	69	0.86	80.5100	58.566	113.71	7
20	-2.55	0.5400	24.468	59.148	1	70	0.93	82.3800	59.262	114.82	7
21	-2.48	0.6600	25.164	60.262	1	71	1.00	84.1300	59.958	115.93	7
22	-2.41	0.8000	25.859	61.375	1	72	1.07	85.7700	60.654	117.05	7
23	-2.34	0.9600	26.555	62.489	1	73	1.14	87.2900	61.35	118.16	7
24	-2.27	1.1600	27.251	63.602	1	74	1.20	88.4900	62.046	119.27	7
25	-2.21	1.3600	27.947	64.715	1	75	1.27	89.8000	62.742	120.39	8
26	-2.14	1.6200	28.643	65.829	1	76	1.34	90.9900	63.438	121.5	8
27	-2.07	1.9200	29.339	66.942	1	77	1.41	92.0700	64.134	122.61	8
28	-2.00	2.2800	30.035	68.056	1	78	1.48	93.0600	64.83	123.73	8
29	-1.93	2.6800	30.731	69.169	1	79	1.55	93.9400	65.525	124.84	8
30	-1.86	3.1400	31.427	70.283	1	80	1.62	94.7400	66.221	125.95	8
31	-1.79	3.6700	32.122	71.396	1	81	1.69	95.4500	66.917	127.07	8
32	-1.72	4.2700	32.818	72.509	2	82	1.76	96.0800	67.613	128.18	9
33	-1.65	4.9500	33.514	73.623	2	83	1.83	96.6400	68.309	129.29	9
34	-1.58	5.7100	34.21	74.736	2	84	1.90	97.1300	69.005	130.41	9
35	-1.51	6.5500	34.906	75.85	2	85	1.97	97.5600	69.701	131.52	9
36	-1.44	7.4900	35.602	76.963	2	86	2.04	97.9300	70.397	132.63	9
37	-1.37	8.5300	36.298	78.077	2	87	2.11	98.2600	71.093	133.75	9
38	-1.30	9.6800	36.994	79.19	2	88	2.18	98.5400	71.788	134.86	9
39	-1.23	10.9300	37.69	80.303	3	89	2.25	98.7800	72.484	135.97	9
40	-1.16	12.3000	38.386	81.417	3	90	2.32	98.9800	73.18	137.09	9
41	-1.09	13.7900	39.081	82.53	3	91	2.39	99.1600	73.876	138.2	9
42	-1.02	15.3900	39.777	83.644	3	92	2.46	99.3100	74.572	139.32	9
43	-0.95	17.1000	40.473	84.757	3	93	2.53	99.4300	75.268	140.43	9
44	-0.88	18.9400	41.169	85.871	3	94	2.60	99.5300	75.964	141.54	9
45	-0.81	20.9000	41.865	86.984	3	95	2.67	99.6200	76.66	142.66	9
46	-0.74	22.9600	42.561	88.097	4	96	2.74	99.6900	77.356	143.77	9
47	-0.67	25.1400	43.257	89.211	4	97	2.81	99.7500	78.051	144.88	9
48	-0.60	27.4300	43.953	90.324	4	98	2.87	99.7900	78.747	146	9
49	-0.54	29.4600	44.649	91.438	4	99	2.94	99.8400	79.443	147.11	9
50	-0.47	31.9200	45.344	92.551	4	100	3.01	99.8690	80.139	148.22	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviation of Intelligence Quotient, S-Stanine Score)

Table 5.21: Boys Age 16 Years

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-3.66	0.0110	13.422	41.475	1	51	-0.17	43.2500	48.265	97.224	5
2	-3.59	0.0160	14.118	42.59	1	52	-0.10	46.0200	48.962	98.339	5
3	-3.52	0.0230	14.815	43.705	1	53	-0.03	48.8000	49.659	99.454	5
4	-3.45	0.0300	15.512	44.82	1	54	0.04	51.6000	50.355	100.57	5
5	-3.38	0.0340	16.209	45.934	1	55	0.11	54.3800	51.052	101.68	5
6	-3.31	0.0480	16.906	47.049	1	56	0.17	56.7500	51.749	102.8	5
7	-3.24	0.0680	17.603	48.164	1	57	0.24	59.4800	52.446	103.91	5
8	-3.17	0.0760	18.3	49.279	1	58	0.31	62.1700	53.143	105.03	6
9	-3.10	0.0970	18.997	50.394	1	59	0.38	64.8000	53.84	106.14	6
10	-3.03	0.1220	19.693	51.509	1	60	0.45	67.3600	54.537	107.26	6
11	-2.96	0.1500	20.39	52.624	1	61	0.52	69.8500	55.233	108.37	6
12	-2.89	0.1900	21.087	53.739	1	62	0.59	72.2400	55.93	109.49	6
13	-2.82	99.7600	21.784	54.854	1	63	0.66	74.5400	56.627	110.6	6
14	-2.75	0.3000	22.481	55.969	1	64	0.73	76.7300	57.324	111.72	6
15	-2.68	0.3700	23.178	57.084	1	65	0.80	78.8100	58.021	112.83	7
16	-2.61	0.4500	23.875	58.199	1	66	0.87	80.7800	58.718	113.95	7
17	-2.54	0.5500	24.571	59.314	1	67	0.94	82.6400	59.415	115.06	7
18	-2.47	0.6800	25.268	60.429	1	68	1.01	84.3800	60.111	116.18	7
19	-2.40	0.8200	25.965	61.544	1	69	1.08	85.9900	60.808	117.29	7
20	-2.33	0.9900	26.662	62.659	1	70	1.15	87.4900	61.505	118.41	7
21	-2.26	1.1900	27.359	63.774	1	71	1.22	88.8800	62.202	119.52	7
22	-2.19	1.4300	28.056	64.889	1	72	1.29	90.1500	62.899	120.64	8
23	-2.12	1.7000	28.753	66.004	1	73	1.36	91.3100	63.596	121.75	8
24	-2.06	1.9700	29.449	67.119	1	74	1.43	92.3600	64.293	122.87	8
25	-1.99	2.3300	30.146	68.234	1	75	1.50	93.3200	64.99	123.98	8
26	-1.92	2.7400	30.843	69.349	1	76	1.57	94.1800	65.686	125.1	8
27	-1.85	3.2200	31.54	70.464	1	77	1.64	94.9500	66.383	126.21	8
28	-1.78	3.7500	32.237	71.579	1	78	1.71	95.6400	67.08	127.33	8
29	-1.71	4.3600	32.934	72.694	2	79	1.78	96.2500	67.777	128.44	9
30	-1.64	5.0500	33.631	73.809	2	80	1.85	96.7800	68.474	129.56	9
31	-1.57	5.8200	34.328	74.924	2	81	1.92	97.2600	69.171	130.67	9
32	-1.50	6.6800	35.024	76.039	2	82	1.99	97.6700	69.868	131.79	9
33	-1.43	7.6400	35.721	77.154	2	83	2.06	98.0300	70.564	132.9	9
34	-1.36	8.6900	36.418	78.269	2	84	2.13	98.3400	71.261	134.02	9
35	-1.29	9.8500	37.115	79.384	2	85	2.20	98.6100	71.958	135.13	9
36	-1.22	11.1200	37.812	80.499	3	86	2.27	98.8400	72.655	136.25	9
37	-1.15	12.5100	38.509	81.614	3	87	2.34	99.0400	73.352	137.36	9
38	-1.08	14.0100	39.206	82.729	3	88	2.40	99.1800	74.049	138.48	9
39	-1.01	15.6200	39.902	83.844	3	89	2.47	99.3200	74.746	139.59	9
40	-0.94	17.3600	40.599	84.959	3	90	2.54	99.4500	75.443	140.71	9
41	-0.87	19.2200	41.296	86.074	3	91	2.61	99.5500	76.139	141.82	9
42	-0.80	21.1900	41.993	87.189	3	92	2.68	99.6300	76.836	142.94	9
43	-0.73	23.2700	42.69	88.304	4	93	2.75	99.7000	77.533	144.05	9
44	-0.66	25.4600	43.387	89.419	4	94	2.82	99.7600	78.23	145.17	9
45	-0.59	27.7600	44.084	90.534	4	95	2.89	99.8100	78.927	146.28	9
46	-0.52	30.1500	44.78	91.649	4	96	2.96	99.8500	79.624	147.4	9
47	-0.45	32.6400	45.477	92.764	4	97	3.03	99.8780	80.321	148.51	9
48	-0.38	35.1100	46.174	93.879	4	98	3.10	99.9030	81.017	149.63	9
49	-0.31	37.8300	46.871	94.994	4	99	3.17	99.9300	81.714	150.74	9
50	-0.24	40.5200	47.568	96.109	5	100	3.24	99.9320	82.411	151.86	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviation of Intelligence Quotient, S-Stanine Score)

Table 5.22: Boys Age 17 Years

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-3.80	0.0072	12.003	39.205	1	51	-0.20	42.0700	48.026	96.841	5
2	-3.73	0.0108	12.723	40.357	1	52	-0.13	44.8300	48.746	97.994	5
3	-3.66	0.0120	13.444	41.51	1	53	-0.05	48.0100	49.467	99.147	5
4	-3.58	0.0160	14.164	42.663	1	54	0.02	50.8000	50.187	100.3	5
5	-3.51	0.0233	14.885	43.816	1	55	0.09	53.5900	50.908	101.45	5
6	-3.44	0.0340	15.605	44.968	1	56	0.16	56.3600	51.628	102.61	5
7	-3.37	0.0350	16.326	46.121	1	57	0.23	59.1000	52.349	103.76	5
8	-3.30	0.0483	17.046	47.274	1	58	0.31	62.1700	53.069	104.91	6
9	-3.22	0.0687	17.767	48.427	1	59	0.38	64.8000	53.79	106.06	6
10	-3.15	0.0820	18.487	49.579	1	60	0.45	67.3600	54.51	107.22	6
11	-3.08	0.1030	19.207	50.732	1	61	0.52	69.8500	55.231	108.37	6
12	-3.01	0.1310	19.928	51.885	1	62	0.60	72.5700	55.951	109.52	6
13	-2.94	0.1600	20.648	53.037	1	63	0.67	74.8600	56.671	110.67	6
14	-2.86	0.2100	21.369	54.19	1	64	0.74	77.0400	57.392	111.83	6
15	-2.79	0.2600	22.089	55.343	1	65	0.81	79.1000	58.112	112.98	7
16	-2.72	0.3300	22.81	56.496	1	66	0.88	81.0600	58.833	114.13	7
17	-2.65	0.4000	23.53	57.648	1	67	0.96	83.1500	59.553	115.29	7
18	-2.57	0.5100	24.251	58.801	1	68	1.03	84.8500	60.274	116.44	7
19	-2.50	0.6200	24.971	59.954	1	69	1.10	86.4300	60.994	117.59	7
20	-2.43	0.7500	25.692	61.107	1	70	1.17	87.9000	61.715	118.74	7
21	-2.36	0.9100	26.412	62.259	1	71	1.24	89.2500	62.435	119.9	7
22	-2.29	1.1000	27.133	63.412	1	72	1.32	90.6600	63.156	121.05	8
23	-2.21	1.3600	27.853	64.565	1	73	1.39	91.7700	63.876	122.2	8
24	-2.14	1.6200	28.573	65.718	1	74	1.46	92.7900	64.597	123.35	8
25	-2.07	1.9200	29.294	66.87	1	75	1.53	93.7000	65.317	124.51	8
26	-2.00	2.2800	30.014	68.023	1	76	1.60	94.5200	66.037	125.66	8
27	-1.93	2.6800	30.735	69.176	1	77	1.68	95.3500	66.758	126.81	8
28	-1.85	3.2200	31.455	70.329	1	78	1.75	95.9900	67.478	127.97	8
29	-1.78	3.7500	32.176	71.481	1	79	1.82	96.5600	68.199	129.12	9
30	-1.71	4.3600	32.896	72.634	2	80	1.89	97.0600	68.919	130.27	9
31	-1.64	5.0500	33.617	73.787	2	81	1.96	97.5000	69.64	131.42	9
32	-1.57	5.8200	34.337	74.939	2	82	2.04	97.9300	70.36	132.58	9
33	-1.49	6.8100	35.058	76.092	2	83	2.11	98.2600	71.081	133.73	9
34	-1.42	7.7800	35.778	77.245	2	84	2.18	98.5400	71.801	134.88	9
35	-1.35	8.8500	36.499	78.398	2	85	2.25	98.7800	72.522	136.03	9
36	-1.28	9.8500	37.219	79.55	2	86	2.32	98.9800	73.242	137.19	9
37	-1.21	11.3100	37.939	80.703	3	87	2.40	99.1800	73.963	138.34	9
38	-1.13	12.9200	38.66	81.856	3	88	2.47	99.3200	74.683	139.49	9
39	-1.06	14.4600	39.38	83.009	3	89	2.54	99.4500	75.403	140.65	9
40	-0.99	16.1100	40.101	84.161	3	90	2.61	99.5500	76.124	141.8	9
41	-0.92	17.8800	40.821	85.314	3	91	2.68	99.6300	76.844	142.95	9
42	-0.85	19.7700	41.542	86.467	3	92	2.76	99.7100	77.565	144.1	9
43	-0.77	22.0600	42.262	87.62	3	93	2.83	99.7700	78.285	145.26	9
44	-0.70	24.2000	42.983	88.772	4	94	2.90	99.8100	79.006	146.41	9
45	-0.63	26.4300	43.703	89.925	4	95	2.97	99.8500	79.726	147.56	9
46	-0.56	28.7700	44.424	91.078	4	96	3.04	99.8820	80.447	148.71	9
47	-0.49	31.2100	45.144	92.231	4	97	3.12	99.9100	81.167	149.87	9
48	-0.41	34.0900	45.865	93.383	4	98	3.19	99.9290	81.888	151.02	9
49	-0.34	36.6900	46.585	94.536	4	99	3.26	99.9314	82.608	152.17	9
50	-0.27	39.3600	47.305	95.689	4	100	3.33	99.9517	83.329	153.33	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviation of Intelligence Quotient, S-Stanine Score)

Table 5.23: Girls Age 13 Years

X	Z-Score	PR	T-Score	DIQ	ST	X	Z-score	PR	T-score	DIQ	ST
1	-4.24	0.0032	7.5949	32.152	1	51	-0.02	49.2000	49.789	99.662	5
2	-4.16	0.0032	8.4388	33.502	1	52	0.06	52.3900	50.633	101.01	5
3	-4.07	0.0032	9.2827	34.852	1	53	0.15	55.9600	51.477	102.36	5
4	-3.99	0.0048	10.127	36.203	1	54	0.23	59.1000	52.321	103.71	5
5	-3.90	0.0048	10.97	37.553	1	55	0.32	62.5500	53.165	105.06	5
6	-3.82	0.0072	11.814	38.903	1	56	0.40	65.5400	54.008	106.41	6
7	-3.73	0.0108	12.658	40.253	1	57	0.49	68.7900	54.852	107.76	6
8	-3.65	0.0159	13.502	41.603	1	58	0.57	71.5700	55.696	109.11	6
9	-3.57	0.0159	14.346	42.954	1	59	0.65	74.2200	56.54	110.46	6
10	-3.48	0.0233	15.19	44.304	1	60	0.74	77.0400	57.384	111.81	6
11	-3.40	0.0337	16.034	45.654	1	61	0.82	79.3900	58.228	113.16	7
12	-3.31	0.0483	16.878	47.004	1	62	0.91	81.8600	59.072	114.51	7
13	-3.23	0.0687	17.722	48.354	1	63	0.99	83.8900	59.916	115.86	7
14	-3.14	0.0840	18.565	49.705	1	64	1.08	85.9900	60.759	117.22	7
15	-3.06	0.1110	19.409	51.055	1	65	1.16	87.7000	61.603	118.57	7
16	-2.97	0.1500	20.253	52.405	1	66	1.24	89.2500	62.447	119.92	7
17	-2.89	0.1900	21.097	53.755	1	67	1.33	90.8200	63.291	121.27	8
18	-2.81	0.2500	21.941	55.105	1	68	1.41	92.0700	64.135	122.62	8
19	-2.72	0.3300	22.785	56.456	1	69	1.50	93.3200	64.979	123.97	8
20	-2.64	0.4100	23.629	57.806	1	70	1.58	94.2900	65.823	125.32	8
21	-2.55	0.5400	24.473	59.156	1	71	1.67	95.2500	66.667	126.67	8
22	-2.47	0.6800	25.316	60.506	1	72	1.75	95.9900	67.511	128.02	8
23	-2.38	0.8700	26.16	61.857	1	73	1.84	96.7100	68.354	129.37	9
24	-2.30	1.0700	27.004	63.207	1	74	1.92	97.2600	69.198	130.72	9
25	-2.22	1.3200	27.848	64.557	1	75	2.00	97.7200	70.042	132.07	9
26	-2.13	1.6600	28.692	65.907	1	76	2.09	98.1700	70.886	133.42	9
27	-2.05	2.0200	29.536	67.257	1	77	2.17	98.5000	71.73	134.77	9
28	-1.96	2.5000	30.38	68.608	1	78	2.26	98.8100	72.574	136.12	9
29	-1.88	3.0100	31.224	69.958	1	79	2.34	99.0400	73.418	137.47	9
30	-1.79	3.6700	32.068	71.308	1	80	2.43	99.2500	74.262	138.82	9
31	-1.71	4.3600	32.911	72.658	2	81	2.51	99.4000	75.105	140.17	9
32	-1.62	5.2600	33.755	74.008	2	82	2.59	99.5200	75.949	141.52	9
33	-1.54	6.1700	34.599	75.359	2	83	2.68	99.6300	76.793	142.87	9
34	-1.46	7.2100	35.443	76.709	2	84	2.76	99.7100	77.637	144.22	9
35	-1.37	8.5300	36.287	78.059	2	85	2.85	99.7800	78.481	145.57	9
36	-1.29	9.8500	37.131	79.409	3	86	2.93	99.8300	79.325	146.92	9
37	-1.20	11.5100	37.975	80.759	3	87	3.02	99.8740	80.169	148.27	9
38	-1.12	13.1400	38.819	82.11	3	88	3.10	99.9030	81.013	149.62	9
39	-1.03	15.1500	39.662	83.46	3	89	3.19	99.9290	81.857	150.97	9
40	-0.95	17.1000	40.506	84.81	3	90	3.27	99.9520	82.7	152.32	9
41	-0.86	19.4900	41.35	86.16	3	91	3.35	99.9660	83.544	153.67	9
42	-0.78	21.7700	42.194	87.511	3	92	3.44	99.9663	84.388	155.02	9
43	-0.70	24.2000	43.038	88.861	4	93	3.52	99.9767	85.232	156.37	9
44	-0.61	27.0900	43.882	90.211	4	94	3.61	99.9841	86.076	157.72	9
45	-0.53	29.8100	44.726	91.561	4	95	3.69	99.9890	86.92	159.07	9
46	-0.44	33.0000	45.57	92.911	4	96	3.78	99.9928	87.764	160.42	9
47	-0.36	36.3200	46.414	94.262	4	97	3.86	99.9950	88.608	161.77	9
48	-0.27	39.3600	47.257	95.612	4	98	3.95	99.9960	89.451	163.12	9
49	-0.19	42.4700	48.101	96.962	4	99	4.03	99.9968	90.295	164.47	9
50	-0.11	45.6200	48.945	98.312	5	100	4.11	99.9968	91.139	165.82	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviation of Intelligence Quotient, S-Stanine Score)

Table 5.24: Girls Age 14 Years

X	Z-Score	PR	T-Score	DIQ	ST	X	Z-score	PR	T-score	DIQ	ST
1	-3.79	0.0070	12.081	39.33	1	51	-0.29	38.5900	47.12	95.392	4
2	-3.72	0.0110	12.782	40.451	1	52	-0.22	41.2900	47.821	96.513	5
3	-3.65	0.0160	13.483	41.573	1	53	-0.15	44.0400	48.521	97.634	5
4	-3.58	0.0160	14.184	42.694	1	54	-0.08	46.8100	49.222	98.755	5
5	-3.51	0.0230	14.884	43.815	1	55	-0.01	49.6000	49.923	99.877	5
6	-3.44	0.0340	15.585	44.936	1	56	0.06	52.3900	50.624	101	5
7	-3.37	0.0340	16.286	46.057	1	57	0.13	55.1700	51.324	102.12	5
8	-3.30	0.0480	16.987	47.179	1	58	0.20	57.9300	52.025	103.24	5
9	-3.23	0.0687	17.687	48.3	1	59	0.27	60.6400	52.726	104.36	6
10	-3.16	0.0690	18.388	49.421	1	60	0.34	63.3100	53.427	105.48	6
11	-3.09	0.1000	19.089	50.542	1	61	0.41	65.9100	54.128	106.6	6
12	-3.02	0.1260	19.79	51.664	1	62	0.48	68.4400	54.828	107.73	6
13	-2.95	0.1600	20.491	52.785	1	63	0.55	70.8800	55.529	108.85	6
14	-2.88	0.2000	21.191	53.906	1	64	0.62	73.2400	56.23	109.97	6
15	-2.81	0.2500	21.892	55.027	1	65	0.69	75.4900	56.931	111.09	6
16	-2.74	0.3100	22.593	56.149	1	66	0.76	77.6400	57.631	112.21	7
17	-2.67	0.3800	23.294	57.27	1	67	0.83	79.6700	58.332	113.33	7
18	-2.60	0.4700	23.994	58.391	1	68	0.90	81.5900	59.033	114.45	7
19	-2.53	0.5700	24.695	59.512	1	69	0.97	83.4000	59.734	115.57	7
20	-2.46	0.6900	25.396	60.633	1	70	1.04	85.0800	60.434	116.7	7
21	-2.39	0.8400	26.097	61.755	1	71	1.11	86.6500	61.135	117.82	7
22	-2.32	1.0200	26.797	62.876	1	72	1.18	88.1000	61.836	118.94	7
23	-2.25	1.2200	27.498	63.997	1	73	1.25	89.4400	62.537	120.06	7
24	-2.18	1.4600	28.199	65.118	1	74	1.32	90.6600	63.238	121.18	8
25	-2.11	1.7400	28.9	66.24	1	75	1.39	91.7700	63.938	122.3	8
26	-2.04	2.0700	29.601	67.361	1	76	1.46	92.7900	64.639	123.42	8
27	-1.97	2.4400	30.301	68.482	1	77	1.53	93.7000	65.34	124.54	8
28	-1.90	2.8700	31.002	69.603	1	78	1.60	94.5200	66.041	125.67	8
29	-1.83	3.3600	31.703	70.725	1	79	1.67	95.2500	66.741	126.79	8
30	-1.76	3.9200	32.404	71.846	1	80	1.74	95.9100	67.442	127.91	8
31	-1.69	4.5500	33.104	72.967	2	81	1.81	96.4900	68.143	129.03	9
32	-1.62	5.2600	33.805	74.088	2	82	1.88	96.9900	68.844	130.15	9
33	-1.55	6.0600	34.506	75.21	2	83	1.95	97.4400	69.544	131.27	9
34	-1.48	6.9400	35.207	76.331	2	84	2.02	97.8300	70.245	132.39	9
35	-1.41	7.9300	35.907	77.452	2	85	2.09	98.1700	70.946	133.51	9
36	-1.34	9.0100	36.608	78.573	2	86	2.16	98.4600	71.647	134.63	9
37	-1.27	10.2000	37.309	79.694	2	87	2.23	98.7100	72.348	135.76	9
38	-1.20	11.5100	38.01	80.816	3	88	2.30	98.9300	73.048	136.88	9
39	-1.13	12.9200	38.711	81.937	3	89	2.37	99.1100	73.749	138	9
40	-1.06	14.4600	39.411	83.058	3	90	2.44	99.2700	74.45	139.12	9
41	-0.99	16.1100	40.112	84.179	3	91	2.52	99.4300	75.151	140.24	9
42	-0.92	17.8800	40.813	85.301	3	92	2.59	99.5200	75.851	141.36	9
43	-0.85	19.7700	41.514	86.422	3	93	2.66	99.6100	76.552	142.48	9
44	-0.78	21.7700	42.214	87.543	3	94	2.73	99.6800	77.253	143.6	9
45	-0.71	23.8900	42.915	88.664	4	95	2.80	99.7400	77.954	144.73	9
46	-0.64	26.1100	43.616	89.786	4	96	2.87	99.7900	78.655	145.85	9
47	-0.57	28.4300	44.317	90.907	4	97	2.94	99.8400	79.355	146.97	9
48	-0.50	30.8500	45.018	92.028	4	98	3.01	99.8690	80.056	148.09	9
49	-0.43	33.3600	45.718	93.149	4	99	3.08	99.8970	80.757	149.21	9
50	-0.36	32.2800	46.419	94.27	4	100	3.15	99.9180	81.458	150.33	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviation of Intelligence Quotient, S-Stanine Score)

Table 5.25: Girls Age 15 Years

X	Z-Score	PR	T-Score	DIQ	ST	X	Z-score	PR	T-score	DIQ	ST
1	-3.92	0.0050	10.832	37.331	1	51	-0.48	31.5600	45.196	92.313	4
2	-3.85	0.0060	11.519	38.43	1	52	-0.41	34.0900	45.883	93.413	4
3	-3.78	0.0070	12.206	39.53	1	53	-0.34	36.6900	46.57	94.513	4
4	-3.71	0.0110	12.893	40.63	1	54	-0.27	39.3600	47.258	95.612	4
5	-3.64	0.0160	13.581	41.729	1	55	-0.21	41.6800	47.945	96.712	5
6	-3.57	0.0220	14.268	42.829	1	56	-0.14	44.4300	48.632	97.812	5
7	-3.50	0.0230	14.955	43.929	1	57	-0.07	47.2100	49.32	98.911	5
8	-3.44	0.0340	15.643	45.028	1	58	0.00	50.0000	50.007	100.01	5
9	-3.37	0.0400	16.33	46.128	1	59	0.07	52.7900	50.694	101.11	5
10	-3.30	0.0480	17.017	47.227	1	60	0.14	55.5700	51.381	102.21	5
11	-3.23	0.0690	17.704	48.327	1	61	0.21	58.3200	52.069	103.31	5
12	-3.16	0.0790	18.392	49.427	1	62	0.28	61.0300	52.756	104.41	6
13	-3.09	0.1000	19.079	50.526	1	63	0.34	63.3100	53.443	105.51	6
14	-3.02	0.1260	19.766	51.626	1	64	0.41	65.9100	54.131	106.61	6
15	-2.95	0.1600	20.454	52.726	1	65	0.48	68.4400	54.818	107.71	6
16	-2.89	0.1900	21.141	53.825	1	66	0.55	70.8800	55.505	108.81	6
17	-2.82	0.2400	21.828	54.925	1	67	0.62	73.2400	56.192	109.91	6
18	-2.75	0.3000	22.515	56.025	1	68	0.69	75.4900	56.88	111.01	6
19	-2.68	0.3700	23.203	57.124	1	69	0.76	77.6400	57.567	112.11	7
20	-2.61	0.4500	23.89	58.224	1	70	0.83	79.6700	58.254	113.21	7
21	-2.54	0.5500	24.577	59.324	1	71	0.89	81.3300	58.942	114.31	7
22	-2.47	0.6800	25.265	60.423	1	72	0.96	83.1500	59.629	115.41	7
23	-2.40	0.8200	25.952	61.523	1	73	1.03	84.8500	60.316	116.51	7
24	-2.34	0.9600	26.639	62.623	1	74	1.10	86.4300	61.003	117.61	7
25	-2.27	1.1600	27.326	63.722	1	75	1.17	87.9000	61.691	118.71	7
26	-2.20	1.3900	28.014	64.822	1	76	1.24	89.2500	62.378	119.8	7
27	-2.13	1.6600	28.701	65.922	1	77	1.31	90.4900	63.065	120.9	8
28	-2.06	1.9700	29.388	67.021	1	78	1.38	91.6200	63.753	122	8
29	-1.99	2.3300	30.076	68.121	1	79	1.44	92.5100	64.44	123.1	8
30	-1.92	2.7400	30.763	69.221	1	80	1.51	93.4500	65.127	124.2	8
31	-1.85	3.2200	31.45	70.32	1	81	1.58	94.2900	65.814	125.3	8
32	-1.79	3.6700	32.137	71.42	1	82	1.65	95.0500	66.502	126.4	8
33	-1.72	4.2700	32.825	72.52	2	83	1.72	95.7300	67.189	127.5	8
34	-1.65	4.9500	33.512	73.619	2	84	1.79	96.3300	67.876	128.6	9
35	-1.58	5.7100	34.199	74.719	2	85	1.86	96.8600	68.564	129.7	9
36	-1.51	6.5500	34.887	75.819	2	86	1.93	97.3200	69.251	130.8	9
37	-1.44	7.4900	35.574	76.918	2	87	1.99	97.6700	69.938	131.9	9
38	-1.37	8.5300	36.261	78.018	2	88	2.06	98.0300	70.625	133	9
39	-1.31	9.5100	36.948	79.118	2	89	2.13	98.3400	71.313	134.1	9
40	-1.24	10.7500	37.636	80.217	3	90	2.20	98.6100	72	135.2	9
41	-1.17	12.1000	38.323	81.317	3	91	2.27	98.8400	72.687	136.3	9
42	-1.10	13.5700	39.01	82.416	3	92	2.34	99.0400	73.375	137.4	9
43	-1.03	15.1500	39.698	83.516	3	93	2.41	99.2000	74.062	138.5	9
44	-0.96	16.8500	40.385	84.616	3	94	2.47	99.3200	74.749	139.6	9
45	-0.89	18.6700	41.072	85.715	3	95	2.54	99.4500	75.436	140.7	9
46	-0.82	20.6100	41.759	86.815	3	96	2.61	99.5500	76.124	141.8	9
47	-0.76	22.3600	42.447	87.915	3	97	2.68	99.6300	76.811	142.9	9
48	-0.69	24.5100	43.134	89.014	4	98	2.75	99.7000	77.498	144	9
49	-0.62	26.7600	43.821	90.114	4	99	2.82	99.7600	78.186	145.1	9
50	-0.55	29.1200	44.509	91.214	4	100	2.89	99.8100	78.873	146.2	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviation of Intelligence Quotient, S-Stanine Score)

Table 5.26: Girls Age 16 Years

X	Z-Score	PR	T-Score	DIQ	ST	X	Z-score	PR	T-score	DIQ	ST
1	-3.75	0.0070	12.542	40.068	1	51	-0.21	41.6800	47.853	96.565	5
2	-3.68	0.0110	13.249	41.198	1	52	-0.14	44.4300	48.559	97.695	5
3	-3.60	0.0160	13.955	42.328	1	53	-0.07	47.2100	49.266	98.825	5
4	-3.53	0.0230	14.661	43.458	1	54	0.00	50.0000	49.972	99.955	5
5	-3.46	0.0300	15.367	44.588	1	55	0.07	52.7900	50.678	101.08	5
6	-3.39	0.0340	16.073	45.718	1	56	0.14	55.5700	51.384	102.21	5
7	-3.32	0.0480	16.78	46.847	1	57	0.21	58.3200	52.09	103.34	5
8	-3.25	0.0680	17.486	47.977	1	58	0.28	61.0300	52.797	104.47	5
9	-3.18	0.0740	18.192	49.107	1	59	0.35	63.6800	53.503	105.6	5
10	-3.11	0.0940	18.898	50.237	1	60	0.42	66.2800	54.209	106.73	5
11	-3.04	0.1180	19.605	51.367	1	61	0.49	68.7900	54.915	107.86	5
12	-2.97	0.1500	20.311	52.497	1	62	0.56	71.2300	55.621	108.99	6
13	-2.90	0.1900	21.017	53.627	1	63	0.63	73.5700	56.328	110.12	6
14	-2.83	0.2300	21.723	54.757	1	64	0.70	75.8000	57.034	111.25	6
15	-2.76	0.2900	22.429	55.887	1	65	0.77	77.9400	57.74	112.38	6
16	-2.69	0.3600	23.136	57.017	1	66	0.84	79.9500	58.446	113.51	6
17	-2.62	0.4400	23.842	58.147	1	67	0.92	82.1200	59.153	114.64	6
18	-2.55	0.5400	24.548	59.277	1	68	0.99	83.8900	59.859	115.77	6
19	-2.47	0.6800	25.254	60.407	1	69	1.06	85.5400	60.565	116.9	7
20	-2.40	0.8200	25.96	61.537	1	70	1.13	87.0800	61.271	118.03	7
21	-2.33	0.9900	26.667	62.667	1	71	1.20	88.4900	61.977	119.16	7
22	-2.26	1.1900	27.373	63.797	1	72	1.27	89.8000	62.684	120.29	8
23	-2.19	1.4300	28.079	64.927	1	73	1.34	90.9900	63.39	121.42	8
24	-2.12	1.7000	28.785	66.056	1	74	1.41	92.0700	64.096	122.55	8
25	-2.05	2.0200	29.492	67.186	1	75	1.48	93.0600	64.802	123.68	8
26	-1.98	2.3900	30.198	68.316	1	76	1.55	93.9400	65.508	124.81	8
27	-1.91	2.8100	30.904	69.446	1	77	1.62	94.7400	66.215	125.94	8
28	-1.84	3.2900	31.61	70.576	1	78	1.69	95.4500	66.921	127.07	8
29	-1.77	3.8400	32.316	71.706	1	79	1.76	96.0800	67.627	128.2	9
30	-1.70	4.4600	33.023	72.836	2	80	1.83	96.6400	68.333	129.33	9
31	-1.63	5.1600	33.729	73.966	2	81	1.90	97.1300	69.04	130.46	9
32	-1.56	5.9400	34.435	75.096	2	82	1.97	97.5600	69.746	131.59	9
33	-1.49	6.8100	35.141	76.226	2	83	2.05	97.9800	70.452	132.72	9
34	-1.42	7.7800	35.847	77.356	2	84	2.12	98.3000	71.158	133.85	9
35	-1.34	9.0100	36.554	78.486	2	85	2.19	98.5700	71.864	134.98	9
36	-1.27	10.2000	37.26	79.616	2	86	2.26	98.8100	72.571	136.11	9
37	-1.20	11.5100	37.966	80.746	3	87	2.33	99.0100	73.277	137.24	9
38	-1.13	12.9200	38.672	81.876	3	88	2.40	99.1800	73.983	138.37	9
39	-1.06	14.4600	39.379	83.006	3	89	2.47	99.3200	74.689	139.5	9
40	-0.99	16.1100	40.085	84.136	3	90	2.54	99.5400	75.395	140.63	9
41	-0.92	17.8800	40.791	85.266	3	91	2.61	99.5500	76.102	141.76	9
42	-0.85	19.7700	41.497	86.395	3	92	2.68	99.6300	76.808	142.89	9
43	-0.78	21.7700	42.203	87.525	3	93	2.75	99.7000	77.514	144.02	9
44	-0.71	23.8900	42.91	88.655	4	94	2.82	99.7600	78.22	145.15	9
45	-0.64	26.1100	43.616	89.785	4	95	2.89	99.8100	78.927	146.28	9
46	-0.57	28.4300	44.322	90.915	4	96	2.96	99.8500	79.633	147.41	9
47	-0.50	30.8500	45.028	92.045	4	97	3.03	99.8780	80.339	148.54	9
48	-0.43	33.3600	45.734	93.175	4	98	3.10	99.9030	81.045	149.67	9
49	-0.36	35.9400	46.441	94.305	4	99	3.18	99.9260	81.751	150.8	9
50	-0.29	38.5900	47.147	95.435	4	100	3.25	99.9400	82.458	151.93	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviation of Intelligence Quotient, S-Stanine Score)

Table 5.27: Girls Age 17 Years

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-4.19	0.0016	8.1169	32.987	1	51	-0.13	44.8300	48.701	97.922	5
2	-4.11	0.0020	8.9286	34.286	1	52	-0.05	48.0100	49.513	99.221	5
3	-4.03	0.0030	9.7403	35.584	1	53	0.03	51.2000	50.325	100.52	5
4	-3.94	0.0050	10.552	36.883	1	54	0.11	54.3800	51.136	101.82	5
5	-3.86	0.0060	11.364	38.182	1	55	0.19	57.5300	51.948	103.12	5
6	-3.78	0.0070	12.175	39.481	1	56	0.28	61.0300	52.76	104.42	6
7	-3.70	0.0110	12.987	40.779	1	57	0.36	64.0600	53.571	105.71	6
8	-3.62	0.0160	13.799	42.078	1	58	0.44	67.0000	54.383	107.01	6
9	-3.54	0.0230	14.61	43.377	1	59	0.52	69.8500	55.195	108.31	6
10	-3.46	0.3000	15.422	44.675	1	60	0.60	72.5700	56.006	109.61	6
11	-3.38	0.0340	16.234	45.974	1	61	0.68	75.1700	56.818	110.91	6
12	-3.30	99.9520	17.045	47.273	1	62	0.76	77.6400	57.63	112.21	7
13	-3.21	99.9310	17.857	48.571	1	63	0.84	79.9500	58.442	113.51	7
14	-3.13	0.0870	18.669	49.87	1	64	0.93	82.3800	59.253	114.81	7
15	-3.05	0.1140	19.481	51.169	1	65	1.01	84.3800	60.065	116.1	7
16	-2.97	0.1500	20.292	52.468	1	66	1.09	86.2100	60.877	117.4	7
17	-2.89	0.1900	21.104	53.766	1	67	1.17	87.9000	61.688	118.7	7
18	-2.81	0.2500	21.916	55.065	1	68	1.25	89.4400	62.5	120	7
19	-2.73	0.3200	22.727	56.364	1	69	1.33	90.8200	63.312	121.3	8
20	-2.65	0.4000	23.539	57.662	1	70	1.41	92.0700	64.123	122.6	8
21	-2.56	0.5200	24.351	58.961	1	71	1.49	93.1900	64.935	123.9	8
22	-2.48	0.6600	25.162	60.26	1	72	1.57	94.1800	65.747	125.19	8
23	-2.40	0.8200	25.974	61.558	1	73	1.66	95.1500	66.558	126.49	8
24	-2.32	1.0200	26.786	62.857	1	74	1.74	95.9100	67.37	127.79	8
25	-2.24	1.2500	27.597	64.156	1	75	1.82	96.5600	68.182	129.09	9
26	-2.16	1.5400	28.409	65.455	1	76	1.90	97.1300	68.994	130.39	9
27	-2.08	1.8800	29.221	66.753	1	77	1.98	97.6100	69.805	131.69	9
28	-2.00	2.2800	30.032	68.052	1	78	2.06	98.0300	70.617	132.99	9
29	-1.92	2.7400	30.844	69.351	1	79	2.14	98.3800	71.429	134.29	9
30	-1.83	3.3600	31.656	70.649	1	80	2.22	98.6800	72.24	135.58	9
31	-1.75	4.0100	32.468	71.948	1	81	2.31	98.9600	73.052	136.88	9
32	-1.67	4.7500	33.279	73.247	2	82	2.39	99.1600	73.864	138.18	9
33	-1.59	5.5900	34.091	74.545	2	83	2.47	99.3200	74.675	139.48	9
34	-1.51	6.5500	34.903	75.844	2	84	2.55	99.4600	75.487	140.78	9
35	-1.43	7.6400	35.714	77.143	2	85	2.63	99.5700	76.299	142.08	9
36	-1.35	8.8500	36.526	78.442	2	86	2.71	99.6600	77.11	143.38	9
37	-1.27	10.2000	37.338	79.74	2	87	2.79	99.7400	77.922	144.68	9
38	-1.19	11.7000	38.149	81.039	3	88	2.87	99.7900	78.734	145.97	9
39	-1.10	13.5700	38.961	82.338	3	89	2.95	99.8400	79.545	147.27	9
40	-1.02	15.3900	39.773	83.636	3	90	3.04	99.8820	80.357	148.57	9
41	-0.94	17.3600	40.584	84.935	3	91	3.12	99.9100	81.169	149.87	9
42	-0.86	19.4900	41.396	86.234	3	92	3.20	99.9310	81.981	151.17	9
43	-0.78	21.7700	42.208	87.532	3	93	3.28	99.9500	82.792	152.47	9
44	-0.70	24.2000	43.019	88.831	4	94	3.36	99.9600	83.604	153.77	9
45	-0.62	26.7600	43.831	90.13	4	95	3.44	99.9660	84.416	155.06	9
46	-0.54	29.4600	44.643	91.429	4	96	3.52	99.9870	85.227	156.36	9
47	-0.45	32.6400	45.455	92.727	4	97	3.60	99.9840	86.039	157.66	
48	-0.37	35.5700	46.266	94.026	4	98	3.69	99.9890	86.851	158.96	
49	-0.29	38.5900	47.078	95.325	4	99	3.77	99.9930	87.662	160.26	
50	-0.21	41.6800	47.89	96.623	5	100	3.85	99.9940	88.474	161.56	

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviations of Intelligence Quotient, S-Stanine Score)

Table 5.28: Boys Class VIII

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-3.92	0.0048	10.802	37.284	1	51	0.05	51.9900	50.516	100.83	5
2	-3.84	0.0072	11.597	38.554	1	52	0.13	55.1700	51.311	102.1	5
3	-3.76	0.0073	12.391	39.825	1	53	0.21	58.3200	52.105	103.37	5
4	-3.68	0.0108	13.185	41.096	1	54	0.29	61.4100	52.899	104.64	6
5	-3.60	0.0159	13.979	42.367	1	55	0.37	64.4300	53.693	105.91	6
6	-3.52	0.0232	14.774	43.638	1	56	0.45	67.3600	54.488	107.18	6
7	-3.44	0.0336	15.568	44.909	1	57	0.53	70.1900	55.282	108.45	6
8	-3.36	0.0340	16.362	46.18	1	58	0.61	72.9100	56.076	109.72	6
9	-3.28	0.0485	17.156	47.45	1	59	0.69	75.4900	56.871	110.99	6
10	-3.20	0.0687	17.951	48.721	1	60	0.77	77.9400	57.665	112.26	7
11	-3.13	0.0870	18.745	49.992	1	61	0.85	80.2300	58.459	113.53	7
12	-3.05	0.1140	19.539	51.263	1	62	0.93	82.3800	59.253	114.81	7
13	-2.97	0.1500	20.334	52.534	1	63	1.00	84.1300	60.048	116.08	7
14	-2.89	0.1900	21.128	53.805	1	64	1.08	85.9900	60.842	117.35	7
15	-2.81	0.2500	21.922	55.075	1	65	1.16	87.7000	61.636	118.62	7
16	-2.73	0.3200	22.716	56.346	1	66	1.24	89.2500	62.431	119.89	7
17	-2.65	0.4000	23.511	57.617	1	67	1.32	90.6600	63.225	121.16	8
18	-2.57	0.5100	24.305	58.888	1	68	1.40	91.9200	64.019	122.43	8
19	-2.49	0.6400	25.099	60.159	1	69	1.48	93.0600	64.813	123.7	8
20	-2.41	0.8000	25.894	61.43	1	70	1.56	94.0600	65.608	124.97	8
21	-2.33	0.9900	26.688	62.701	1	71	1.64	94.9500	66.402	126.24	8
22	-2.25	1.2200	27.482	63.971	1	72	1.72	95.7300	67.196	127.51	8
23	-2.17	1.5000	28.276	65.242	1	73	1.80	96.4100	67.99	128.78	9
24	-2.09	1.8300	29.071	66.513	1	74	1.88	96.9900	68.785	130.06	9
25	-2.01	2.2200	29.865	67.784	1	75	1.96	97.5000	69.579	131.33	9
26	-1.93	2.6800	30.659	69.055	1	76	2.04	97.9300	70.373	132.6	9
27	-1.85	3.2200	31.454	70.326	1	77	2.12	98.3000	71.168	133.87	9
28	-1.78	3.7500	32.248	71.597	1	78	2.20	98.6100	71.962	135.14	9
29	-1.70	4.4600	33.042	72.867	2	79	2.28	98.8700	72.756	136.41	9
30	-1.62	5.2600	33.836	74.138	2	80	2.36	99.0900	73.55	137.68	9
31	-1.54	6.1700	34.631	75.409	2	81	2.43	99.2500	74.345	138.95	9
32	-1.46	7.2100	35.425	76.68	2	82	2.51	99.4000	75.139	140.22	9
33	-1.38	8.3800	36.219	77.951	2	83	2.59	99.5200	75.933	141.49	9
34	-1.30	9.6800	37.014	79.222	2	84	2.67	99.6200	76.728	142.76	9
35	-1.22	11.1200	37.808	80.492	3	85	2.75	99.7000	77.522	144.03	9
36	-1.14	12.7100	38.602	81.763	3	86	2.83	99.7700	78.316	145.31	9
37	-1.06	14.4600	39.396	83.034	3	87	2.91	99.8200	79.11	146.58	9
38	-0.98	16.3500	40.191	84.305	3	88	2.99	99.8600	79.905	147.85	9
39	-0.90	18.4100	40.985	85.576	3	89	3.07	99.8930	80.699	149.12	9
40	-0.82	20.6100	41.779	86.847	3	90	3.15	99.9180	81.493	150.39	9
41	-0.74	22.9600	42.573	88.118	3	91	3.23	99.9313	82.288	151.66	9
42	-0.66	25.4600	43.368	89.388	4	92	3.31	99.9517	83.082	152.93	9
43	-0.58	28.1000	44.162	90.659	4	93	3.39	99.9663	83.876	154.2	9
44	-0.50	30.8500	44.956	91.93	4	94	3.47	99.9765	84.67	155.47	9
45	-0.42	33.7200	45.751	93.201	4	95	3.55	99.9769	85.465	156.74	9
46	-0.35	36.3200	46.545	94.472	4	96	3.63	99.9840	86.259	158.01	9
47	-0.27	39.3600	47.339	95.743	4	97	3.71	99.9892	87.053	159.29	9
48	-0.19	42.4700	48.133	97.014	5	98	3.78	99.9928	87.847	160.56	9
49	-0.11	45.6200	48.928	98.284	5	99	3.86	99.9942	88.642	161.83	9
50	-0.03	48.8000	49.722	99.555	5	100	3.94	99.9953	89.436	163.1	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviations of Intelligence Quotient, S-Stanine Score)

Table 5.29: Boys Class IX

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-3.90	0.0048	10.976	37.561	1	51	-0.32	37.4500	46.844	94.95	4
2	-3.83	0.0071	11.693	38.709	1	52	-0.24	40.5200	47.561	96.098	5
3	-3.76	0.0076	12.41	39.857	1	53	-0.17	43.2500	48.278	97.245	5
4	-3.69	0.0108	13.128	41.004	1	54	-0.10	46.0200	48.996	98.393	5
5	-3.62	0.0158	13.845	42.152	1	55	-0.03	48.8000	49.713	99.541	5
6	-3.54	0.0220	14.562	43.3	1	56	0.04	51.6000	50.43	100.69	5
7	-3.47	0.0240	15.28	44.448	1	57	0.11	54.3800	51.148	101.84	5
8	-3.40	0.0337	15.997	45.595	1	58	0.19	57.5300	51.865	102.98	5
9	-3.33	0.0482	16.714	46.743	1	59	0.26	60.2600	52.582	104.13	6
10	-3.26	0.0600	17.432	47.891	1	60	0.33	62.9300	53.3	105.28	6
11	-3.19	0.0710	18.149	49.039	1	61	0.40	65.5400	54.017	106.43	6
12	-3.11	0.0940	18.867	50.187	1	62	0.47	68.0800	54.735	107.58	6
13	-3.04	0.1180	19.584	51.334	1	63	0.55	70.8800	55.452	108.72	6
14	-2.97	0.1500	20.301	52.482	1	64	0.62	73.2400	56.169	109.87	6
15	-2.90	0.1900	21.019	53.63	1	65	0.69	75.4900	56.887	111.02	6
16	-2.83	0.2300	21.736	54.778	1	66	0.76	77.6400	57.604	112.17	7
17	-2.75	0.3000	22.453	55.925	1	67	0.83	79.6700	58.321	113.31	7
18	-2.68	0.3700	23.171	57.073	1	68	0.90	81.5900	59.039	114.46	7
19	-2.61	0.4500	23.888	58.221	1	69	0.98	83.6500	59.756	115.61	7
20	-2.54	0.5500	24.605	59.369	1	70	1.05	85.3100	60.473	116.76	7
21	-2.47	0.6800	25.323	60.516	1	71	1.12	86.8600	61.191	117.91	7
22	-2.40	0.8200	26.04	61.664	1	72	1.19	88.3000	61.908	119.05	7
23	-2.32	1.0200	26.758	62.812	1	73	1.26	89.6200	62.626	120.2	8
24	-2.25	1.2200	27.475	63.96	1	74	1.33	90.8200	63.343	121.35	8
25	-2.18	1.4600	28.192	65.108	1	75	1.41	92.0700	64.06	122.5	8
26	-2.11	1.7400	28.91	66.255	1	76	1.48	93.0600	64.778	123.64	8
27	-2.04	2.0700	29.627	67.403	1	77	1.55	93.9400	65.495	124.79	8
28	-1.97	97.5600	30.344	68.551	1	78	1.62	94.7400	66.212	125.94	8
29	-1.89	2.9340	31.062	69.699	1	79	1.69	95.4500	66.93	127.09	8
30	-1.82	3.4400	31.779	70.846	1	80	1.76	96.0800	67.647	128.24	9
31	-1.75	4.0100	32.496	71.994	1	81	1.84	96.7100	68.364	129.38	9
32	-1.68	4.6500	33.214	73.142	2	82	1.91	97.1900	69.082	130.53	9
33	-1.61	5.3700	33.931	74.29	2	83	1.98	97.6100	69.799	131.68	9
34	-1.54	6.1700	34.648	75.438	2	84	2.05	97.9800	70.516	132.83	9
35	-1.46	7.2100	35.366	76.585	2	85	2.12	98.3000	71.234	133.97	9
36	-1.39	8.2300	36.083	77.733	2	86	2.20	98.6100	71.951	135.12	9
37	-1.32	9.3400	36.801	78.881	2	87	2.27	98.8400	72.669	136.27	9
38	-1.25	10.5600	37.518	80.029	2	88	2.34	99.0400	73.386	137.42	9
39	-1.18	11.9000	38.235	81.176	3	89	2.41	99.2000	74.103	138.57	9
40	-1.10	86.4300	38.953	82.324	3	90	2.48	99.3400	74.821	139.71	9
41	-1.03	15.1500	39.67	83.472	3	91	2.55	99.4600	75.538	140.86	9
42	-0.96	16.8500	40.387	84.62	3	92	2.63	99.5700	76.255	142.01	9
43	-0.89	18.6700	41.105	85.768	3	93	2.70	99.6500	76.973	143.16	9
44	-0.82	20.6100	41.822	86.915	3	94	2.77	99.7200	77.69	144.3	9
45	-0.75	22.6600	42.539	88.063	3	95	2.84	99.7700	78.407	145.45	9
46	-0.67	25.1400	43.257	89.211	4	96	2.91	99.8200	79.125	146.6	9
47	-0.60	27.4300	43.974	90.359	4	97	2.98	99.8600	79.842	147.75	9
48	-0.53	29.8100	44.692	91.506	4	98	3.06	99.8890	80.56	148.9	9
49	-0.46	32.2800	45.409	92.654	4	99	3.13	99.9130	81.277	150.04	9
50	-0.39	34.8300	46.126	93.802	4	100	3.20	99.9313	81.994	151.19	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviations of Intelligence Quotient, S-Stanine Score)

Table 5.30: Boys Class X

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-3.57	0.0200	14.299	42.878	1	51	-0.35	36.3200	46.474	94.358	4
2	-3.51	0.0233	14.942	43.907	1	52	-0.29	38.5900	47.117	95.387	4
3	-3.44	0.0335	15.586	44.937	1	53	-0.22	41.2900	47.761	96.417	5
4	-3.38	0.0400	16.229	45.967	1	54	-0.16	43.6400	48.404	97.447	5
5	-3.31	0.0483	16.873	46.996	1	55	-0.10	46.0200	49.048	98.476	5
6	-3.25	0.0600	17.516	48.026	1	56	-0.03	48.8000	49.691	99.506	5
7	-3.18	0.0740	18.16	49.055	1	57	0.03	51.2000	50.335	100.54	5
8	-3.12	0.0900	18.803	50.085	1	58	0.10	53.9800	50.978	101.56	5
9	-3.06	0.1110	19.447	51.115	1	59	0.16	57.1400	51.622	102.59	5
10	-2.99	0.1400	20.09	52.144	1	60	0.23	59.1000	52.265	103.62	5
11	-2.93	0.1700	20.734	53.174	1	61	0.29	61.4100	52.909	104.65	6
12	-2.86	0.2100	21.377	54.203	1	62	0.36	64.0600	53.552	105.68	6
13	-2.80	0.2600	22.021	55.233	1	63	0.42	66.2800	54.196	106.71	6
14	-2.73	0.3200	22.664	56.263	1	64	0.48	68.4400	54.839	107.74	6
15	-2.67	0.3900	23.308	57.292	1	65	0.55	70.8800	55.483	108.77	6
16	-2.60	0.4700	23.951	58.322	1	66	0.61	72.9100	56.126	109.8	6
17	-2.54	0.5500	24.595	59.351	1	67	0.68	75.1700	56.77	110.83	6
18	-2.48	0.6600	25.238	60.381	1	68	0.74	77.0400	57.413	111.86	6
19	-2.41	0.8000	25.882	61.411	1	69	0.81	79.1000	58.057	112.89	7
20	-2.35	0.9400	26.525	62.44	1	70	0.87	80.7800	58.7	113.92	7
21	-2.28	1.1300	27.169	63.47	1	71	0.93	82.3800	59.344	114.95	7
22	-2.22	1.3200	27.812	64.499	1	72	1.00	84.1300	59.987	115.98	7
23	-2.15	1.5800	28.456	65.529	1	73	1.06	85.5400	60.631	117.01	7
24	-2.09	1.8300	29.099	66.559	1	74	1.13	87.0800	61.274	118.04	7
25	-2.03	2.1200	29.743	67.588	1	75	1.19	88.3000	61.918	119.07	7
26	-1.96	2.5000	30.386	68.618	1	76	1.26	89.6200	62.561	120.1	8
27	-1.90	2.8700	31.03	69.647	1	77	1.32	90.6600	63.205	121.13	8
28	-1.83	3.3600	31.673	70.677	1	78	1.38	91.6200	63.848	122.16	8
29	-1.77	3.8400	32.317	71.707	1	79	1.45	92.6500	64.492	123.19	8
30	-1.70	4.4600	32.96	72.736	2	80	1.51	93.4500	65.135	124.22	8
31	-1.64	5.0500	33.604	73.766	2	81	1.58	94.2900	65.779	125.25	8
32	-1.58	5.7100	34.247	74.795	2	82	1.64	94.9500	66.422	126.28	8
33	-1.51	6.5500	34.891	75.825	2	83	1.71	95.6400	67.066	127.31	8
34	-1.45	7.3500	35.534	76.855	2	84	1.77	96.1600	67.709	128.33	9
35	-1.38	8.3800	36.178	77.884	2	85	1.84	96.7100	68.353	129.36	9
36	-1.32	9.3400	36.821	78.914	2	86	1.90	97.1300	68.996	130.39	9
37	-1.25	10.5600	37.465	79.943	2	87	1.96	97.5000	69.64	131.42	9
38	-1.19	11.7000	38.108	80.973	3	88	2.03	97.8800	70.283	132.45	9
39	-1.12	13.1400	38.752	82.003	3	89	2.09	98.1700	70.927	133.48	9
40	-1.06	14.4600	39.395	83.032	3	90	2.16	98.4600	71.57	134.51	9
41	-1.00	15.8700	40.039	84.062	3	91	2.22	98.6800	72.214	135.54	9
42	-0.93	17.6200	40.682	85.091	3	92	2.29	98.9000	72.857	136.57	9
43	-0.87	19.2200	41.326	86.121	3	93	2.35	99.0600	73.501	137.6	9
44	-0.80	21.1900	41.969	87.151	3	94	2.41	99.2000	74.144	138.63	9
45	-0.74	22.9600	42.613	88.18	4	95	2.48	99.3400	74.788	139.66	9
46	-0.67	25.1400	43.256	89.21	4	96	2.54	99.4500	75.431	140.69	9
47	-0.61	27.0900	43.9	90.239	4	97	2.61	99.5500	76.075	141.72	9
48	-0.55	29.1200	44.543	91.269	4	98	2.67	99.6200	76.718	142.75	9
49	-0.48	31.5600	45.187	92.299	4	99	2.74	99.6900	77.362	143.78	9
50	-0.42	33.7200	45.83	93.328	4	100	2.80	99.7400	78.005	144.81	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviations of Intelligence Quotient, S-Stanine Score)

Table 5.31: Girls Class VIII

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-4.03	0.0032	9.736	35.578	1	51	0.10	53.9800	50.99	101.58	5
2	-3.94	0.0047	10.561	36.898	1	52	0.18	57.1400	51.815	102.9	5
3	-3.86	0.0060	11.386	38.218	1	53	0.26	60.2600	52.64	104.22	6
4	-3.78	0.0060	12.211	39.538	1	54	0.35	63.6800	53.465	105.54	6
5	-3.70	0.0108	13.036	40.858	1	55	0.43	66.6400	54.29	106.86	6
6	-3.61	0.0160	13.861	42.178	1	56	0.51	69.5000	55.116	108.18	6
7	-3.53	0.0232	14.686	43.498	1	57	0.59	72.2400	55.941	109.5	6
8	-3.45	0.0310	15.512	44.818	1	58	0.68	75.1700	56.766	110.83	6
9	-3.37	0.0320	16.337	46.139	1	59	0.76	77.6400	57.591	112.15	7
10	-3.28	0.0484	17.162	47.459	1	60	0.84	79.9500	58.416	113.47	7
11	-3.20	0.0687	17.987	48.779	1	61	0.92	82.1200	59.241	114.79	7
12	-3.12	0.0900	18.812	50.099	1	62	1.01	84.3800	60.066	116.11	7
13	-3.04	0.1180	19.637	51.419	1	63	1.09	86.2100	60.891	117.43	7
14	-2.95	0.1600	20.462	52.739	1	64	1.17	87.9000	61.716	118.75	7
15	-2.87	0.2100	21.287	54.059	1	65	1.25	89.4400	62.541	120.07	7
16	-2.79	0.2600	22.112	55.38	1	66	1.34	90.9900	63.366	121.39	8
17	-2.71	0.3400	22.937	56.7	1	67	1.42	92.2200	64.191	122.71	8
18	-2.62	0.4400	23.762	58.02	1	68	1.50	93.3200	65.017	124.03	8
19	-2.54	0.5500	24.587	59.34	1	69	1.58	94.2900	65.842	125.35	8
20	-2.46	0.6900	25.413	60.66	1	70	1.67	95.2500	66.667	126.67	8
21	-2.38	0.8700	26.238	61.98	1	71	1.75	95.9900	67.492	127.99	8
22	-2.29	1.1000	27.063	63.3	1	72	1.83	96.6400	68.317	129.31	9
23	-2.21	1.3600	27.888	64.62	1	73	1.91	97.1900	69.142	130.63	9
24	-2.13	1.6600	28.713	65.941	1	74	2.00	97.7200	69.967	131.95	9
25	-2.05	2.0200	29.538	67.261	1	75	2.08	98.1200	70.792	133.27	9
26	-1.96	2.5000	30.363	68.581	1	76	2.16	98.4600	71.617	134.59	9
27	-1.88	3.0100	31.188	69.901	1	77	2.24	98.7500	72.442	135.91	9
28	-1.80	3.5900	32.013	71.221	1	78	2.33	99.0100	73.267	137.23	9
29	-1.72	4.2700	32.838	72.541	2	79	2.41	99.2000	74.092	138.55	9
30	-1.63	5.1600	33.663	73.861	2	80	2.49	99.3600	74.917	139.87	9
31	-1.55	6.0600	34.488	75.182	2	81	2.57	99.4900	75.743	141.19	9
32	-1.47	7.0800	35.314	76.502	2	82	2.66	99.6100	76.568	142.51	9
33	-1.39	8.2300	36.139	77.822	2	83	2.74	99.6900	77.393	143.83	9
34	-1.30	9.6800	36.964	79.142	2	84	2.82	99.7600	78.218	145.15	9
35	-1.22	11.1200	37.789	80.462	3	85	2.90	99.8100	79.043	146.47	9
36	-1.14	12.7100	38.614	81.782	3	86	2.99	99.8600	79.868	147.79	9
37	-1.06	14.4600	39.439	83.102	3	87	3.07	99.8930	80.693	149.11	9
38	-0.97	16.6000	40.264	84.422	3	88	3.15	99.9180	81.518	150.43	9
39	-0.89	18.6700	41.089	85.743	3	89	3.23	99.9310	82.343	151.75	9
40	-0.81	20.9000	41.914	87.063	3	90	3.32	99.9517	83.168	153.07	9
41	-0.73	23.2700	42.739	88.383	4	91	3.40	99.9663	83.993	154.39	9
42	-0.64	26.1100	43.564	89.703	4	92	3.48	99.9760	84.818	155.71	9
43	-0.56	28.7700	44.389	91.023	4	93	3.56	99.9800	85.644	157.03	9
44	-0.48	31.5600	45.215	92.343	4	94	3.65	99.9870	86.469	158.35	9
45	-0.40	34.4600	46.04	93.663	4	95	3.73	99.9893	87.294	159.67	9
46	-0.31	37.8300	46.865	94.983	4	96	3.81	99.9928	88.119	160.99	9
47	-0.23	40.9000	47.69	96.304	5	97	3.89	99.9950	88.944	162.31	9
48	-0.15	44.0400	48.515	97.624	5	98	3.98	99.9960	89.769	163.63	9
49	-0.07	47.2100	49.34	98.944	5	99	4.06	99.9968	90.594	164.95	9
50	0.02	50.8000	50.165	100.26	5	100	4.14	99.9970	91.419	166.27	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviations of Intelligence Quotient, S-Stanine Score)

Table 5.32: Girls Class IX

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-3.89	0.0049	11.136	37.818	1	51	-0.36	35.9400	46.422	94.275	4
2	-3.82	0.0072	11.842	38.947	1	52	-0.29	38.5900	47.128	95.404	4
3	-3.75	0.0101	12.548	40.076	1	53	-0.22	41.2900	47.833	96.534	5
4	-3.67	0.0130	13.253	41.205	1	54	-0.15	44.0400	48.539	97.663	5
5	-3.60	0.0159	13.959	42.335	1	55	-0.08	46.8100	49.245	98.792	5
6	-3.53	0.0232	14.665	43.464	1	56	0.00	50.0000	49.951	99.921	5
7	-3.46	0.0310	15.371	44.593	1	57	0.07	52.7900	50.656	101.05	5
8	-3.39	0.0338	16.076	45.722	1	58	0.14	55.5700	51.362	102.18	5
9	-3.32	0.0482	16.782	46.851	1	59	0.21	58.3200	52.068	103.31	5
10	-3.25	0.0600	17.488	47.98	1	60	0.28	61.0300	52.773	104.44	6
11	-3.18	0.0740	18.193	49.109	1	61	0.35	63.6800	53.479	105.57	6
12	-3.11	0.0940	18.899	50.239	1	62	0.42	66.2800	54.185	106.7	6
13	-3.04	0.1180	19.605	51.368	1	63	0.49	68.7900	54.891	107.82	6
14	-2.97	0.1500	20.311	52.497	1	64	0.56	71.2300	55.596	108.95	6
15	-2.90	0.1900	21.016	53.626	1	65	0.63	73.5700	56.302	110.08	6
16	-2.83	0.2300	21.722	54.755	1	66	0.70	75.8000	57.008	111.21	6
17	-2.76	0.2900	22.428	55.884	1	67	0.77	80.7800	57.713	112.34	7
18	-2.69	0.3600	23.133	57.013	1	68	0.84	79.9500	58.419	113.47	7
19	-2.62	0.4400	23.839	58.143	1	69	0.91	81.8600	59.125	114.6	7
20	-2.55	0.5400	24.545	59.272	1	70	0.98	83.6500	59.831	115.73	7
21	-2.47	0.6800	25.251	60.401	1	71	1.05	85.3100	60.536	116.86	7
22	-2.40	0.8200	25.956	61.53	1	72	1.12	86.8600	61.242	117.99	7
23	-2.33	0.9900	26.662	62.659	1	73	1.19	88.3000	61.948	119.12	7
24	-2.26	1.1900	27.368	63.788	1	74	1.27	89.8000	62.653	120.25	8
25	-2.19	1.4300	28.073	64.917	1	75	1.34	90.9900	63.359	121.37	8
26	-2.12	1.7000	28.779	66.047	1	76	1.41	92.0700	64.065	122.5	8
27	-2.05	2.0200	29.485	67.176	1	77	1.48	93.0600	64.771	123.63	8
28	-1.98	2.3900	30.191	68.305	1	78	1.55	93.9400	65.476	124.76	8
29	-1.91	2.8100	30.896	69.434	1	79	1.62	94.7400	66.182	125.89	8
30	-1.84	3.2900	31.602	70.563	1	80	1.69	95.4500	66.888	127.02	8
31	-1.77	3.8400	32.308	71.692	1	81	1.76	96.0800	67.594	128.15	9
32	-1.70	4.4600	33.013	72.821	2	82	1.83	96.6400	68.299	129.28	9
33	-1.63	5.1600	33.719	73.951	2	83	1.90	97.1300	69.005	130.41	9
34	-1.56	5.9400	34.425	75.08	2	84	1.97	97.5600	69.711	131.54	9
35	-1.49	6.8100	35.131	76.209	2	85	2.04	97.9300	70.416	132.67	9
36	-1.42	7.7800	35.836	77.338	2	86	2.11	98.2600	71.122	133.8	9
37	-1.35	8.8500	36.542	78.467	2	87	2.18	98.5400	71.828	134.92	9
38	-1.28	10.0300	37.248	79.596	2	88	2.25	98.7800	72.534	136.05	9
39	-1.20	11.5100	37.953	80.725	3	89	2.32	98.9800	73.239	137.18	9
40	-1.13	12.9200	38.659	81.855	3	90	2.39	99.1600	73.945	138.31	9
41	-1.06	14.4600	39.365	82.984	3	91	2.47	99.3200	74.651	139.44	9
42	-0.99	16.1100	40.071	84.113	3	92	2.54	99.4500	75.356	140.57	9
43	-0.92	17.8800	40.776	85.242	3	93	2.61	99.5500	76.062	141.7	9
44	-0.85	19.7700	41.482	86.371	3	94	2.68	99.6300	76.768	142.83	9
45	-0.78	21.7700	42.188	87.5	3	95	2.75	99.7000	77.474	143.96	9
46	-0.71	23.8900	42.893	88.629	4	96	2.82	99.7600	78.179	145.09	9
47	-0.64	26.1100	43.599	89.759	4	97	2.89	99.8100	78.885	146.22	9
48	-0.57	28.4300	44.305	90.888	4	98	2.96	99.8500	79.591	147.35	9
49	-0.50	30.8500	45.011	92.017	4	99	3.03	99.8780	80.296	148.47	9
50	-0.43	33.3600	45.716	93.146	4	100	3.10	99.9030	81.002	149.6	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviations of Intelligence Quotient, S-Stanine Score)

Table 5.33: Girls Class X

X	Z	PR	T	DIQ	ST	X	Z	PR	T	DIQ	ST
1	-4.23	0.0024	7.7314	32.37	1	51	-0.69	24.5100	43.067	88.907	4
2	-4.16	0.0030	8.4382	33.501	1	52	-0.62	26.7600	43.774	90.038	4
3	-4.09	0.0031	9.1449	34.632	1	53	-0.55	29.1200	44.481	91.169	4
4	-4.01	0.0032	9.8516	35.763	1	54	-0.48	31.5600	45.187	92.3	4
5	-3.94	0.0042	10.558	36.893	1	55	-0.41	34.0900	45.894	93.43	4
6	-3.87	0.0060	11.265	38.024	1	56	-0.34	36.6900	46.601	94.561	4
7	-3.80	0.0072	11.972	39.155	1	57	-0.27	39.3600	47.307	95.692	4
8	-3.73	0.0102	12.678	40.286	1	58	-0.20	42.0700	48.014	96.823	5
9	-3.66	0.0130	13.385	41.416	1	59	-0.13	44.8300	48.721	97.953	5
10	-3.59	0.0200	14.092	42.547	1	60	-0.06	47.6100	49.428	99.084	5
11	-3.52	0.0202	14.799	43.678	1	61	0.01	50.4000	50.134	100.21	5
12	-3.45	0.0190	15.505	44.808	1	62	0.08	53.1900	50.841	101.35	5
13	-3.38	0.0310	16.212	45.939	1	63	0.15	55.9600	51.548	102.48	5
14	-3.31	0.0483	16.919	47.07	1	64	0.23	59.1000	52.254	103.61	5
15	-3.24	0.0600	17.625	48.201	1	65	0.30	61.7900	52.961	104.74	6
16	-3.17	0.0760	18.332	49.331	1	66	0.37	64.4300	53.668	105.87	6
17	-3.10	0.0970	19.039	50.462	1	67	0.44	67.0000	54.375	107	6
18	-3.03	0.1220	19.746	51.593	1	68	0.51	69.5000	55.081	108.13	6
19	-2.95	0.1600	20.452	52.724	1	69	0.58	71.9000	55.788	109.26	6
20	-2.88	0.2000	21.159	53.854	1	70	0.65	74.2200	56.495	110.39	6
21	-2.81	0.2500	21.866	54.985	1	71	0.72	76.4200	57.201	111.52	6
22	-2.74	0.3100	22.572	56.116	1	72	0.79	78.5200	57.908	112.65	7
23	-2.67	0.3800	23.279	57.247	1	73	0.86	80.5100	58.615	113.78	7
24	-2.60	0.4700	23.986	58.377	1	74	0.93	82.3800	59.322	114.91	7
25	-2.53	0.5700	24.693	59.508	1	75	1.00	84.1300	60.028	116.05	7
26	-2.46	0.6900	25.399	60.639	1	76	1.07	85.7700	60.735	117.18	7
27	-2.39	0.8400	26.106	61.77	1	77	1.14	87.2900	61.442	118.31	7
28	-2.32	1.0200	26.813	62.9	1	78	1.21	88.6900	62.148	119.44	7
29	-2.25	1.2200	27.519	64.031	1	79	1.29	90.1500	62.855	120.57	8
30	-2.18	1.4600	28.226	65.162	1	80	1.36	91.3100	63.562	121.7	8
31	-2.11	1.7400	28.933	66.293	1	81	1.43	92.3600	64.269	122.83	8
32	-2.04	2.0700	29.64	67.423	1	82	1.50	93.3200	64.975	123.96	8
33	-1.97	2.4400	30.346	68.554	1	83	1.57	94.1800	65.682	125.09	8
34	-1.89	2.9400	31.053	69.685	1	84	1.64	94.9500	66.389	126.22	8
35	-1.82	3.4400	31.76	70.816	1	85	1.71	95.6400	67.095	127.35	8
36	-1.75	4.0100	32.466	71.946	1	86	1.78	96.2500	67.802	128.48	9
37	-1.68	4.6500	33.173	73.077	2	87	1.85	96.7800	68.509	129.61	9
38	-1.61	5.3700	33.88	74.208	2	88	1.92	97.2600	69.216	130.74	9
39	-1.54	6.1700	34.587	75.339	2	89	1.99	97.6700	69.922	131.88	9
40	-1.47	7.0800	35.293	76.469	2	90	2.06	98.0300	70.629	133.01	9
41	-1.40	8.0800	36	77.6	2	91	2.13	98.3400	71.336	134.14	9
42	-1.33	9.1800	36.707	78.731	2	92	2.20	98.6100	72.042	135.27	9
43	-1.26	10.3800	37.413	79.861	2	93	2.27	98.8400	72.749	136.4	9
44	-1.19	11.7000	38.12	80.992	3	94	2.35	99.0600	73.456	137.53	9
45	-1.12	13.1400	38.827	82.123	3	95	2.42	99.2200	74.163	138.66	9
46	-1.05	14.6900	39.534	83.254	3	96	2.49	99.3600	74.869	139.79	9
47	-0.98	16.3500	40.24	84.384	3	97	2.56	99.4800	75.576	140.92	9
48	-0.91	18.1400	40.947	85.515	3	98	2.63	99.5700	76.283	142.05	9
49	-0.83	20.3300	41.654	86.646	3	99	2.70	99.6500	76.989	143.18	9
50	-0.76	22.3600	42.36	87.777	3	100	2.77	99.7200	77.696	144.31	9

(X-Raw Score, Z-Sigma Score, PR-Percentile Rank, T-T score, DIQ-Déviations of Intelligence Quotient, S-Stanine Score)

5.4 STUDYING THE LEVEL OF INTELLIGENCE:

The level of intelligence of the present test was studied by the same data collected on the sample of 3000 which have been used for estimating the reliability, validity and establishing the norms. The levels of intelligence of the entire sample No = 3000 in terms of the classification DIQs were described in Table 5.34 to 5.41 sex-wise and age-wise. The Histogram indicating the distribution level of intelligence for the entire sample sex-wise and age- wise were presented in Fig. 5.16 to 5.21

Table 5.34: Classification of Sex-wise DIQs of the entire Sample No. =3000

DIQ Scores	Boys	%	Girls	%	Total	%	**Classification**
Below 70	21	1.62	34	2.00	55	1.83	Mentally Defective
70 -79	124	9.55	161	9.46	285	9.50	Borderline Defective
80 -89	225	17.33	287	16.86	512	17.07	Low Average
90 – 109	559	43.07	768	45.12	1327	44.23	Normal/Average
110 – 119	216	16.64	239	14.04	455	15.17	High Average
120 – 139	152	11.71	213	12.51	361	12.17	Superior
140 & above	1	0.07	0	0	1	0.03	Very Superior
Total	1298	100	1702	100	3000	100	

Table 5.35: Classification of Age-wise Distribution of DIQs of the Total sample No.= 3000 (13-17 years)

DIQ Scores	13 years	14 years	15 years	16 years	17 years	Total	Classification
Below 70	5	21	16	11	2	55	Mentally Defective
70 -79	32	77	91	71	14	285	Borderline Defective
80 -89	50	177	155	99	31	512	Low Average
90 – 109	140	404	420	286	77	1327	Normal/Average
110 – 119	45	130	148	112	20	455	High Average
120 – 139	37	122	110	72	24	365	Superior
140 & above	1	0	0	0	0	1	Very Superior
Total	310	931	940	651	168	3000	

Table 5.36: Classification of Sex-wise DIQs for 13 years No.= 310

DIQ Scores	Boys	%	Girls	%	Total	%	Classification
Below 70	1	0.83	4	2.12	5	1.61	Mentally Defective
70 -79	12	9.92	20	10.58	32	10.32	Borderline Defective
80 -89	21	17.36	29	15.34	59	16.13	Low Average
90 – 109	55	45.45	85	44.97	140	45.16	Normal/Average
110 – 119	18	14.88	27	14.29	47	14.52	High Average
120 – 139	13	10.74	24	12.70	37	11.94	Superior
140 & above	1	0.83	0	0.00	1	0.32	Very Superior
Total	121	100.00	189	100.00	310	100.00	

Table 5.37: Classification of Sex-wise DIQs for 14 years No.= 931

DIQ Scores	Boys	%	Girls	%	Total	%	Classification
Below 70	10	2.57	11	2.03	21	2.26	Mentally Defective
70 -79	33	8.48	44	8.12	77	8.27	Borderline Defective
80 -89	72	18.51	105	19.37	177	19.01	Low Average
90 – 109	155	39.85	249	45.94	404	43.39	Normal/Average
110 – 119	72	18.51	58	10.70	130	13.96	High Average
120 – 139	47	12.08	75	13.84	122	13.10	Superior
140 & above	0	0.00	0	0.00	0	0	Very Superior
Total	389	100.00	542	100.00	931	100.00	

Table 5.38: Classification of Sex-wise DIQs for 15 years No.= 940

DIQ Scores	Boys	%	Girls	%	Total	%	Classification
Below 70	6	1.59	10	1.78	16	1.70	Mentally Defective
70 -79	36	9.52	55	9.79	91	9.68	Borderline Defective
80 -89	65	17.20	90	16.01	155	16.49	Low Average
90 – 109	165	43.65	255	45.37	420	44.68	Normal/Average
110 – 119	64	16.93	84	14.95	148	15.75	High Average
120 – 139	42	11.11	68	12.10	110	11.70	Superior
140 & above	0	0.00	0	0	0	0	Very Superior
Total	378	10000	562	100.00	940	100.00	

Table 5.39: Classification of Sex-wise DIQs for 16 years No.= 651

DIQ Scores	Boys	%	Girls	%	Total	%	Classification
Below 70	3	0.91	8	2.48	11	1.69	Mentally Defective
70 -79	37	11.25	34	10.56	71	10.91	Borderline Defective
80 -89	50	15.20	49	15.22	99	15.21	Low Average
90 – 109	146	44.38	140	43.48	286	43.93	Normal/Average
110 – 119	55	16.72	57	17. 70	112	17.20	High Average
120 – 139	38	11.55	34	10.56	72	11.06	Superior
140 & above	0	0.	0	0	0	0	Very Superior
Total	329	100.00	322	100.00	651	100.00	

Table 5.40: Classification of Sex-wise DIQs for 17 years No.= 168

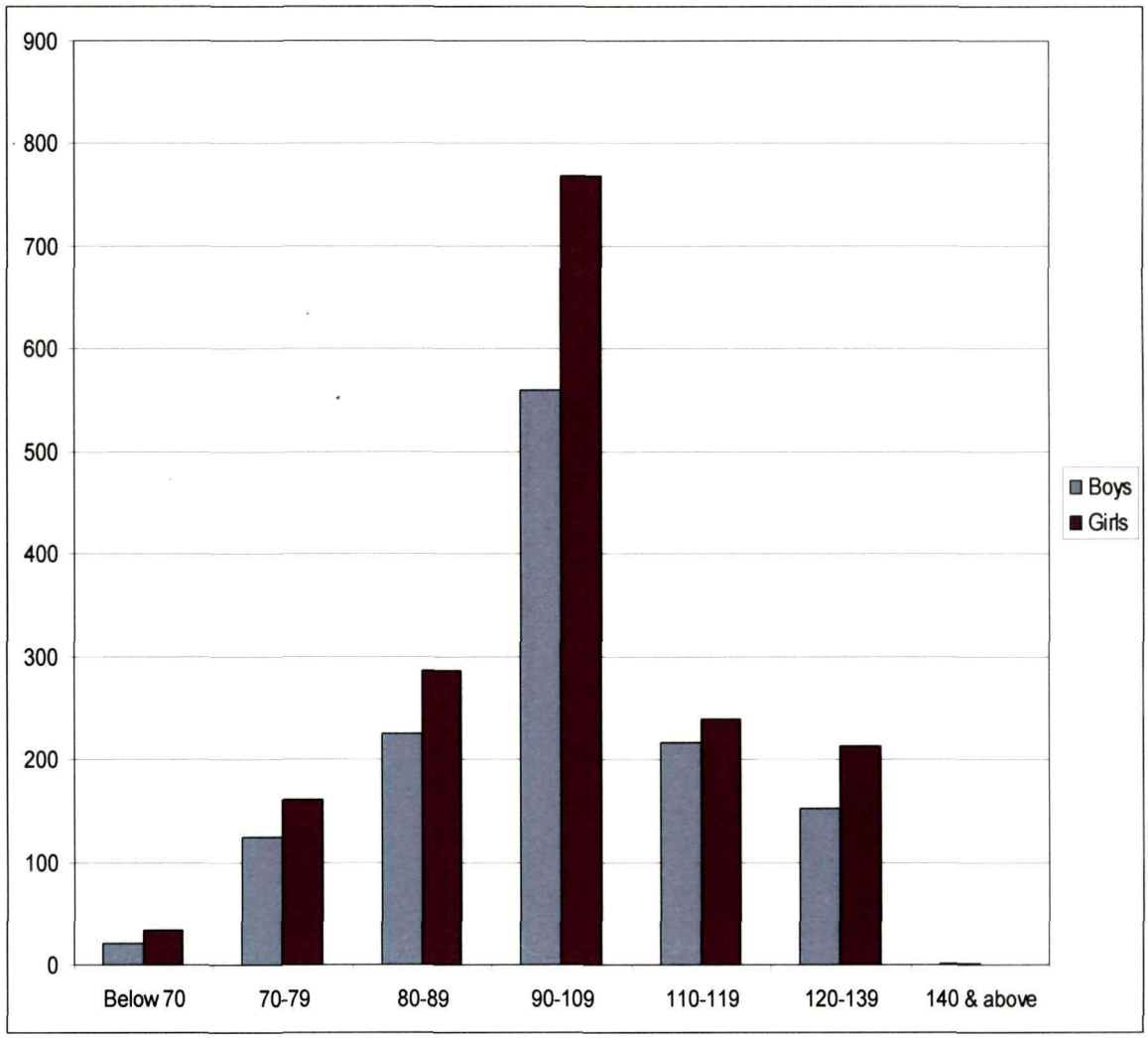
DIQ Scores	Boys	%	Girls	%	Total	%	Classification
Below 70	1	1.23	1	1.15	2	1.19	Mentally Defective
70 -79	6	7.41	8	9.20	14	8.33	Borderline Defective
80 -89	17	20.99	14	16.09	31	18.45	Low Average
90 – 109	38	46.91	39	14.83	77	45.83	Normal/Average
110 – 119	7	8.64	13	14.94	20	11.91	High Average
120 – 139	12	14.81	12	13.79	24	14.29	Superior
140 & above	0	0	0	0	0	0	Very Superior
Total	81	100.00	87	100.00	168	100.00	

A glance to all the above tables showed that the level of intelligence was normally distributed in all age levels. As regards to the distribution of intelligence for the entire sample (sex-wise and age-wise) is concerned the table no. 5.34 and 5.35 revealed that the intelligence was normally distributed.

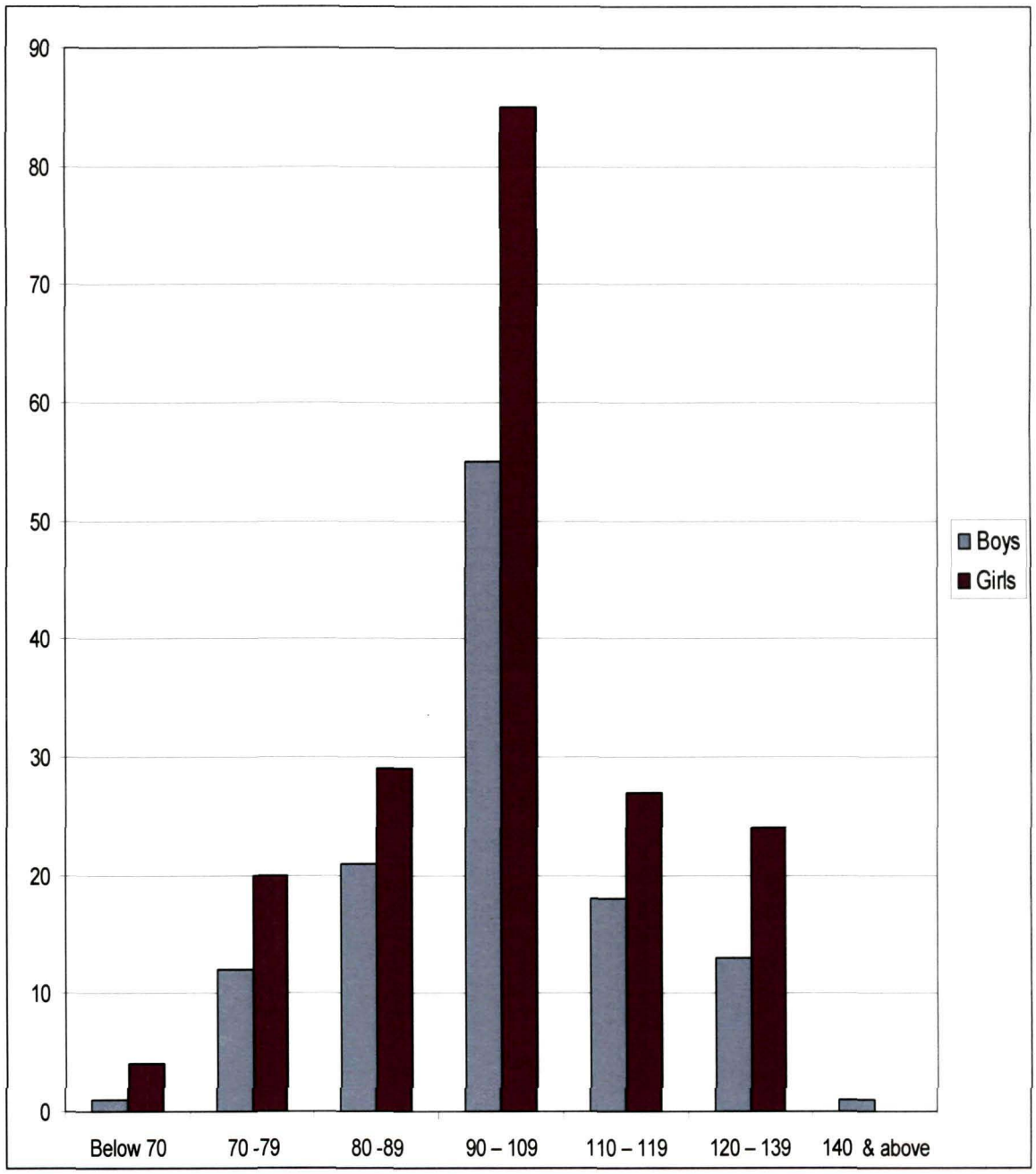
Table 5.41: Classification of Age-wise distribution of DIQ, Mean & S.D of the total Sample No =3000

DIQ	13yrs	14yrs	15yrs	16yrs	17yrs	Total
50-55	0	0	0	0	0	0
55-60	0	3	1	0	0	4
60-65	2	5	3	5	1	16
65-70	3	13	12	6	1	35
70-75	10	23	40	24	4	101
75-80	22	54	51	47	10	184
80-85	20	69	66	48	13	216
85-90	30	108	89	51	18	296
90-95	30	93	97	80	15	315
95-100	30	117	119	60	19	345
100-105	43	91	96	90	16	336
105-110	37	103	108	56	27	331
110-115	30	63	92	73	9	267
115-120	15	67	56	39	11	188
120-125	13	56	52	22	7	150
125-130	12	38	31	26	7	114
130-135	9	22	21	12	5	69
135-140	3	6	6	12	5	32
140-145	1	0	0	0	0	1
145-150	0	0	0	0	0	0
150-155	0	0	0	0	0	0
155-160	0	0	0	0	0	0
Total	310	931	940	651	168	3000
Mean	99.90	99.58	99.47	99.44	100.89	99.64
SD	16.09	16.07	15.77	16.17	16.46	16.01

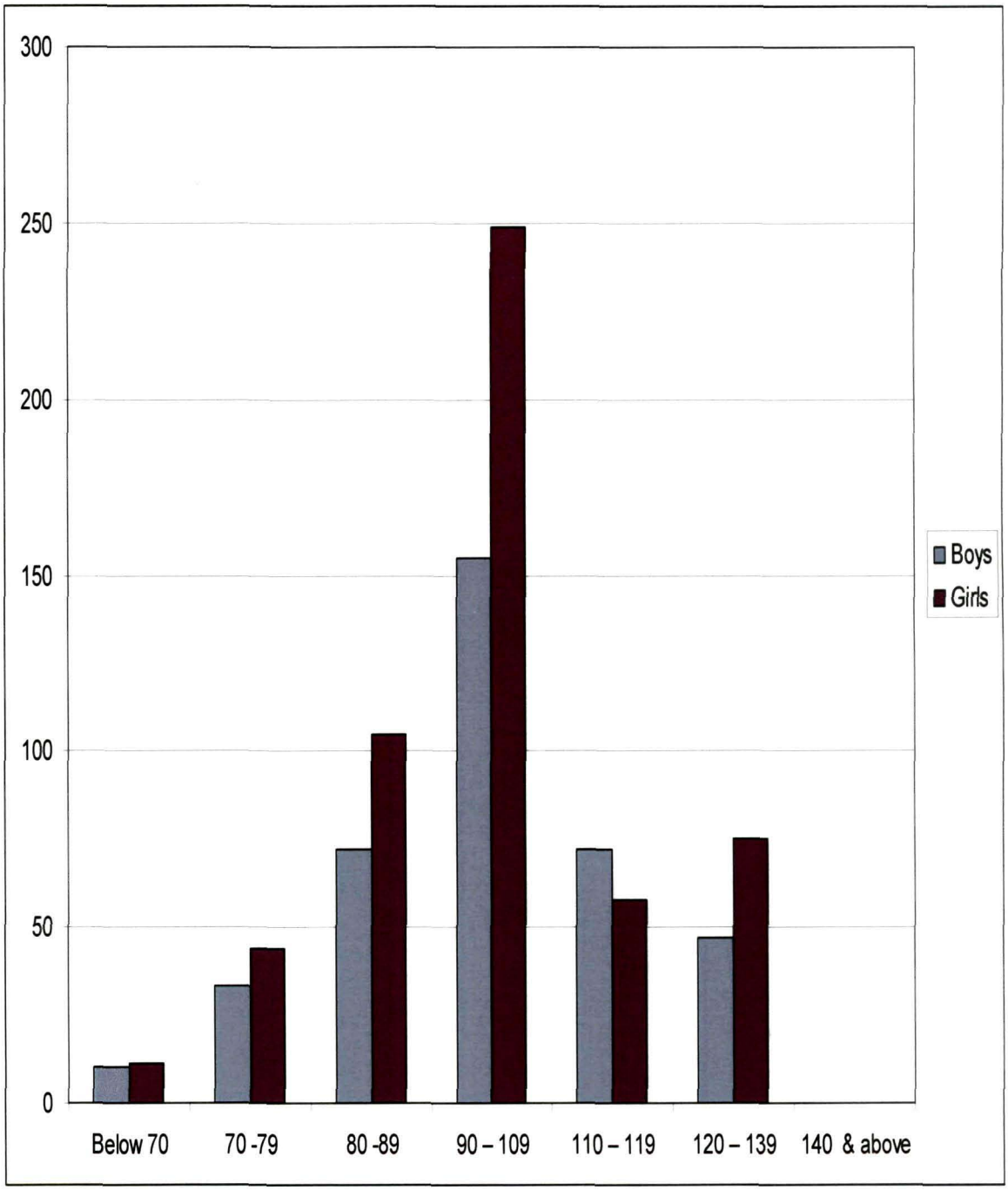
The above table shows that the age-wise distribution of DIQs for the entire sample N=3000 was normally distributed. It is observed that the Mean of every age-group was much closed to 100 and S.D to 16. The Mean and S.D. of the entire sample (3000) were 99.64 and 16.01 respectively. This leads to the conclusion that the process of standardization of the present study was quite satisfactory.



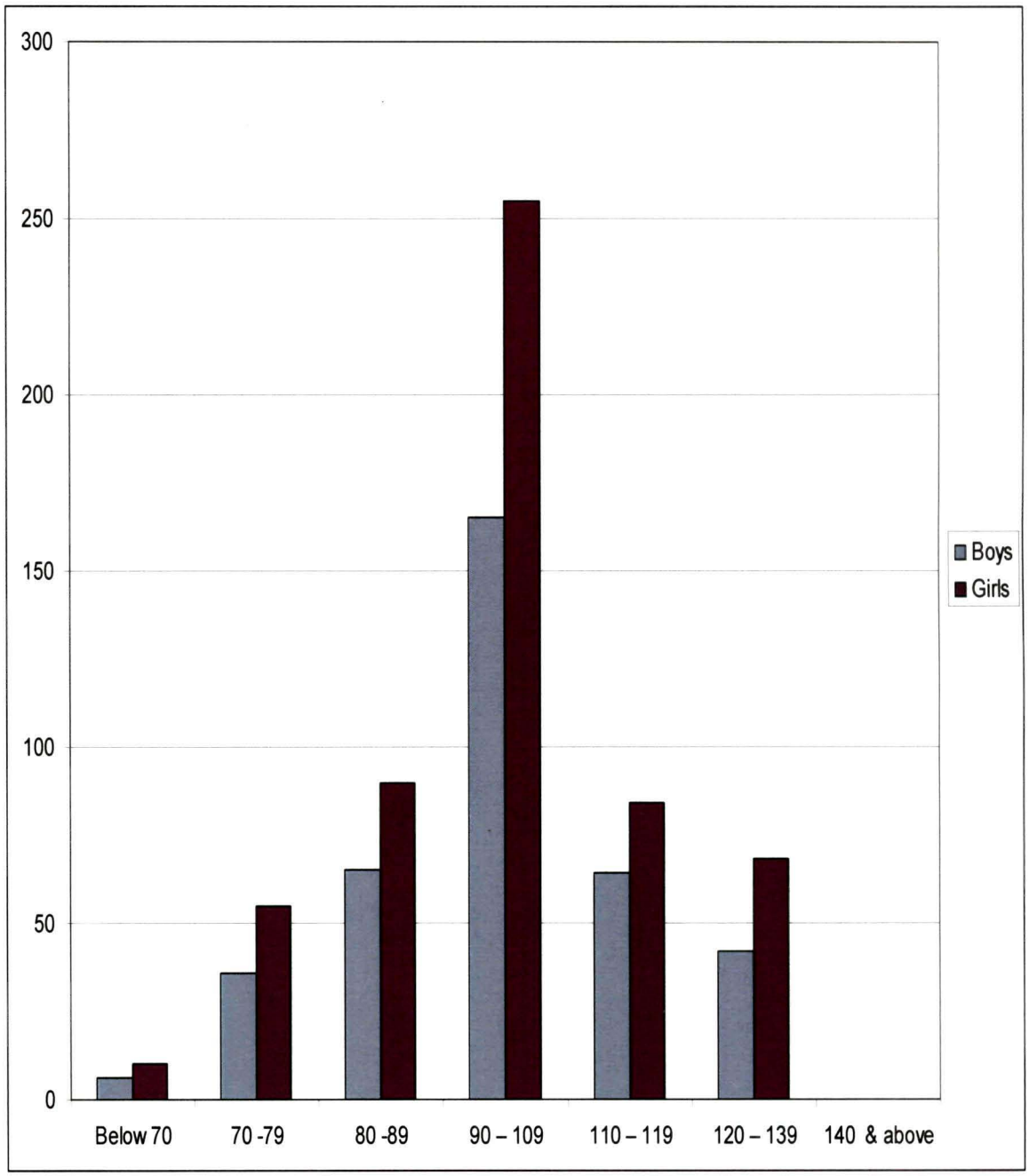
5.16: Histogram Showing the Level of Intelligence Sex-wise for entire Sample (N=3000)



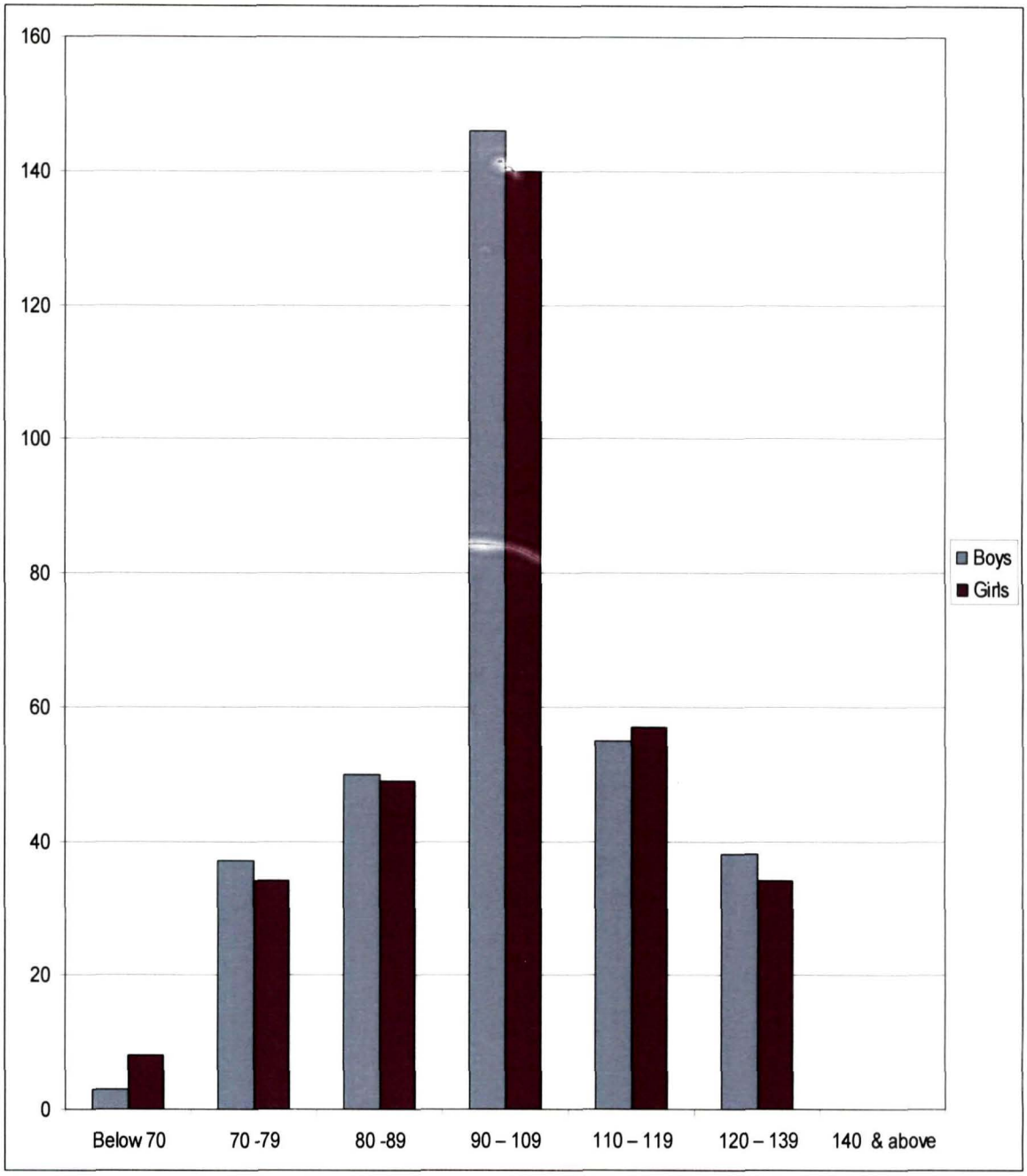
5.17: Histogram Showing the Level of Intelligence Sex-wise for 13 years



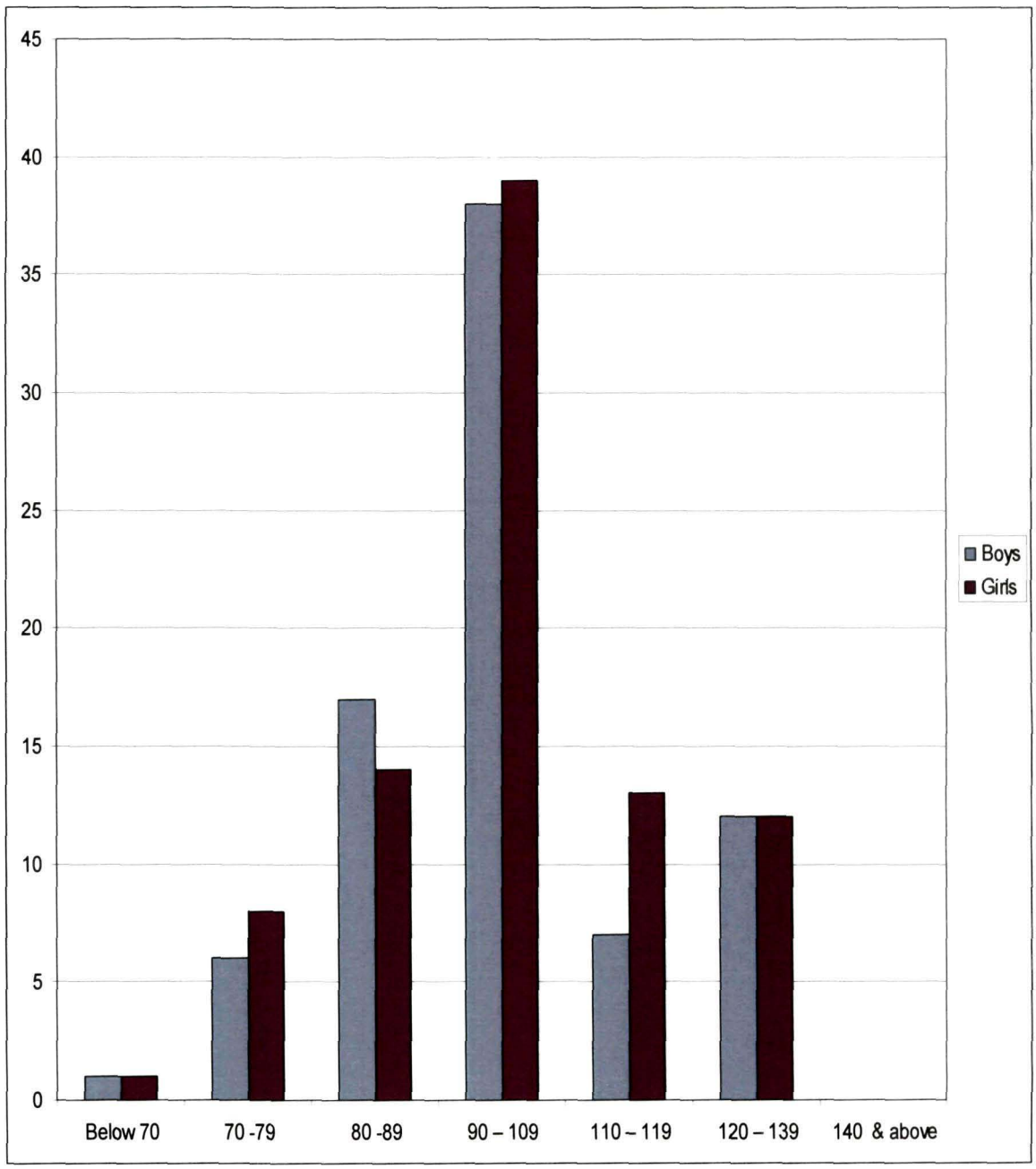
5.18: Histogram Showing the Level of Intelligence Sex-wise for 14 years



5.19: Histogram Showing the Level of Intelligence Sex-wise for 15 years



5.20: Histogram Showing the Level of Intelligence Sex-wise for 16 years



5.21: Histogram Showing the Level of Intelligence Sex-wise for 17 years

Chapter - VI

FINDINGS AND IMPLICATIONS OF THE STUDY

6.1 : The Test

6.2 : The Sub-tests

6.3 : Number of Items

6.4 : Reliability of the Test

6.5 : Validity of the Test

6.6 : Normality of Sampling Distribution

6.7 : Derivation of Norms

6.8 : Interpretation Table for Deviation IQ

6.9 : Distribution of Level of Intelligence in the Sample

6.10 : Educational Implications

6.11 : Suggestions for further researches.

CHAPTER – VI

FINDINGS AND IMPLICATIONS OF THE STUDY

Findings and Implications constitute an important part of the investigation. This chapter presents the findings of the present Verbal Group Test of Intelligence (VGTI) as constructed by the investigator and its educational implications and suggestions for further Researches.

6.1 THE TEST:

The main reason for construction of the present Verbal Group Test of Intelligence in the Khasi language is because there was no such standardized psychological test constructed in the Khasi language to measure either the general mental ability or the scholastic achievement of the school going children. Therefore, to meet this demand the investigator constructed the verbal group test of Intelligence for the Khasi speaking school-going children of the state of Meghalaya, studying in classes VIII – X of the age-group 14 -16 years +. The Test has been designed in such a way that it covered the different aspects of intelligence of the school-going children and to be able to administer easily in 35 minutes of the school period. The provision of answering the items in the separate Answer-Sheet allows

one to re-use the Test Booklet. To administer the test, clear Instructions and Practice Examples of all the 10 sub-tests have been written clearly in the Test Booklet.

6.2 THE SUB-TESTS:

The test contained the following 10 sub-tests:

(i). Classification:

(ii). Coding:

(iii). General Comprehension:

(iv). Akin/Imitative Words:

(v). Verbal Analogy:

(vi). General Reasoning:

(vii). Number Series:

(viii). Evaluation of Relationship:

(ix). General Information:

(x). Arithmetic Reasoning:

6.3 NUMBER OF ITEMS:

The whole Test contained of 10 sub-tests in 100 items which can be administered in 30 minutes. Following were the items retained and time taken in each sub-test:

Table 6.1: Items and Time taken

Sl. No.	Sub-Test	No. of Items selected	Time- taken (in Minutes)
1	Classification	9	$1^1/_2$
2	Coding	11	4
3	General Comprehension	10	3
4	Akin Words	12	3
5	Verbal Analogy	10	$2^1/_1$
6	General Reasoning	9	3
7	Number Series	13	4
8	Evaluation of Relationship	11	4
9	General Information	6	1
10	Arithmetic Reasoning	9	4
Total		100	30

6.4 RELIABILITY OF THE TEST:

The Split-half and Kuder-Richardson reliability of the test were found as follows:

Table 6.2: Reliability Test

Types of Reliability	r_{11}	P
Split-half reliability	0.86	.01*
Kuder-Richardson reliability	0.89	.01*

* Significant at .01 level.

6.5 VALIDITY OF THE TEST:

(a) Content Validity of the Test:

The Content Validity was determined by seeking the expert's opinions on a rating scale. The analysis of the responses revealed that the test items were suitable in terms of the contents, difficulty and language.

(b) Concurrent Validity:

The Concurrent Validity of the present test was calculated by using Ahuja's Group Test of Intelligence and Cattell's Culture Fair Test as the criterion test which were as follows:

Table 6.3: Test of Intelligence

Criterion test used	r_{11}	P
Ahuja's test validity	0.80	.01*
Cattell's test validity	0.66	.01*

* Significant at .01 level.

(c) Construct Validity:

Construct validity of the test was calculated by determining the inter-subtests correlations and factorial validity indicating first common factor as given below:

Table 6.4: Inter-Subtests Correlations

Sub-test	Internal consistency r with the total test	First Common factor (Thurstone's Cantroid method)	Ranks order of the sub-test
1.Classification	.527	.563	8
2. Coding	.661	.620	5
3.General Comprehension	.574	.601	7
4. Akin Words	.555	.543	9
5. Verbal Analogy	.632	.653	2
6.General Reasoning	.643	.654	1
7. Number Series	.680	.625	3
8.Evaluation of Relationship	.602	.604	6
9.General Knowledge	.363	.441	10
10.Arithmetic Reasoning	.616	.621	4

6.6 NORMALITY OF SAMPLING DISTRIBUTION:

The test constructed was administered on a sample of 3000 students and data was collected. The statistics obtained from the data analyzed was as follows:

Table 6.5: Distribution of Descriptive Statistics

No.	Mean	Median	SD	SK	Ku
3000	55.43	54.86	14.34	0.198	0.282

The above statistics reveals that the mean, median of the data fall nearly at the same point, skewness is 0.198 and kurtosis is .282 as required for normal distribution. It shows that the distribution of the sample was approximately normal.

6.7 DERIVATION OF NORMS:

For the present test, Sigma score, norms, Percentile Ranks, T-Score norms, Deviation IQ norms and Stanine Score norms have been derived and given in Tables (5.18 – 5.33) in main body of the Thesis

6.8 INTERPRETATION TABLE FOR DEVIATION IQ:

The DIQ of the entire sample was classified in the following seven (7) groups as suggested classification of revised Stanford-Binet test for interpreting the DIQ of the child.

Table 6.6: Classification for Interpreting DIQ of the entire Sample

DIQ Scores	Total	Percentage	Classification
Below 70	55	1.83	Mentally Defective
70 -79	285	9.50	Borderline Defective
80 -89	512	17.07	Low Average
90 – 109	1327	44.23	Normal/Average
110 – 119	455	15.17	High Average
120 – 139	361	12.17	Superior
140 & above	1	0.03	Very Superior
Total	3000	100.00	

6.9 DISTRIBUTION OF LEVEL OF INTELLIGENCE AMONG THE TOTAL SAMPLE:

As already mentioned, the test constructed by the investigator was administered on a large sample of 3000 school going children (1298 Boys and 1702 Girls) of the age group 14 to 16 + years. The data so collected was utilized for computing the reliability, validity and establishing the norms. The same data was also used to study the level of intelligence of the above children which was given as below:

Table 6.7: Classification of Sex-wise DIQs of the entire Sample (N=3000) (Age group 13-17 years)

DIQ Scores	Boys	%	Girls	%	Total	%	**Classification**
Below 70	21	1.62	34	2.00	55	1.83	Mentally Defective
70 -79	124	9.55	161	9.46	285	9.50	Borderline Defective
80 -89	225	17.33	287	16.86	512	17.07	Low Average
90 – 109	559	43.07	768	45.12	1327	44.23	Normal/Average
110 – 119	216	16.64	239	14.04	455	15.17	High Average
120 – 139	152	11.71	213	12.51	361	12.17	Superior
140 & above	1	0.07	0	0	1	0.03	Very Superior
Total	1298	100	1702	100	3000	100.00	

A glance to the above table shows that the level of intelligence was normally distributed for both boys and girls and for the entire sample.

Table 6.8: Classification of Age-wise distribution of DIQ, Mean & S.D of the total sample=3000

DIQ	13yrs	14yrs	15yrs	16yrs	17yrs	Total
50-55	0	0	0	0	0	0
55-60	0	3	1	0	0	4
60-65	2	5	3	5	1	16
65-70	3	13	12	6	1	35
70-75	10	23	40	24	4	101
75-80	22	54	51	47	10	184
80-85	20	69	66	48	13	216
85-90	30	108	89	51	18	296
90-95	30	93	97	80	15	315
95-100	30	117	119	60	19	345
100-105	43	91	96	90	16	336
105-110	37	103	108	56	27	331
110-115	30	63	92	73	9	267
115-120	15	67	56	39	11	188
120-125	13	56	52	22	7	150
125-130	12	38	31	26	7	114
130-135	9	22	21	12	5	69
135-140	3	6	6	12	5	32
140-145	1	0	0	0	0	1
145-150	0	0	0	0	0	0
150-155	0	0	0	0	0	0
155-160	0	0	0	0	0	0
Total	310	931	940	651	168	3000
Mean	99.90	99.58	99.47	99.44	100.89	99.64
SD	16.09	16.07	15.77	16.17	16.46	16.01

The above table shows that the age-wise distribution of DIQs for the entire sample N=3000 was normally distributed. It is observed that the Mean of every age-group was very close to 100 and S.D to 16. The Mean and S.D. of the entire sample (3000) were 99.64 and

16.01 respectively. This leads to the conclusion that the process of standardization of the present study was quite satisfactory.

6.10 IMPLICATIONS OF THE STUDY:

The present test is the first Verbal Group Test of Intelligence constructed in the Khasi Language for school-going children of the state of Meghalaya of the age-group 14 to 16 + years aims to serve the following purposes for the Khasi students:

(a) Testing the Intelligence of the Khasi Students:

We are living in a modern and complex world which requires a more sophisticated knowledge to meet the needs and challenges of the day. Parents and school authorities have to face numerous problems to help the children to cope up with the modern requirements. Besides, all students are not the same; some could not even cope up with the normal school work. Therefore, the problem could only be solved if modern tools are available to identify the level of intelligence of the students. The present test could be used as one of those tools to measure the level of intelligence of the Khasi student and the knowledge so collected could be used for providing educational guidance according to the level of the intelligence of the students

(b) Intelligence Testing in Selection and Classification of Candidates:

The school authority or any authority either for administrative and organizational reasons, can use the present test for selection and placing candidates of lower grades base on the obtained scores, candidates may be classified as superior, average and below average.

(c) Intelligence Testing and Promotion of Pupils:

From time to time it has been seen that a large number of school students failed to score the minimum pass mark. When the number of failure is sufficiently large, pupils are awarded grace mark on some principle and thus the pass percentage is raised to a comfortable figure. In some schools, marginal cases are considered upon taking into account pupil's performance in previous examinations or class work. These methods of promotion for marginal cases are often found to be not quite related to the basic problem of giving the most potential pupil a chance to improve. Therefore a test like the present intelligence may be useful to school authorities in solving promotional problems of the Khasi students at the higher level.

(d) Intelligence Testing and School Admission:

When people have realized the value of education, there is always a rush for admission in good schools and colleges especially at the level-entrance classes. The school authority used to select students on the basis of their over-all performance of the last examination. Such procedures can faster the screening process, especially when there is a huge demand for admission. No doubt such screening is useful for selecting pupils; but such type of yardstick is not healthy for all students and for all times together, as certain uncontrollable factors may affects the student's performance. It is in such a situation that the present test may offer considerable help in selecting students for admission.

(e) Intelligence Testing and Researches:

The present test could be used by the B.Ed/M.Ed students who have to do a project work as a part to fulfill the partial requirement of the syllabus. The test will also be useful for the research scholars at Ph.D. level to collect information on the level of intelligence of the Khasi speaking students of the state. This will be a great help to them to get the correct information. The test will also be used by research workers as external criteria to validate another test.

6.11 SUGGESTIONS FOR FURTHER RESEARCHES:

Construction of intelligence testing have been a long pursuit all over the country, but with respect to the Khasis of the state of Meghalaya, this is the first study where attempt has been made to construct and standardize a verbal group test of intelligence in the Khasi language for school going children of the age group 14 to 16 + years. The present study may have its own limitations as it could not cover all aspects of intelligence testing which need to be investigated. The investigator, therefore, would like to suggest the future investigators to conduct studies on the following aspects:

1. Construction and standardization of verbal group test of intelligence in Khasi language for pre-primary school children of the age group 3 to 5+ years of Meghalaya.
2. Construction and standardization of verbal group test of intelligence in Khasi language for primary school going children of age-group 6 to 12+ of Meghalaya.
3. Construction and standardization of verbal group test of intelligence for adults of the state of Meghalaya.

CHAPTER – VII

SUMMARY

7.1: Introduction

7.2: Review of Related Literature

7.3: Need and justification of the study

7.4: Statement of the Problem

7.5: Objectives of the Study

7.6: Operational Definitions of the Terms used

7.7: Delimitation of the Study

7.8: Research Design

7.9: Construction of the Study

7.10: Standardization of the Test

7.11: Findings and Implications of the Study

CHAPTER – VII

SUMMARY

7.1 INTRODUCTION:

Intelligence plays an important role in one's academic, professional, social and personal life. It is because of this reason that parents, teachers and employing organizations have always been concerned with the problems of measuring intelligence. Earlier primitive man employed crude methods of measuring intelligence by means of physical strength and solving puzzle. With the advancement of civilization and development of scientific enquiry the methods of measuring intelligence were also improved. Psychologists and educators have developed various kinds of tools like scales and tests to measure intelligence of children. With the help of these scales, IQ of children of different age-group can be measured. The use of intelligence tests has greatly increased in these days. The fact is due to wide individual differences that exist among individuals with regard to intelligence. Truly speaking, no two individuals, even identical twins or individuals nurtured in identical environments, are endowed with equal mental energy. The assessment of intelligence by various tests has given reasons enough to believe that not only does intelligence vary from individual to individual, but it also tends to vary in the same individual from age to age and situation to situation.

7.2 REVIEW OF RELATED LITERATURE:

To the French psychologist Binet goes the credit of giving the world the first systematic intelligence tests. Binet (1905) and his co-worker Simon published the first scale for measurement of intelligence known as Binet - Simon scale. Binet (1908) and Simon revised the scale and it was the first Age-Scale which had created interests among the psychologists. The concept of Mental Age (MA) which gives a measure of the individual's level of intellectual development, though formulated by Binet in 1905, was first used in the 1908 scale. Terman (1916) brought out the Stanford Revision of the Binet-Simon scale which is known as the Stanford-Binet Scale and popularized the term 'Intelligent Quotient' (IQ), which has since then, been found to be an extremely practical concept. American Psychologist Wechsler (1949,67) published his new intelligence test known as the Wechsler-Bellevue scale for children above 10 and adults and the new version was named as WAIS- Wechsler Adult Intelligence Scale. He also devised a scale for children known as Wechsler Intelligence Scale for Children aged 5-15 and a scale known as the Wechsler Pre-school and Primary Scale of Intelligence. Cattell (1930) developed a Culture Fair test of Intelligence while Thurstone (1938) developed the Primary Mental Abilities (PMA). Kuhlman and Anderson (1963) developed an intelligence test for children age group KG to grade 12 levels. McCarthy (1972) developed a scale of children abilities known as the Mc Carthy Scales of Children Abilities (MSCA) suitable for children between the ages $2^1/_2$ to $8^1/_2$. Thorndike & Hagen (1982) devised a Cognitive Abilities Test (CAT) for primary levels. Kaufman & Kaufman (1983) developed the Kaufman Assessment Battery for Children (K-ABC) aged $2^1/_2$ to $12^1/_2$ and in 1990 they developed the Kaufman Brief

Intelligence Test (K-BIT), designed as a quick screening instrument to estimate the level of intellectual functioning of the age group 4 to 90 years.

Historically, In India, construction of psychological testing was started by the Christian missionaries' upto the year 1921. The first Indian who took the initiative in the construction of Intelligence test was Rice in 1922 who about the year 1929 published his "Hindustani Binet Performance-Point Scale". The test was an adaptation of the Binet test along with some additional performance tests. Kamat in the thirties adapted the 1917 version of the test in Marathi and Kannada, Shukla in the forties developed the Gujrati version. Mahalanobis was the pioneer in developing group intelligence tests in Bengali. Subsequently, we have the tests developed by Lal, Jalota and Mohsin in Hindi. Bhatia Standardized for the first time a battery of performance tests for school going children. The first Indian doctorate in test construction was awarded to Desai (1954) for developing a group test of intelligence in Gujrati. In the area of non-verbal intelligence test, Pathak (1955) made a pioneering study of Good-enough's Draw-a –man Test and developed a new scoring method in her standardization of the test for Gujrati children. In the area of Performance test, Mehta (1961) developed a pioneering study in a group test of intelligence for students of the age group 11 and 17 years. In the field of adaptation of foreign tests Malin (1964) worked out the first Indian adaptation of WISC for the students of age-group 6-15 Kapat (1960) constructed a group test of intelligence in Bengali for children of grade V- VII. Pandey (1961) constructed and standardized a group test of intelligence in Nepali for children of class VIII to X. Pathak (1961) constructed a group test of intelligence in Marathi for the age group 9 to 13 years. Hundal and Singh (1963) devised their scale for Punjabi speaking children of age group 13 to 17 years. Ahuja (1966) & Ahuja (1969) constructed a group test

of intelligence in English for Bombay children in age group of 13 to 17 and 9 to 13 years respectively. Patel (1970) Constructed and standardized verbal group test in Gujrati for children of 14 + to 16 + years of age. Thakur (1979) Constructed and standardized a Verbal Group Test of Intelligence in Assamese for students reading in classes V to VIII in Upper Assam. Mishra (1985) Constructed and standardized a Verbal Group Test of Intelligence in Oriya for the age group 12 + to 15 +. Lalhmingliana (2005) Constructed and standardized a Verbal Group Test of Intelligence in Mizo for the age group 13 to 16 + years of Mizoram state.

From the above reviews it could be observed that there are many standardized intelligence tests in the country today, but most of those tests were found to have developed for a specific regional languages and cultures. No fully fledged study could be traced out with respect to the intelligence testing for the Khasis children in Meghalaya.

7.3 NEED AND JUSTIFICATION OF THE STUDY:

Shillong the capital of Meghalaya in North-East, India, has always been the hub of educational prospects in the region, where students of different backgrounds and different socio-economic status flock in to receive the best education, which different institutions of the state provide. So, the capital of the state has become the home of many communities. This has lead to the increased educational competition and challenges amongst the Khasi students and outsiders. As the world is also becoming more and more advanced and complex; educational performance and competition among the students have also become more and more difficult. The teachers and parents are often confused, curious and talked about the differences in the educational performance and academic achievement of the school going

children; as most of them believe that intelligence is one of the main determinants in the student's success and failure. It is this phenomenon which has encouraged the investigator to study the intelligence of the Khasi School going children of the state. In fact, if a child's potential or talent could be measured, estimated or at least identified before he enters into a course of training or discipline, much wasted efforts could be spared. The measurement or identification of intelligence and other mental abilities is very crucial at all stages and it can be checked and examined by intelligence test. A good intelligence test may contribute to the improvement of education. Tests of abilities and other personal characteristics play a large role in modern life, contributing to countless decisions that shape individual's upbringing, schooling and careers.

As uses of Intelligence Tests are manifold, many intelligence tests have been constructed and standardized by researchers of our country from time to time. Tests prepared by others researchers of the country are not suitable to the Khasi children of the state in terms of item, content and language Seeing the relative importance of both, the general ability of the students as a development to human resources in one hand and the necessity of intelligence tests as a measuring tool, on the other; the investigator, feels that it is important to properly test the intelligence of the Khasi school-going children, in order to provide effective educational policies and programs.

The investigator therefore, decided to construct and standardize a verbal group test of intelligence in the Khasi language for the Khasi school-going children, on the following grounds:

1. Intelligence Tests prepared for children of other states are not suitable in terms of the culture, content and language of Khasi children

2. So far no test has been constructed and standardized in the Khasi language for Khasi children of the state of Meghalaya.
3. No intelligence test is available with the local norms

7.4 STATEMENT OF THE PROBLEM:

The problem of the study is stated as follows:

"Construction and Standardization of A Verbal Group Test of Intelligence in the Khasi language for School going children"

7.5 OPERATIONAL DEFINITIONS OF THE TERMS USED:

The terms used in the title of the study are operationally defined as follows:

i *Intelligence*: Intelligence is a general intellectual capacity which consists of the abilities: to reason well with abstract materials, to comprehend well, to have a clear direction of thought, to relate thinking with the attainment of a desirable end.

ii *Intelligence Test*: Intelligence test is a standardized instrument which measures general mental abilities of an individual.

iii *Construction:* Construction of a test means writing of items and selection of items by means of items analysis.

iv *Standardization*: Standardization means preparing the uniform procedures of administering and scoring the test and establishing its reliability, validity and norms.

7.6 OBJECTIVES OF THE STUDY:

The objectives of the study are as follows:

1. To construct a verbal group test of intelligence in the Khasi language for school going children studying in classes VIII, IX and X of the age group 14 to 16 + years.
2. To standardize the test by establishing its reliability and validity.
3. To set up norms for the test
4. To develop a test manual
5 To study the level of intelligence of the Khasi children (age-wise) as obtained by the intelligence test constructed by the investigator.

7.7 DELIMITATION OF THE STUDY:

The study is delimited in the following ways:

1. The sample of the population is restricted only to the Khasi speaking school-going children of four districts of the state of Meghalaya viz.: East Khasi Hills, West Khasi Hills, Jaintia Hills and Ri Bhoi District.
2. The test instrument is limited only to measure the intelligence of the students belonging to the age-group 14 to 16 + years studying in classes VIII to X.
3. The test items and instructions in the manual were prepared in the Khasi language. However, English version was also made available for the purpose of references only.

7.8 RESARCH DESIGN:

The present study was designed as follows:

A. Population:

For the present study, the population comprises of both Khasi boys and girls students of the state of Meghalaya studying in classes VIII to X of the age group 14 to16 + years. The total number of Khasi speaking students studying in classes VIII to X at the time of collecting the data was about 32,110.

B. Sample of the study:

For the present study, the investigator adopted the Simple Random Method which was found appropriate for the study. The study has three sets of samples for the different stages of test construction.

i. Sample for preliminary try-out:

For the preliminary try-out a very small sample of 180 Khasi students studying in classes Viii - X was taken randomly comprising of 80 boys and 100 girls.

ii. Sample for first try-out:

For the first try-out a sample of 555 Khasi students comprising of 277 boys and 278 girls was selected randomly representing each grade.

iii. Sample for the final try-out:

For the final try-out, a sample of 3000 Khasi students (ten percent of the total population) comprising of 1298 boys and 1702 girls were selected randomly from the Khasi speaking population of 4 districts of the state (Table 3.3).

C. Tools Used:

For the present study, the following tools were used:

i. Verbal Group Test of Intelligence constructed by the investigator

ii Ahuja's Group Test of Intelligence

iii. Cattell's Culture Fair Test of Intelligence

iv. Rating scale constructed by the investigator

D. Method of Study:

As the objective of the present study is to construct and standardize an Intelligence test, the investigator decided to use a descriptive method of research, to prepare the following materials: (Appendix 1-4)

(a) Test Booklet (b) Test Manual

(c) Answer Sheet (d) Scoring Key

(a) Test Booklet:

For the present study, a booklet containing the general instructions of the test and ten sub-tests spreading in 100 items was prepared. In each subtest of the booklet, necessary instructions and practice examples were provided. The investigator has carefully categorized the selection of items, so, as to make the present test comprehensive enough, to cover out the intellectual behaviour of the students of classes VIII –X, as follows:

1. Classification 2. Coding 3. General Comprehension

4. Akin/Imitative Words 5. Verbal Analogy 6. General Reasoning

7. Number Series 8. Evaluation of Relationship

9. General Information 10. Arithmetic Reasoning.

(b) Test Manual:

For the present study, the investigator has prepared a Manual of the test, (both in Khasi and English language) which consists of the details of the following: (Appendix 1-B and 2 –B):

(1). Construction procedure

(2). Direction for Administering and Scoring the test.

(3). Sample for Standardization

(4). Reliability and validity of the Test.

(5). Different kinds of Norms in Tables

(6). Interpretation.

(c) Answer Sheet

For the present Test, a compiled answer sheet of all the subtests was prepared where in the subject (student) is required to put a (X) cross mark at the correct answer indicated by the alphabets A, B, C, D, (Appendix 1- C and 2 –C).

(d). Scoring Key

For the scoring key of the present test, the investigator has prepared a transparent stencils , where the correct answer of each item of all the ten subtest were indicated by a box in a tracing paper (Appendix1-D and 2-D).

(E) Collection of Data:

Based on the nature of the study, the collection of data was done in three phases:

(a) First Phase:

The first phase of collection of data for the preliminary try-out was done in the month of May 2007. The test was administered to 180 Khasi students from 6 High Schools. Data obtained from this phase was used to make a preliminary modification of the test.

(b) Second Phase:

The second phase of data collection was done in October 2007. The same procedures of administering the test were followed by the investigator in the second phase. For this try-out a sample of 555 Khasi students were taken randomly from 10 High Schools (Table 3.2).

(c) Third Phase:

The third phase of data collection for final try-out was done in the months of May to August, 2008. In this phase a large sample of 3000 Khasi students were drawn from 42 High Schools (Table 3.3) of the schools population from four Khasi speaking districts of Meghalaya. The data was collected by administering the following three tools:

(i). Investigator's Group Test of Intelligence (in Khasi language).

(ii). Ahuja's Group Test of Intelligence.

(iii). Cattell's Culture Fair Test of Intelligence. (Scale 2 Form A)

Data collected from the third phase was used for the standardization of the test.

(F) Statistical Techniques used:

In the present study, the investigator used the following statistical techniques

(i) *For scoring procedures:* to avoid the problems of guessing, the formula of correcting the difficulty index of an item for chance success was used as suggested by Garrett[1].

[1] H.E Garrett: *Statistics in Psychology and Education,* Valkis, Feffer and Simon Ltd, Bombay, 1981, p. 364.

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

(ii) *For Item Analysis*: the difficulty value and discriminative power of an item was calculated by applying Davis's formula[2].

$$DV = (P_u + P_l)/2$$

$$DP = P_u - P_l$$

(iii) *For Item selections*: only the items whose difficulty values (DV) found between 0.30 to 0.70 and discriminative power (DP) equal to 0.40 and above as suggested by Stanley & Hopkins[3] were retained for the final form.

(iv) *For estimating the reliability of the test*: The (a) Split-half and (b) Kuder-Richardson reliability methods were used. For calculating the Split-half, Pearson's Product Moment and Spearman-Brown Phrophecy formulae were used. The formulae were as follows:

(a) Pearson's Product Moment formula:

$$r = \frac{N \Sigma X'Y' - \Sigma f X' \Sigma f Y'}{\sqrt{\{N \Sigma fX'^2 - (\Sigma f X')^2\} x \{N\Sigma f Y'^2 - (\Sigma f Y')^2/\}}}$$

Spearman-Brown Prophecy formulae:

$$r_{11} = 2 r'_{11} / (1 + r'_{11})$$

[2] S.A Sharma: *Essentials of Measurement in Education & Psychology*; Surya Publication, Meerut, 2005, p.187.
[3] J.C Stanley & K.D. Hopkins: *Educational & Psychological Measurement and Evaluation,* Prentice Hall of India Pvt. Ltd., New Delhi, 1978, p. 270.

(b) K-R 21 formula

$$r_{11} = \frac{n\sigma^2_t - M\,(n\text{-}M)}{\sigma^2_t \quad (n-1)}$$

(v) *For estimating the validity of the test* the following three methods were adopted:

a) Content Validity of the test was rated by the expert's judgment.

b) Concurrent Validity was studied by correlating the present test scores with two external criterion tests: Ahuja Group test and Cattell"s Culture Fair Test and was calculated by Pearson's Product Moment Method.

c) Construct validity of the test was studied by the Inter subtest Correlation and Factorial validity was verified by Thurstone's Centroid Method. To estimate the internal consistency of the present test, the inter-subtests correlation among all ten subtests and the correlation of the sub-tests with the total were computed with the help of computer software Packages of social Sciences.

d) *For Testing the Normality age-wise and class-wise*: the normality of the distribution of the scores was calculated by the Mean, Median, Standard Deviation, P_{10}, P_{90}, Skewness and Kurtosis.

e) *For establishing the Norms*: Sigma Score or Z-Score, Percentile Score, T-Score, DIQ and Stanine score were used to derive for the test age-wise and class-wise.

7.9 CONSTRUCTION OF THE TEST;

The steps involved in the construction of the present test were as follows:

(i) Planning, (ii) Preparation, (iii) Preliminary try-out, (iv)Try-out, (v) Item Analysis, (vi) Item selection, and (vii) Final form of the test

(i) Planning:

Planning is an essential activity in all stages of test construction. Test planning not only involves the preparation of an outline or specifying the content or operation to be covered by the test, but it also involves decision with regards to the: (a) Nature of the test, (b) Types of items to be included, (c) Time-limit for the test and (d) Scoring procedure

(a) Nature of the Test:

After referring to different related psychological tests, the investigator decided to develop a comprehensive test by including ten sub-tests so that the general mental abilities of students may be measured as widely as possible. For the present test, the following ten subtests were included:

1. Akin/Imitative Words	2. Classification
3. Verbal Analogy	4. Number Series
5. Arithmetic Reasoning	6. General Information
7. General Reasoning	8. Coding
9. Evaluation of Relationship	10. General Comprehension

(b) Types of items to be included:

The second step in test construction is the preparation of the type of items to be included. For the present study, the investigator decided to have the multiple-choice items. Multiple-choice

items have come to be the most popular, common, flexible and effective form for standardized testing in recent years and they are also found to have the following advantages:

i. They help to measure the student's capacity for interpretation and discrimination.

ii. They are highly objective, and can be readily scored either by hand as well as machine.

iii. They are not difficult for students to understand and use.

iv. They are not so much influenced by guessing.

(c) Length of the Test:

For the present study the investigator decided that the length of test should be within a period of school hour i.e. 35 minutes for attempting all the 100 items of the final form including the instructions.

(d) Scoring Procedures:

For scoring, the test unit weightage procedure has been preferred over differential weightage. Hawks, Mann and Lindquist (1936) recommended that the simplest and nearly in all cases a satisfactory procedure for scoring an objective test is to give a credit of one to each correct response, the total score thus being the total number of correct responses. To avoid the problems of guessing the investigator has decided to apply the formula of correcting the difficulty index of an item for chance success as has been suggested by Garrett (1981)[4].

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

Where,

P = the percent who actually know the right answer
R = the number who get the right answer
W = the number who get the wrong answer
N = the number of examinees in the sample.

[4] H.E Garrett: *Statistic in Psychology and Education,* Valkis, Feffer and Simon Ltd, Bombay, 1981, p. 364.

Hr = the number of the examinees who do not reach the item (and hence do not try)
K = the number of options or choices.

Scoring was done with the help of a scoring key which was prepared by the investigator. The score, thus obtained was used for estimation of reliability and validity as well as item analysis of the test.

(ii) Preparation:

For the present study, the preparation was based on the following steps:

(a) Writing the test items.

(b) Test Directions for the examinees.

(c) Reviewing and editing of the test items and

(d) Preparing the answer-sheets and scoring key.

(a) Writing the Test Items:

While preparing the test items, the investigator has referred to all the possible common sources available. Intelligence tests prepared by researchers, books on test your IQ, related psychological tests, related dissertations available in the field, magazines, journals and books on the Khasi's culture were critically examined. In addition to these, the investigator has also consulted various subjects' experts to share their views in this matter. On the basis of all the above information collected, the investigator prepared around 400 items. These items were then tried out on 20 students of classes VIII, IX, X. After a thorough study of the responses collected from the 20 respondents, the following 200 items were retained:

Total No. of Subtests & Items included for Preliminary Try-out

Sl. No.	Name of Subtests	No. of items included
1	Akin/Imitative Words	20
2	Classification	20
3	Verbal Analogy	20
4	Number Series	20
5	Arithmetic Reasoning	20
6	General Information	20
7	General Reasoning	20
8	Coding	20
9	Evaluation of Relationship	20
10	General Comprehension	20
Total		200

(b) Test Directions for the Examinees:

For the present study, the directions has specified clearly in front page of the test booklet and in all its subtests separately. Test directions contained the following information:

(i) The time allowed for completing the test.

(ii) Number of items in the tests.

(iii) Maximum marks for the test.

(iv) How and where to record the answers.

(c) Reviewing and Editing of the Test Items:

After the test items of the present study have been written, it has to be reviewed and edited; the purpose was to have a final decision concerning several matters like: length of the test, time-limits, arranging of items of the test, or any technical flaws, directions for the examinees, if any. When all these problems were sorted out, reviewed and edited, the test items were prepared in test booklet form and were made ready for a preliminary try-out.

(d) Preparing Answer - Sheet and Scoring Key:

For scoring the answers, a separate answer sheet was prepared rather using the test booklet itself, because the test booklet was prepared to be reusable whereas answer sheets were prepared to be consumable. The answer sheet was prepared in such a way that spaces were provided for the choices A, B, C, D, against each item. The students were instructed before hand to put a (X) cross mark corresponding to the correct answer.

To make the scoring easier, the investigator used tracing paper of the same size of the answer sheet and by drawing boxes at places corresponding to the correct answer. In each page of answer sheet star marks were put at the top and bottom corners at the right and left to fix the scoring key in the correct position. The correct answers was visible in a 'X' cross mark at the boxes of the scoring key which was adjusted on the page of the answer sheet. Then the total scores were then counted easily.

(iii) Preliminary try-out:

The main purpose of the try-out was to improve and modify the language ambiguity and difficulty of the test items. It was a step to find out how pupils react to the test in terms of content and language. The prepared test at this stage contained of 200 items which was given for preliminary try out on the sample of 180 Khasi students of six High Schools of Shillong town. The time- limit was not set at this stage. The responses and reactions of the testees were recorded. On the basis of the feedback collected, the items which were found vague and different were modified and re-arranged accordingly. After some modifications, it was decided that all the 200 items were to be included in the first try-out.

(iv) First try-out:

The main purpose of the first try-out in the present study was to select the appropriate items and reject the inappropriate ones on the basis of item analysis for obtaining item indexes, viz., (i) Difficulty Value and (ii) Discriminative power and (iii) Determining the time limit of each subtest and length of the test. For this try-out, a sample of 555 Khasi students was drawn from ten high schools of Shillong town as already described in chapter 3. The test containing of 200 items spreaded over ten sub-tests was administered to 555 students and data was collected.

(v) Item Analysis:

When the items have been tried out, they were subjected to procedures called Item analysis. Item Analysis is a statistical technique which is used for selecting and rejecting the items of a test on the basis of their difficulty values and discriminative power. The present study employed the Kelley's method of item analysis, where the indices of item difficulty and discriminative power were calculated by 27 percent top and 27 percent bottom dichotomy and rejecting the middle 46 percent. To compute the difficulty value and discriminative power of an item of the present test, answer sheets of 555 students were arranged in descending order (i.e. from the highest to the lowest score) The three groups were formed as follows:

(i). Upper 27 percent of total sheets (i.e 150 sheets)

(ii). Middle 46 percent of total sheets (i.e.255 sheets)

(iii). Lower 27 percent of total sheets (i.e. 150 sheets)

To get the corrected value for chance success the following Guildford's formula of correction as suggested by Garrett (1981)[5] was adopted:

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[5] H.E. Garrett: *op.cit.* p. 368.

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

Where,

Pc = the percent who actually know the right answer
R = the number who get the right answer
W = the number who get the wrong answer
N = the number of examinees in the sample.
HR = the number of the examinees who do not reach the item (and hence do not try)
K = the number of options or choices.

Now, for each item the proportion of the pupils who passed an item correctly in the upper and the lower groups was determined. The difficulty value and discriminative value of an item was then calculated by using the following formula as suggested by Davis as quoted by Sharma[6]

Difficulty value (DV) $= (P_U + P_L)/2$

Discriminative Power (DP) $= P_U - P_L$

Where,

P_U = Proportion of correct answers on the item of upper group examinees
P_L = Proportion of correct answers on the item of lower group examinees.

(vi) Items Retained for the Final Form of the Test:

The items whose difficulty value found in between 0.30 and 0.70 and discriminative power 0.40 and above were retained as suggested by Stanley and Hopkin[7]. The items with negative discriminative power were rejected. However, items which did not fall under the said difficulty value and discriminative power were omitted. As a result, out of 200 items, 100 items were rejected who's

[6] R.A. Sharma: *op. cit.* p. 187
[7] J.C.Stanley and K.D. Hopkins: *Educational & Psychological Measurement and Evaluation,* Prentice Hall of India Pvt. Ltd., New Delhi, 1978, p. 270.

item difficulty and discriminative power did not fall in the range as mentioned above. The total 100 items were then retained for the final test was given as below:

Showing the number of items retained in each subtests having DV 0.30-0.70 and DP above 0.40

Test No.		Items accepted having DV .30-.70 and DP above .40	Total No. of Items accepted in each subtests
1	CL	5, 10, 12, 13, 15, 16, 17, 19	9
2	CO	3, 5, 12, 13, 14, 15, 16, 17, 18, 19, 20,	11
3	GC	2, 4, 6, 8, 9, 10, 11, 12, 16, 17	10
4	AW	2, 4, 6, 7, 8, 10, 11, 12, 13, 14, 17, 20	12
5	VA	1, 4, 7, 10, 12, 13, 15, 17, 18, 19	10
6	GR	2, 3, 7, 8, 9, 12, 13, 17, 18	9
7	NS	4, 5, 6, 8, 9, 10, 12, 13, 14, 15, 16, 18, 19	13
8	ER	3, 4, 5, 6, 9, 10, 13, 14, 15, 17, 20	11
9	GI	2, 6, 8, 9, 13, 16	6
10	AR	1, 2, 3, 5, 12, 14, 15, 16, 18	9
Total			100

(vii) Final Form of the Test:

On the basis of their recorded time in the answer-sheet, average time taken by 555 students was calculated for each sub-test. Thus the final form of the test after item analysis and time taken in each subtest was given as follows:

Number of Items retained & Time taken in each Subtest

Sl. No.	Sub-Test	No. of Items retained	Time- taken (in Minutes)
1	Classification	9	$1^1/_2$
2	Coding	11	4
3	General Comprehension	10	3
4	Akin Words	12	3
5	Verbal Analogy	10	$2^1/_1$
6	General Reasoning	9	3
7	Number Series	13	4
8	Evaluation of Relationship	11	4
9	General Information	6	1
10	Arithmetic Reasoning	9	4
Total		100	30 mins

7.10 STANDARDIZATION OF THE TEST:

For standardization of the present test, reliability and validity of the test have been estimated and norms have been established. For estimating the reliability, validity and derivation of norms of the present test, the final data collected from the entire sample of 3000 was used. The data was collected by administering the three types of tests viz. Ahuja's Group Test of Intelligence, Cattell's Culture Fair Test of Intelligence and the Investigator's Group Test of Intelligence.

(i) Estimation of Reliability:

For computing the reliability of the present test, Split-half and Kuder-Richardson reliability methods were used. To compute the split-half reliability the scores of the entire sample 3000 were divided into two equivalent halves of odd and even items. The coefficient of correlation (r'_{11}) between the two sets of scores obtained from the two halves was computed by Product Moment Method and was found to be 0.76. From the reliability of the half test, the self correlation of the whole test was then estimated by Spearman-Brown Prophecy formula. The coefficient of correlation was found to be 0.86. For estimating the reliability index of the present study, the formula of K-R 21 was followed. The Kuder-Richardson reliability coefficient of the present test was found to be 0.89.

(ii) Estimation of Validity:

For estimating the validity of the present test, the following three methods were used:

(a). Content Validity

(b). Concurrent Validity

(c). Construct Validity

(a). Content Validity:

For rating the present test, the investigator constructed a rating scale consisting of seven questions. The constructed rating scale was given to 20 experts. According to them the items by and large were representative of the mental ability of the school going children of age-group 14 to 16 + to a great extent and the test was able to measure the level of intelligence. Further, the test covered the various components of intellectual abilities to a

great extent and items were suitable for school going children in terms of content, difficulty and language.

(b). Concurrent Validity:

The concurrent validity of the test was determined by correlating the present test scores with two external criterion scores obtained from the Ahuja's test and Cattell's Culture Fair Test. The obtained concurrent validity coefficient of correlation of the present test with Ahuja's test was found to be 0.80 and with respect of Cattell's Culture Fair test was 0.66 respectively.

(c). Construct Validity:

To estimate the internal consistency or construct validity of the present test, the inter-subtests correlation among all ten subtests and the correlation of the sub-tests with the total test were computed with the help of a Computer Software Packages of Social Science (SPSS). On computation it was found that all the ten subtests were inter-correlated and significant at .01 level. The internal consistency of the present test was further verified by using Thurstone's Centriod Method. It was found to be a unifactor test

(iii) Establishment of Norms:

The data collected from the sample of 3000 Khasi students (1298 boys and 1702 girls) was used for derivation of norms. Before deriving the norms, the normality of the frequency distribution was tested age-wise and grade-wise. . In order to judge the normality of the distribution of the scores, the value of Mean, Median, S D, P_{10}, P_{90}, Skewness and Kurtosis were calculated. The Mean, Median, SD, of each Age-group and Grade was found

to be very close to one another, skewness is 0.198 and kurtosis is .282 as required for normal distribution. This shows that the distribution of the sample was approximately normal.

As the present test is meant for the Khasi students of classes VIII – X (age group 14 – 16 +) Sigma score norms, Percentile norms, T-score norms, DIQ and Stanine scores have been derived grade-wise and age- wise.

(a) **Sigma Score Norms (Z):**

Sigma scores are a kind of standard measure which indicate how many standard deviation the given score deviates from the mean of the distribution. In other words, deviations from the mean expressed in SD units are called Sigma Scores. Sigma Scores are also called as 'Z-Score'. The Sigma Scores or Z-Scores were calculated by applying the following formula:

$$Z = (X - M)/\sigma$$

Where

Z = Standard score in σ units
X = Raw score of an individual
M = Mean of test score
σ = Standard Deviation of the test scores.

The sigma score for each raw score of the present test were given in Table 5.18-5.33

(b) **Percentile Norms:**

Percentile Norms are expressed in percentile ranks. A Percentile Rank indicates a pupil relative's position in a group in terms of percentage of pupils scoring below him. To calculate the individual's percentile norms on a test, the deviation of scores were first expressed in sigma score as already described above. With the help of these scores

percentage of deviation from the mean was obtained by seeing area under the normal probability curve from Garrett's Table A[8]. The percentile norms were then established by adding or subtracting 50 to this value. The percentile norms for each raw score were given in Table 5.18-5.33

© T-Score Norms:

T-Score are normalized standard scores converted into the distribution with a mean of 50 and SD of 10 (Garrett)[6]. If normalized standard score is multiplied by 10 and added to or subtracted from 50, it is converted into T-Score.. Thus the formula used for calculating T-Score is as follows:

$$\text{T-Score} = 50 \pm 10 \text{ (Z score)}.$$

The values of T-scores for each raw score were calculated for different age groups of both the sexes and class group separately and presented in separate Tables 5.18-5.33

(d)Deviation Intelligence Quotient (DIQ) Norms:

Deviation Intelligence Quotient is a normalized standard score which does not involve the mental age of a child. It is not the ratio of mental and chronological ages. The raw scores were transformed into DIQs with the help of the following formula:

$$\text{DIQ} = 100 + 16 (\sigma)$$

The DIQ scores for each raw score were calculated and presented for different age groups of both the sexes and class group and presented in Table 5.18-5.33. The separate Tables for DIQ scores in classified forms for all age groups and sex-wise were also worked out and presented in Table 5.34- 5.41.

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[8] H.E. Garrett: *Statistics in Psychology and Education,* Valkis, Feffer and Simons Ltd., Bombay, 1981, p.458

(e) Stanine Score Norms:

In Stanine scale, raw scores are converted to a nine points scale (ranging from 1-9) with a mean of 5 and SD of 1.96 (approximately 2). Stanine norms for each raw score were calculated and presented in Table No. 5.18 to 5.33.

(iv) Studying the Level of Intelligence of the entire Sample 3000:

The level of intelligence of the present study was studied by the same data collected on the sample of 3000 which have been used for estimating the reliability, validity and establishing the norms. The level of intelligence of the 3000 children was described in Tables 5.34 – 5.40 sex-wise and age-wise. A glance to these tables showed that the level of intelligence was normally distributed at all age levels. Table 5.41 revealed that the Mean of every age-group was very closed to 100 and S.D to 16. The Mean and S.D. of the entire sample (3000) were 99.64 and 16.01 respectively. This leads to the conclusion that the process of standardization of the present test was quite satisfactory.

7.11 FINDINGS AND IMPLICATIONS OF THE STUDY

(i) The Test:

The main reason for construction of t of Intelligence in the Khasi language is because there was no such standardized psychological test constructed in the Khasi language to measure either the general mental ability or the scholastic achievement of the school going children. Therefore, to meet this demand the investigator constructed the verbal group test of Intelligence for the Khasi speaking school-going children of the state of Meghalaya, studying in classes VIII – X of the age-group 14 -16 years +. The Test has been designed in such a way that it covered the different aspects of mental abilities of the school-going

children of the state of Meghalaya, studying in classes VIII – X of the age-group 14 -16 years +. The Test has been designed in such a way that it covered the different aspects of mental abilities of the school-going children and to be able to administer easily in 35 minutes of the school period. The provision of answering the items in the separate Answer-Sheet allows one to re-use the Test Booklet. To administer the test, clear Instructions and Practice Examples of all the 10 sub-tests have been written clearly in the Test Booklet.

(ii) Subtests:

The test contained the following 10 sub-tests:

(a) ***Classification:*** This type of item is used to assess the ability of seeing the relationship to form the group and the power of discrimination to isolate the correct response. In this type of item, words, terms, concepts, facts and objects are given which belong to a class or group, but of these, one does not belong to the class that is to be identified.

(b) ***Coding:*** This type of items is mainly used to assess the perceptual and memory ability. The letters of a word are substituted by numbers or the numbers are substituted by the letters of a word. The examinees have to substitute by using the same code for another set of code letters. The same system of code letters can be used for substituting another word.

(c) ***General Comprehension:*** This type of item is used to asses the ability to grasp, understand and react to a given situation. In this type of sub-test, items are defined as a series of sentences in which certain important words or phrases have been omitted. The examinees are required to fill in or continue the sentence by selecting from the alternative words or phrases to complete the statement.

(d) ***Akin/Imitative Words*:** this type of item is commonly used in the Khasi community and cannot be translated into English. It is used to asses the ability of relationship of a particular word with another. When speaking, an imitative word is added, like adding tags to a speech, e.g. hynmen-hynbew, here the word hynmen means an elder brother and hynbew is an akin/Imitative word. The examinee is required to choose the correct response from the given four words.

(e) ***Verbal Analogy:*** An analogy is a type of item which involves two parallel or similar situations. In the first situation two words are given having some specific relationship. In the second situation, an incomplete form is given where only one word is provided. The second word is to be selected or to be recalled for establishing the same relationship by the examinees

(f) ***General Reasoning***: This type of test is used to assess the ability to reason logically. In this sub- test, the examinee is required to find out the solution of the given problems.

(g) Number Series: In this type of items, the numbers are arranged to form a series of numbers. These numbers are related to each other to continue to form series. An examine has to identify this relationship with the help of his number reasoning ability. In the same order, he has to provide the next number in the continuation of the series.

(h) ***Evaluation of Relationship:*** This type of item is used to asses the ability to evaluate the relationship of people. The examinee is required to find out the correct relationship of an individual with another. This sub-test is based on the Khasi's culture.

(i) ***General Information:*** This is a type of mental ability test which is used to understand and grasp substantive meaning in language, thought and action. In this test the examinee is given a problem. He is required to solve the problem by selecting the best answer from the given alternatives.

(j) ***Arithmetic Reasoning*:** This type of test is commonly used in a general mental ability test. In this test a problem is given in one or two sentences and the examinee is required to solve the problem in numerical

(iii) Number of Items:

The whole Test contained of 10 sub-tests in 100 items which can be administered in 30 minutes. Following were the items retained and time taken in each sub-test:

Number of Items Retained and Time taken in each subtest

Sl. No.	Sub-Test	No. of Items retained	Time- taken (in Minutes)
1	Classification	9	$1^{1}/_{2}$
2	Coding	11	4
3	General Comprehension	10	3
4	Akin Words	12	3
5	Verbal Analogy	10	$2^{1}/_{1}$
6	General Reasoning	9	3
7	Number Series	13	4
8	Evaluation of Relationship	11	4
9	General Information	6	1
10	Arithmetic Reasoning	9	4
Total		100	30

(iv) Reliability of the Test:

The Split-half and Kuder-Richardson reliability of the test were found as follows:

Reliability of the Test

Types of Reliability	r_{11}	P
Split-half reliability	0.86	.01*
Kuder-Richardson reliability	0.89	.01*

* Significant at .01 level.

(v) Validity of the Test:

(a) Content Validity of the Test:

The Content Validity was determined by seeking the expert's opinions on a rating scale. The analysis of the responses revealed that the test items were suitable in terms of the contents, difficulty and language.

(b) Concurrent Validity:

The Concurrent Validity of the present test was calculated by using Ahuja's Group Test of Intelligence and Cattell's Culture Fair Test as the criterion test which were as follows:

Validity of the Test

Criterion test used	r_{11}	P
Ahuja's test validity	0.80	.01*
Cattell's test validity	0.66	.01*

* Significant at .01 level.

(c) Construct Validity:

Construct validity of the test was calculated by determining the inter-subtests correlations and factorial validity indicating first common factor was given below:

Inter-Subtests Correlations

Sub-test	Internal consistency r with the total test	First Common factor (Thurstone's Cantroid method)	Ranks order of the sub-test
1.Classification	.527	.563	8
2. Coding	.661	.620	5
3.General Comprehension	.574	.601	7
4. Akin Words	.555	.543	9
5. Verbal Analogy	.632	.653	2
6.General Reasoning	.643	.654	1
7. Number Series	.680	.625	3
8.Evaluation of Relationship	.602	.604	6
9.General Knowledge	.363	.441	10
10.Arithmetic_Reasoning	.616	.621	4

On computation it was found that all the ten subtests were inter-correlated and significant at .01 level.

(v) Normality of Sampling Distribution:

The test constructed was administered on a sample of 3000 students and data was collected. The statistics obtained from the data analyzed was as follows:

Distribution of Descriptive Statistics

No	Mean	Median	SD	SK	KU
3000	55.43	54.86	14.34	0.198	0.282

The above statistics revealed that the Mean, Median of the data fall nearly at the same point, Skewness is 0.198 and Kurtosis is .282 as required for normal distribution. It shows that the distribution of the sample was approximately normal.

(vi) Derivation of Norms:

For the present test, Sigma score. norms, Percentile Ranks, T-Score norms, Deviation IQ norms and Stanine Score norms have been derived and presented in Tables 5.18 – 5.33

(viii) Interpretation Table for Deviation IQ:

The DIQ of the entire sample was classified in the following seven (7) groups as suggested classification of revised Stanford-Binet test for interpreting the DIQ of the child:

Classification for Interpreting DIQ of the entire Sample

DIQ Scores	Total	Percentage	Classification
Below 70	55	1.83	Mentally Defective
70 -79	285	9.50	Borderline Defective
80 -89	512	17.07	Low Average
90 – 109	1327	44.23	Normal/Average
110 – 119	455	15.17	High Average
120 – 139	361	12.17	Superior
140 & above	1	0.03	Very Superior
Total	3000	100.00	

(ix) Distribution of Level of Intelligence among the Total Sample:

The test constructed by the investigator was administered on a large sample of 3000 school going children (1298 Boys and 1702 Girls) of the age group 14 to 16 + years. The data so collected was utilized for computing the reliability, validity and establishing the norms. The same data was also used to study the level of intelligence of the sample which was given as below:

Classification of Sex-wise DIQs of the entire Sample (N=3000) (Age group 13-17 years)

DIQ Scores	Boys	%	Girls	%	Total	%	**Classification**
Below 70	21	1.62	34	2.00	55	1.83	Mentally Defective
70 -79	124	9.55	161	9.46	285	9.50	Borderline Defective
80 -89	225	17.33	287	16.86	512	17.07	Low Average
90 – 109	559	43.07	768	45.12	1327	44.23	Normal/Average
110 – 119	216	16.64	239	14.04	455	15.17	High Average
120 – 139	152	11.71	213	12.51	361	12.17	Superior
140 & above	1	0.07	0	0	1	0.03	Very Superior
Total	1298	100	1702	100	3000	100.00	

A glance to the above table shows that the level of intelligence was normally distributed for both boys and girls and for the entire sample.

Classification of Age-wise distribution of DIQ, Mean & S.D of the total sample=3000

DIQ	13yrs	14yrs	15yrs	16yrs	17yrs	Total
50-55	0	0	0	0	0	0
55-60	0	3	1	0	0	4
60-65	2	5	3	5	1	16
65-70	3	13	12	6	1	35
70-75	10	23	40	24	4	101
75-80	22	54	51	47	10	184
80-85	20	69	66	48	13	216
85-90	30	108	89	51	18	296
90-95	30	93	97	80	15	315
95-100	30	117	119	60	19	345
100-105	43	91	96	90	16	336
105-110	37	103	108	56	27	331
110-115	30	63	92	73	9	267
115-120	15	67	56	39	11	188
120-125	13	56	52	22	7	150
125-130	12	38	31	26	7	114
130-135	9	22	21	12	5	69
135-140	3	6	6	12	5	32
140-145	1	0	0	0	0	1
145-150	0	0	0	0	0	0
150-155	0	0	0	0	0	0
155-160	0	0	0	0	0	0
Total	310	931	940	651	168	3000
Mean	99.90	99.58	99.47	99.44	100.89	99.64
SD	16.09	16.07	15.77	16.17	16.46	16.01

The above table shows the age-wise distribution of DIQs for the entire sample N=3000 was found to be normally distributed. It is observed that the Mean of every age-group was very close to 100 and S.D to 16. The Mean and S.D. of the entire sample (3000)

were 99.64 and 16.01 respectively. This leads to the conclusion that the process of standardization of the present study was quite satisfactory.

(x) Implications of the Study:

The present test is the first Verbal Group Test of Intelligence constructed in the Khasi Language for school-going children of the state of Meghalaya of the age-group 14 to 16 + years aims to serve the following purposes for the Khasi students:

(a) Testing the Intelligence of the Khasi Students:

The problem of the teachers and parents could only be solved if modern tools are available to identify the level of intelligence of the students. The present test could be used as one of those tools to measure the level of intelligence of the Khasi student and the knowledge so collected could be used for providing educational guidance according to the level of the intelligence of the students

(b) Intelligence Testing in Selection and Classification of Candidates:

The school authority or any authority either for administrative and organizational reasons, can use the present test for selection and placing candidates of lower grades base on the obtained scores. Candidates may be classified as superior, average and below average.

(c) Intelligence Testing and Promotion of Pupils:

From time to time it has been seen that a large number of school students failed to score the minimum pass mark. When the number of failure is sufficiently large, pupils are awarded grace mark on some principle and thus the pass percentage is raised to a comfortable figure. In some schools, marginal cases are considered upon taking into account

pupil's performance in previous examinations or class work. These methods of promotion for marginal cases are often found to be not quite related to the basic problem of giving the most potential pupil a chance to improve. Therefore a test like the present intelligence may be useful to school authorities in solving promotional problems of the Khasi students at the higher level

(d) Intelligence Testing and School Admission:

When people have realized the value of education, there is always a rush for admission in good schools and colleges especially at the level-entrance classes. The school authority used to select students on the basis of their over-all performance of the last examination. Such procedures can faster the screening process, especially when there is a huge demand for admission. No doubt such screening is useful for selecting pupils; but such type of yardstick is not healthy for all students and for all times together, as certain uncontrollable factors may affects the student's performance. It is in such a situation that the present test may offer considerable help in selecting students for admission.

(e) Intelligence Testing and Researches:

The present test could be used by the B.Ed/M.Ed students who have to do a project work as a part to fulfil the partial requirement of the syllabus. The test will also be useful for the research scholars at Ph.D. level to collect information on the level of intelligence of the Khasi speaking students of the state. This will be a great help to them to get the correct information. The test will also be used by research workers as external criteria to validate another test.

(xi) Suggestions for Further Researches:

Construction of intelligence testing have been a long pursuit all over the country, but with respect to the Khasis of the state of Meghalaya, this is the first study where attempt has been made to construct and standardize a verbal group test of intelligence in the Khasi language for school going children of the age group 14 to 16 + years. The present study may have its own limitations as it may not cover all aspects of intelligence testing which needs to be investigated. The investigator, therefore, would like to suggest the future investigators to conduct studies on the following aspects:

1. Construction and standardization of verbal group test of intelligence in Khasi language for pre-primary school children of the age group 3 to 5+ years of Meghalaya.
2. Construction and standardization of verbal group test of intelligence in Khasi language for primary school going children of age-group 6 to 12+ of Meghalaya.
3. Construction and standardization of verbal group test of intelligence for adults of the state of Meghalaya.

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(Appendix 1 A)

KA TYNJUH
JINGSTAD IA KI KHYNNAH SKUL
BAHAPDENG 14 -16 + KA RYTA.

BA LA PYNBIT-PYNBIANG DA I

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KI KYNDON BA DONKAM BAN KYNMAW

1. **YM SHAH BAN PLIED IA KANO-KANO KA SLA JONG KANE KA KOT TYNJUH TAD YNDA LA ONG IA PHI.**

2. **YM SHAH BAN THOH EI-EI HA KANE KA KOT LYNGKDOP-TYNJUH BAD LA KYRPAD IA PHI BAN SUMAR KHUID IA KA.**

3. **IA KI JUBAB JONG PHI DEI BAN THOH HA KA SLA JUBAB HA KI JAKA BA LA BUH KHNANG NA KA BYNTA KAWEI-PA-KAWEI KA TYNJUH.**

4. **DA THOH IA KA KYRTENG JONG PHI BAD KIWE-KIWEI KI JINGDONKAM KAT KUM BA LA BUH HA KA SLA JUBAB**

KI JINGBATAI KYLLUM

1. Ha kane ka KOT LYNGKDOP don 10 shnat ki Tynjuh-jingeh kiba hap ban jubab kawei hadien kawei, bad ha kawei-pa-kawei ka Tynjuh la thoh ia ki Jingbatai ryngkat bad ki Nuksa Jingpyrshang. Dei ban sngewthuh shai bha ia ki, shwa ban ai ia ki Jubab jong phi.

2. Ha kawei-pa-kawei ka Jingkylli jong ka Tynjuh la ai lpa 3 ne 4 tylli ki Jubab kiba phi hap ban jied tang kawei na ki. Phi hap ban pyni ia ki jubab jong phi da kaba buh tang uwei u dak X (POM) na ka bynta kawei ka jubab ha ka jaka ba la buh khnang ha ka SlA JUBAB jong kawei-pa-kawei ka shnat jong ka Tynjuh. Yn khein ia ki jubab tang ha ba buh ia u dak X (pom).

3. Lada phi bakla ban jubab buh da u dak PYLLUN (O) ha kata ka jaka ba bakla.Phi lah ban ai biang ia ka jubab jong phi da kaba buh DAK POM (X)

4. Ia ka Por sdang bad Por kut thoh yn iathuh bad ong ha phi kat kum ka por ba la buh na ka bynta jong kawei-pa-kawei ka Tynjuh bad phin hap ban sangeh thoh shisyndon ynda la kut ka por ba la buh.

5. Pyrshang katba lah ban jubab lut ia ki Jinkylli, bad lada phi lap ia kino kino ki jingkylli ba kham eh phi lah ban iehnoh shwa bad nang jubab ia kiwei pat ter-ter. Wat ym pynlut por than tang ha kawei ka Tynjuh.

6. Phi hap ban jubab kham sted bad ialeh katba lah ban kiar na ki jingbakla.

7. Ym shah ban thoh ei-ei ha kane ka KOT TYNJUH.

8. Lada phi don kano-kano ka jingbymsngewthuh ne jingartatien, phi lah ban kylli shwa ban sdang ka por thoh.

TYNJUH---I

NUKSA JINGPYRSHANG

JINGBATAI: Ha kane ka Tynjuh la ai saw tylli ki kyntien ne kyrteng, lai na ki, ki dei kiba ia hap ha kajuh ka kynhun bad kawei pat ka bym don jingiadei eiei bad ki. Phi hap ban wad ia kata kaba pher tam na ki.

NUKSA JINGPYRSHANG:

No. I. A. KWAI B. TYMPEW K. SHUN D. SHANG

Hangtei ka jubab kaba dei ka hap ha u D, namar ba kyntien *Shang* kam dei ka jingbam, katba kiwei pat ki lai kyntien ki dei ki jait jingbam kiba ngi ju bam lang. Mynta peit ha ka **Sla Jubab** jong ka Tynjuh ba I, sla 2 phin lap ba la buh dak pom (X) ha u D pyrshah ka Nuksa Jingpyrshang No. I.

No. II. A. Ka BEN B. Ka RNONG K. Ka SHUKI D. Ka MIEJ

Hangne ka jubab kaba dei ka hap ha u K. Phi hap ban buh dak pom (X) hi da lade ha pyrshah ka Nuksa Jingpyrshang No. II.

Ha kane ka rukom phin hap ban leh ha ki 9 tylli ki tynjuh-jingeh ha ka sla kaba bud. Ia ki Jubab jong phi dei ban buh dak pom ha ka **Sla Jubab** ha ka jaka bala bud khnang na ka bynta jong kane ka Tynjuh ba I sla 2. La ai por ban jubab tang *shi* minit *shiteng* na ka bynta jong kane ka Tynjuh.

YM SHAH BAN PLIED IA KANE KA SLA TAD YNDA LA ONG IA PHI

TYNJUH---I

(Por : $1^{1}/_{2}$ Minit)

TYNJUH-JINGEH

Sl.No.				
1.	A. Khulom	B. Kot sada	K. Mawthoh	D. U let
2.	A. Rajai	B. Kombor	K. Jain tapthiah	D. Karpet
3.	A. Naitung	B. Naiing	K. Nailur	D. Nailar
4.	A. Ja	B. Doh	K. Dabor	D. Jhur
5.	A. Sohprew	B. Bta	K. Sait	D. Sum
6.	A. Iam	B. Rkhie	K. Ud	D. Lynniar
7.	A. Bri	B. Lyngkha	K. Hali	D. Madan lehkai
8.	A. Tainia	B. Lekshor	K. Sngap	D. Iasaid nia
9.	A. Mawshyieng	B. Mawlynnai	K. Mawbah	D. Mawsahnam

TYNJUH ---II

NUKSA JINGPYRSHANG

JINGBATAI: Ha kane ka Tynjuh phin lap ia ka jingbuh da ki nombor ha ka jaka ki kyntien ne na ki kyntien sha ki nombor. Phi hap ban wad ia ki dak pule ne ki nombor kiba iahap na ki saw tylli kiba la ai lpa.

NUKSA JINGPYRSHANG:

No.I Lada ia ka kyntien MEAI la buh da 4352, kumno yn buh ia ka kyntien IAME ha ki nombar?

A. 2543 B. 2435 K. 2345 D. 2354

Hangtei ka jubab kaba dei ka hap ha u A, ia ka kyntien *IAME* la buh da ki nombar 2543. Mynta peit ha ka **Sla Jubab** jong ka Tynjuh ba II, sla 2 phin lap bala buh dak pom (**X**) ha u A pyrshah ka Nuksa Jingpyrshang No.I

No. II Lada ia u nombar 326 la thoh kum BAM bad 879 kum DOH. Ka kyntien aiu yn buh ha ka jaka u nombor **32826?**

A. DAMMA B. BADAM K. MADAM D. DAMBA

Hangne ka jubab kaba dei ka hap ha u B. Phin hap ban buh dak pom (X) hi dalade ha ka Nuksa Jingpyrshang No. II

Ha kane ka rukom phin hap ban leh ha ki 11 tylli ki tynjuh- jingeh ha ka sla kaba bud. Ia ki jubab jong phi dei ban buh dak pom ha ka **Sla Jubab** ha ka jaka ba la buh khnang na ka bynta kane ka Tynjuh ba II, sla 2. Yn ai por tang *Saw* minit na ka bynta kane ka Tynjuh.

YM SHAH BAN PLIED IA KANE KA SLA TAD YNDA LA ONG IA PHI

TYNJUH –II
(Por : 4 Minit)
TYNJUH-JINGEH

1. Lada ia u alphabet A yn buh da u V, B da u I, K da u X. Kumno yn buh ia ka ktien KBA ha ki dak Roman?
   A. VIX B. IXV K. XIV D. XVI

2. Lada ia u nombar 2567 la thoh kum SHAD bad 3418 kum KMEN. Ki alphabet aiu yn buh ha ka jaka u nombar137426 ?
   A. EKDMSA B. KESDMA K. MEKADS D. SMKDAE

3. Lada ia ka kyntien WEI la buh da ki nombar 135, AR kum 46 bad LAI kum 745. Ki alphabet aiu yn buh ha ka jaka u nombar 134567 ?
   A. WEAIRL B. RWEALI K. LWERIA D. AIRWEL

4. Lada ia u nombar 3958612 la thoh kum PYRKHAT. Kumno yn buh ia u nombar 983652 ha ki alphabet?
   A. TRYKPH B. HYTKPR K. PTHRYK D. YKPHRT

5. Lada ia ka kyntien RAT la thoh kum 453, DEM kum 786. Kumno yn buh ia ka kyntien DATARAM ha u nombar?
   A.7535456 B. 5653547 K. 3575654 D. 4756535

6. Lada ia u nombar 03124 la thoh kum RBWSP bad 69578 kum MYNTD. U nombar aiu yn buh ha ka jaka ki alphabet BDPRMY?
   A. 906843 B. 384069 K. 630984 D. 490863

7. Lada ia ka ktien KHASI la buh kum MGYLH, PNAR kum JTYN.Kumno yn buh ia ka ktien PARIAH ha ki alphabet?
   A. GHYNYJ B. YHJNGY K. HYJGNY D. JYNHYG

8. Lada ia u nombar 612354 la thoh kum KHMIED bad 709 kum TANG. U nombar aiu yn buh ha ka jaka ka kyntien ATMIANG?
   A. 090723 B. 072309 K. 029037 D. 0329097

9. Lada ia u nombar 187 la buh kum ABK, 265 kum DEG bad 349 kum NGHI. Ka kyntien aiu yn buh ha ka jaka u nombar 741263?
   A. KHADENG B. DANGKHE K. KHANGDE D. KHEDANG

10. Lada ia ka kyntien SNGI la buh kum O2I, BNAI kum 6731. U nombar aiu yn buh ha ka jaka ka kyntien NGINSAN?
    A. 707312 B. 173702 K. 217037 D. 321770

11. Lada ia ka ktien SKUL la buh kum BMNO bad HIKAI kum TPMWY. Ki alphabet aiu yn buh ha ka jaka ka kyntien KHASKI ?
    A. WTMYBM B. BYMTWM K. YMBTMW D. MTWBMY

TYNJUH ---III

NUKSA JINGPYRSHANG

JINGBATAI: Ha kane ka Tynjuh phin lap ia ki jingkren ki bym pura. Phi hap ban wad ia ka jubab kaba dei na ki saw tylli ki kyntien ba la ai lupa ban pynpura ia ka jingkren.

NUKSA JINGPYRSHANG:-

No. I **Ngi ri miaw ha ing namar ba ki.....**

A. Ai khun miaw ia ngi.
B. Pynsngewtynnad ia ka ing.
K. Bang bha ban bam doh.
D. Pynher krad ia ki khnai

Hangtei ka jubab kaba biang ka hap ha u D, namar ki miaw ki iarap ia ngi ha ka ban beh khnai. Mynta peit ha ka **Sla Jubab** jong ka Tynjuh ba III, sla 3 phin lap ba la buh dak pom (**X**) ha u D pyrshah ka Nuksa Jingpyrshang No.I

No. II **Ngi pyndonkam shatri kham bunsien ha ka por lyiur namar ba....**

A. Shit bad slap.
B. Lyer bad pyrthad.
K. Beh ka 'er pyngngad.
D. Khriat bad tyrkhong

Hangne ka jubab kaba biang ka hap ha u **A**. Phin hap ban buh dak (**X**) pom hi dalade ha u **A** pyrshah ka Nuksa Jingpyrshang No.II

Ha kane ka rukom phin hap ban leh ha ki 10 tylli ki tynjuh- jingeh ha ka sla kaba bud. Ia ki jubab jong phi dei ban buh dak pom ha ka **Sla Jubab** ha ki jaka ba la ba la buh khnang na ka bynta kane ka Tynjuh ba III, sla 3. La ai por ia phi tang *Lai* minit na ka bynta kane ka Tynjuh.

YM SHAH BAN PLIED IA KANE KA SLA TAD YNDA LA ONG IA PHI.

TYNJUH ---III
(Por : 3 Minit)
TYNJUH-JINGEH

1. Ngi donkam ia ka jingiarap jong ki pulit pyniaid lynti namar ban --
   A. Kloi ka kam ka jam B. Kem ia ki nong lehbakla
   K. Iada na ki jingshahksiden D. Iaid beit ka ain sorkar.

2. Ha u Khasi, ym bit ban iapoikha shikur, namar—
   A. Ka long be-ain B. Ka dei ka sang
   K. Ym nang ban ia khein kur shuh D. Ym ju bit.

3. Haba wan briew ha ing ngi ju ai shuwa da u kwai-u tympew namar ba –
   A. Ba dei ka riti ka dustur B. Yn ym don ka jingiapher hapdeng u duk bad u riewspah.
   K. U kham tad bad suk ban khoh D. U mih tang ha Ri-Khasi & Jaintia.

4. Ia ki ing bun mala lah ban lap tang ha ki sor bah namar ba—
   A.Kham duna ka bam jaka. B. Pahuh ki tiar ki tar
   K. Kham tad ka jaka D. Kham bha ha ki jaka ba bun briew.

5. Ha man la ki shnong ngi don la u Rangbah Shnong namar ban—
   A. Iarap ia ka Sorkar B. Long u nongmihkhmat la ka dong
   K. Bishar ia ki kam ki nongshong shnong. D. Khmih ia ka bha ka miat ka shnong ka thaw

6. Ngim dei ban shu sngap ia ka "Nam ka khlieng ka tyngab" namar ba ki dei ki—
   A. Khubor lorni B. Khubor kiba shu sawa na shaneng sharum khlem nongrim
   K. Khubor kiba ioh na ka kot khubor D. Ki dei tang ki khana –puriskam.

7. Ngi iohi shuwa iaka jingthaba ka leilieh bad sa iohsngew iaka jingtied u pyrthat namarba ka -
   A. Jingshai ka kham iaid sted ban ia ka leilieh. B. Jingsawa ka kham shim por ban poi sha ngi. K. Jingthaba ka wan nyngkong. D. Khmat ka kham trei sted ban ia ka shkor

8. Don katto katne ki balun kiba kah ban her ha suin-bneng namar ba –
   A. Ki balun ki kham sting ban ia ka lyer. B. Ki trai balun ki kum pyllait noh.
   K. La pyndap da ka lyer kaba kham sting ban ia. kiwei pat ki jait lyer
   D. La pyndap palat da ka lyer.

9. Ha ka jylla jongi ki kynthei Khasi & Jaintia kim juh paw ha ka synshar-khaddar namar—
   A. Kam don hok satia. B. Ka dei tang ka 'riewkynthei
   K. Kam bit ia ka kynthei ban shim bynta ha ka hima-sima
   D. Ia ka la burom kum ka nongpynroi ia ka jait ka kynja .

10. Ki Khasi ki ju ong, "Da burom ia ka Meikha" namar ba—
    A. Ka dei ka nongkamai ka ing u kpa. B. Ka dei ka nongkha jong u kpa uba ai ia ka Long rynieng K. U kpa u dei u khlieh jong ka ing. D. Ka shuwa ban ia u kpa.

TYNJUH----- IV

NUKSA JINGPYRSHANG

JINGBATAI: Ha kane ka Tynjuh la ai saw tylli ki kyntien bad kawei na ki ka dei ka ktien kynnoh ne ktien pynbud. Phi hap ban wad ia kata ka ktien kynnoh kaba iahap bad ka jingkylli.

NUKSA JINGPYRSHANG:

No. I **KHOHSIEW:** _____

A. KHOHSHAIN **B. KHOHLUH**
K. KHOHNUB **D. KHOHWAH**

Hangne ka jubab kaba dei ka hap ha u K, *Khohnub*, namar ba ka dei ka 'tien-kynnoh ne 'tien pynbud jong Khohsiew. Mynta peit ha ka **Sla Jubab** jong ka Tynjuh ba IV sla 3, phin lap ba la buh dak pom ha u K ha ka Nuksa Jingpyrshang No.I

No. II **SNENG:** _____

A. SNAR **B. KYRKHU**
K. SNAIT **D. KRAW**

Hangne ka jubab kaba dei ka hap ha u D. Phin hap ban buh dak pom X hi dalade ha ka Nuksa Jingpyrshang No II.

Ha kane ka rukom phin hap ban leh ha ki 12 tylli ki tynjuh-jingeh ha ka sla kaba bud. Ia ki jubab jong phi dei ban buh dak pom ha ka **Sla Jubab** ha ki jaka ba la buh khnang na ka bynta kane ka Tynjuh ba IV, sla 3.Yn ai por iaphi tang *Ar* minit na ka bynta kane ka Tynjuh.

YM SHAH BAN PLIED IA KANE KA SLA TAD YNDA LA ONG IAPHI

TYNJUH----IV

(Por: 2 Minit)

TYNJUH-JINGEH

Sl.No.				
1. Kular:-	A. Kulia	B. Madar	K. Kumah	D. Kutin
2. Ngap :-	A. Kyieng	B. Dkhiew	K. Lwai	D. Khniang
3. Iap-khlam :-	A. Iap-ler	B. Iap-ngoh	K. Iap-kyndit	D. Iapsuk
4. Ing-basa :-	A. Ing-basun	B. Ing-dulan	K. Ing-shongneh	D. Ing-trep
5. Jajah :-	A. Jaton	B. Jatngam	K. Jatah	D. Jadoh
6. Lyntang :-	A. Thaboh	B. Lynther	K. Lyngngot	D. Lyngknot
7. Minot:-	A. Adkar	B. Mutia	K. Ador	D. Trei shitom
8. Myntri:-	A. Myntor	B. Daloi	K. Bakhraw	D. Korbari
9. Nongkhynraw :-	A. Nongkitni	B. Nong-kynti	K. Nong-muna	D. Nongkhyndein
10. Oh-kuna :-	A. Ot-kad	B. Oh-kaid	K. Oh-nong	D. Oh-shrup
11. Raitong :-	A. Rangli	B. Rajon	K. Rai-not	D Raibi
12. Synniang :-	A. Bynhei	B. Synri	K. Synsher	D. Synlar

TYNJUH---V

NUKSA JINGPYRSHANG

JINGBATAI: Ha kane ka Tynjuh phin lap ia ki jingkren ne senten bym pura, ha kaba ar tylli ki kyntien ba ha shuwa ki don ka jingiadei kawei na kawei pat ha la ka jong ka rukom. Phin hap ban wad ia kata ka kyntien na ki saw tylli ki ba la ai lpa kaba don ka jingiadei ha ka juh ka rukom.

NUKSA JINGPYRSHANG:

No.I Ia u shynrang da ka jainspong katba ia ka kynthei pat da ka ---
A. Ryngkap B. Pansngait K. Symphiah D. Waitlam

Hangtei ka jubab kaba dei ka hap ha u B, namar ba ka jainspong la ju pyndonkam tang da u shynrang, katba ia ka kynthei pat da ka *pansngait* Mynta peit ha ka **Sla Jubab** jong ka Tynjuh ba V sla 4, phin lap ba la buh dak pom (X) ha u B pyrshah ka Nuksa Jingpyrshang No. I.

No. II. Nongthoh: Khulom _____ _____
A. Let: Jingpyndam B. Kor thoh: Kot sada
K. Suloi: Nongbeh mrad D. Misteri dieng: Kurat

Hangtei ka jubab kaba dei ka hap ha u D, namar ha katei ka nuksa ka pyni ia ka jingiadei u *nongtrei bad ka tiar*. Phin hap ban buh dak pom (X) hi da lade ha pyrshah ka Nuksa Jingpyrshang No. II.

Ha kane ka rukom phin hap ban leh ha ki 10 tylli ki tynjuh-jingeh ha ka sla kaba bud. Ia ki Jubab jong phi dei ban buh dak pom ha ka **Sla Jubab** ha ka jaka bala buh khnang ha ka Tynjuh ba V, Sla 4. La ai por ban jubab tang *Ar* minit *shiteng* na ka bynta jong kane ka Tynjuh.

YM SHAH BAN PLIED IA KANE KA SLA TAD YNDA LA ONG IA PHI

TYNJUH---V

(Por : $2^1/_2$ Minit)

TYNJUH-JINGEH

Sl.No.

1. Ingmane ia ki Kristan katba Gurudwara ia ki-
   A.Hindu B.Sikh K. Muslim D.Buddhist.

2. Behdiengkhlam jong ki Pnar katba Shad Nongkrem jong ki __
   A. Khyriem B. Lyngnga m K. Bhoi D. War

3. Ba iong bad ba lieh katba miet bad—
   A. Jingdum B. Step K. Sngi D. Iong

4. Ia khun shynrang da khnam bad ryntieh katba ia khun kynthei da—
   A. Shang bad prah B. Jainkyrshah bad jainkup
   K. Khulom bad kot sada D. Khoh bad star

5. Jingbuituh kum u myrsiang katba jingsarong kat u--
   A. Syiem B. Klew K. Shrieh D. Briew

6. Jingshai bad jingdum : _____ _____
   A Jingkmen bad nusib jot B.Jingduh bad jingjop
   K. Jingtlor bad jingkyrmen D. Jingjop bad jingrem

7. Khun-pongka u ne ka khun khlem kpa katba khun-khlieng-kpoh pat u ne ka—
   A. Khun marwei B. Khunswet K. Khun-riewspah D. Khun khadduh

8. Nai khat-saw-synnia u rang bhabriew katba Panshandi-dem-lorkhah pat ka briew kaba-
   A.Dang khmih lynti ia ka jigwan phai la u tnga B. Bym ju poi sha ka lat hadien ba la khreh K. Poi lut sha ki lat D. Pynialuh samla

9. Tarajur bad ki mawser katba:_____ _____
   A.Shuki bad ka ben B. Shatri bad ka knub
   K. Khoh bad u star D. Tari bad jingbat

10. Knub ban kup slap katba Ryngien ban—
    A. Thad ne buh dieng thang B. Thad Jain
    K. Buh tiar- buh tar D. Buh jingbam

TYNJUH –VI

NUKSA JINGPYRSHANG

JINGBATAI: Ha kane ka Tynjuh la buh katto katne ki jingpyni nia ha kaba phi hap ban wad ia ka jubab kaba biang na ki saw tylli ki jubab kiba la ai lpa.

NUKSA JINGPYRSHANG:

No. I U kparad jong ka Phyrnai u shwa ia ka Phyrnai da 50 snem bad ka rta jong ka Phyrnai ka long 15 snem. Katno ka ryta jong u kpa-rad?.
A. 60 B. 65 K. 70

Hangtei ka jubab kaba dei ka hap ha u B, ka 'rta u Kpa'rad ka long 65. Mynta peit ha ka **Sla Jubab** jong ka Tynjuh ba VI, sla 4 phin lap ba la buh dak pom (**X**) ha u B pyrshah ka Nuksa Jingpyrshang No.I

No. II Ha ka eksamin ka Barikor ka ioh bun ka mark ban ia ka Saphimo, bad duna ban ia ka Darity. Mano ba ioh bun eh ka mark.
A. Barikor B. Darity K. Saphimo

Hangne ka jubab kaba dei ka hap ha u B. Phin hap ban buh dak pom (**X**) hi dalade ha u B, pyrshah ka Nuksa Jingpyrshang No. II.

Ha kane ka rukom phin hap ban leh ha ki 9 tylli ki tynjuh- jingeh ha ka sla kaba bud. Ia ki jubab jong phi dei ban buh dak pom ha ka **Sla Jubab** ha ki jaka ba la buh khnang na ka bynta kane ka Tynjuh ba V, sla 4. La ai por tang *Lai* minit na ka bynta kane ka Tynjuh.

YM SHAH BAN PLIED IA KANE KA SLA TAD YNDA LA ONG IA PHI.

TYNJUH ---VI

(Por : 3 Minit)

TYNJUH-JINGEH

1. Ka Saralang ka shuwa ia ka Biangka katba ka Biangka ka kham shuwa ban ia ka Teiri. Mano ba khynnah tam?
   A. Saralang B. Biangka K. Teiri

2. Ia u Lari la kha shuwa ia u Bari, katba ia u Bari la kha shuwa ban ia ka Nari. Mano ba shuwa tam?
   A. Lari B. Bari K. Nari

3. U Kyrmen u kham jrong ban ia ka Rosa bad u kham lyngkot ban ia ka Risha. Mano ba jrong duh?
   A. Rosa B. Kyrmen K. Risha

4. U Tyngshain u kham khynnah ban ia u Khraw bad u Khraw u kham shuwa ban ia u Sanbor. Mano ba shuwa eh?
   A. Sanbor B. Khraw K. Tyngshain

5. Ka Mihpli ka kham lyngkot ban ia ka Sonisha, bad kham jrong ban ia ka Daphi. Mano ba lyngkot tam?
   A. Sonisha B. Mihpli K. Daphi

6. Ka Dakmen ka kham rit ban ia ka Saralin katba ka kham heh ban ia ka Lapynshai. Mano ba rit eh?
   A. Saralin B. Dakmen K. Lapynshai

7 Lada uwei u khynnah u shim por shi minit ban bam uwei u soh apul, katno minit kin shim por, lada 100 ngut ki khynnah ki bam 100 tylli ki soh apul?
   A. 3 B.2 K. 1

8. Ka 2 tarik jong u bnai ka hap ha ka sngi thohdieng. Ka sngi aiu pat ka ban hap ha ka 31 tarik jong u bnai?
   A. Nyngkong B. Baar K. Saitjain

9. Ha ka jingiakhun dro ka Hunlang ka kham bit shibun ban ia ka Iaineh bad kham duna pat ban ia ka Rosalin. Mano ba bit eh?
   A. Hunlang B. Iaineh K. Rosalin

TYNJUH ---VII

NUKSA JINGPYRSHANG

JINGBATAI: Ha kane ka Tynjuh la ai ia ki rukom ban buh ryntih ia ki nombar. Ha kawei-pa-kawei ka rukom buh nombar u don u dak jingkhein uba jah kumba la pyni nuksa (.) Phi hap ban wad ia uta u dak jingkhein na ki saw tylli ki nombar ba la ai lpa.

NUKSA JINGPYRSHANG:

No. I. **6, 12, 18, 24, (.)**

A. 26 B. 28 K. 30 D.32

Hangtei ka jubab kaba dei ka hap ha u K, u nombar uba donkam u dei u *30*, namar ba ki iapher 6 uwei na uwei. Mynta peit ha ka **Sla Jubab** jong ka Tynjuh ba VII, sla 5 phin lap ba la buh dak pom (X) ha u K pyrshah ka Nuksa Jingpyrshang No. I

No. II. **2, 4, 7, 11, (.)**

A. 15 B. 12 K. 15 D. 16

Hangtei ka jubab kaba dei ka hap ha u D. Buh dak pom (**X**) hi da lade ha pyrshah ka Nuksa Jingpyrshang No. II.

Ha kane ka rukom phin hap ban leh ha ki 13 tylli ki tynjuh- jingeh ha ka sla kaba bud. Ia ki jubab jong phi dei ban buh dak pom ha ka **Sla Jubab** ha ki jaka ba la buh khnang na ka bynta kane ka Tynjuh ba VII, sla 5 Yn ai por tang *Saw* minit na ka bynta kane ka Tynjuh.

YM SHAH BAN PLIED IA KANE KA SLA TAD YNDA LA ONG IA PHI.

TYNJUH—VII
(POR : 4 Minit)

TYNJUH-JINGEH

Sl.No.

1.	16,	15,	13,	10,	( )
	A. 5	B.6	K.7	D. 8	
2.	10,	20,	40,	80	( )
	A. 100	B. 140	K. 160	D. 180	
3.	15,	20,	30,	45,	( )
	A.65	B. 75	K. 85	D. 95	
4.	4,	8,	16,	32,	( )
	A. 61	B. 62	K. 63	D. 64	
5.	21,	19,	17,	15,	( )
	A.13	B. 14	K. 15	D. 16	
6.	12,	10,	9,	7,	( )
	A. 7	B. 5	K. 6	D. 8	
7.	4,	5,	7,	10,	( )
	A. 12	B.14	K. 16	D.18	
8.	8,	10,	13,	17,	( )
	A. 22	B. 21	K. 20	D.23	
9.	54,	48,	41,	33,	( )
	A.21	B. 22	K. 23	D. 24	
10.	10,	6,	3,	1,	( )
	A. 2	B. 0	K. 5	D. 4	
11.	21,	17,	14,	12,	( )
	A. 8	B. 9	K. 10	D. 11	
12.	3,	6,	10,	15,	( )
	A. 19	B. 21	K. 23	D. 25	
13.	7,	8,	10,	13,	( )
	A. 15	B.16	K. 17	D. 18	

TYNJUH--VIII

NUKSA JING PYRSHANG

JINGBATAI: Ha kane ka Tynjuh ia ki jingiadei bapher bapher la ai ha ki ar ne lai senten. Phi hap ban wad ia ka jubab kaba iahap na ki jubab ba la ai lpa

NUKSA JINGPYRSHANG:

No. I **Ka Rilang ka dei ka khun ksiew jong u hymmen jong u Thom. Ka Rilang ka dei aiu ia u Thom?**

A. KPARAD **B. MAMA** **K. KPA** **D. BAKHA**

Hangtei ka jubab kaba dei ka hap ha u A. Ka Rilang ka dei *Kparad* ia u Thom. Mynta peit ha ka **Sla Jubab** jong ka Tynjuh ba VIII, Sla 5, phin lap ba la buh dak pom (X) ha u A pyrshah ka Nuksa Jingpyrshang No. I

No. II **Ka Iba ka ong, "Kane kynthei ha ka dur ka dei ka lok jong u para khad-dud jong I mei Jong nga." Ka Iba ka dei aiu ia ia kata ka kynthei ha ka dur?**

A. KONG KYNSI **B. NIA** **K. HYNMEN AR KMIE** **D.PYRSA**

Hangtei ka jubab kaba dei ka hap ha u B. Phin hap ban buh dak pom (X) hi dalade pyrshah ka Nuksa Jingpyrshang No. II

Ha kane ka rukom phi hap ban leh ha ki 11 tylli ki tynjuh-jingeh ha ka sla kaba bud. Ia ki jubab jong phi dei ban buh dak pom ha ka **Sla Jubab** ha ka jaka ba la mang khnang na ka bynta kane ka Tynjuh ba VIII, sla 5 . La ai por tang *Saw* minit na ka bynta kane ka Tynjuh

YM SHAH BAN PLIED IA KANE KA SLA TAD YNDA LA ONG IA PHI

TYNJUH—VIII (Por : 4 Minit)

TYNJUH-JINGEH

Sl. No.

1. U Wadlashem u dei u lok jong ka Phila bad u Wanrap u dei u khun jong ka Phila. U Wanrap u dei aiu ia u Wadlashem?
   A. Pyrsa B. MaMa K.Kpa D.Khun
2. Ka Mariada ka iathuh ha ka paralok jong ka ba u Shanbor u dei u khun jong u hymen jong ka. U Shanbor u dei aiu ia ka Mariada?
   A. Kmie ieid B. Kiaw K. Shi para ar kmie D. Nia-kha
3. Ka Damanbha ka dei ka khun ksiew jong ka Mawkordor; ka Banbet ka dei sa kawei ka khun ksiew jong ka Mawkordor na kawei pat ka khun. Ka Damanbha ka dei aiu ia ka Banbet?
   A. Shipara B. Khunruit K. Shipara ar kmie D. Nahnah
4. Ka Ibakordor bad ka Bansara ki dei shipara ar kmie; ka Bansara ka dei ka khun jong ka Phiba. Ka Ibakordor ka dei aiu ia ka Phiba?
   A. Nahnah B. Hymmen ar kmie K. Paralok D.Khunruit
5. Ka Janai ka pynithuh ia u Kyrshan kum u lok jong ka para khadduh jong ka kmie jong ka. Ka Janai ka dei aiu ia u Kyrshan?
   A. Mama B. Paduh K. Kongkynsi D. Ni
6. Ka Sharibha ka dei ka khun jong u Panbor, ka Baiamon ka dei ka khun ksiew jong ka Sharibha. Ka Baiamon ka dei aiu ia u Panbor?
   A. Kthaw B. Kparad tymmen K. Mama tymmen D. Pasan
7. Ka Sani ka dei ka khun jong u Kitlang bad ka Deidor ka dei ka lok ba-ar jong u Kitlang. Ka Sani ka dei aiu ia ia ka Deidor?
   A. Kiaw-kurim B. Kmie-rad K. Kmie-nah D. Ym don jingiadei
8. Ka Iada ka dei ka kmie ieid jong ka Iohkynti; u Donbok bad ka Iohkynti ki dei shipara; u Mebanjop u dei u khun jong u Donbok. U Mebanjop u dei aiu ia ka Iada?
   A. Kmiekha tymmen B. Kmierad tymmen K. Kiaw kurim D. Kmiesan
9. Ka Wandahun ka dei ka para jong u Banjop; u Mebanshan u dei u lok jong ka Wandahun bad ka Rikynti ka dei ka lok jong u Banjop. Ka Rikynti bad u Mebanshan ki ia dei aiu?
   A. Shipara B. Kynsi K. Shi-bakha D. Para shongkha
10. U Kupar haba kdew ia ka dur u ong, "Kane ka kynthei kaba don ha kane ka dur ka dei ka khun jong ka hynmen kynthei jong nga" Ka dei aiu kata ka kynthei ia u Kupar?
    A. Mama B. Shi ba kha K. Shi para kha D. Pakhynnah
11. Ka Rimeka ka iathuh ha ka paralok jong ka, ka ong, "Ka Pynbha ka dei ka khun marwei na u kpa jong ka bad ngam don khun shuh na u ne u tnga u Meban'. Ka Pynbha ka dei aiu ia u Meban?
    A. Kthaw B. Kpanah K. Kpa ieit D. Mama

TYNJUH-----IX

NUKSA JINGPYRSHANG

JINGBATAI: Ha kane ka Tynjuh phi hap ban pyndap ia ki jaka ba suda da kaba jied ia ki jubab kaba iahap ne iadei bad ka senten na ki saw tylli ki jubab ba la ai lypa ban pyn- pura ia ki senten.

NUKSA JINGPYRSHANG:

No.I. Ka kyntien 'Meghalaya' ka mut ka_____

A. Jing-itynnad ka Mariang **B. Ri jong ki Lyoh**
K. Ri jong u slap **D. Ri jong ka jingsuk.**

Hangtei ka jubab kaba dei ka hap ha u B, *Ka Ri Jong ki Lyoh.* Mynta peit ha ka **Sla Jubab** jong ka Tynjuh ba IX, sla 6 phin lap ba la buh dak (X) pom ha u B, pyrshah ka Nuksa Jingpyrshang No.I

No. II Ka shnong Domiasiat Ha West Khasi Hills ka riewspah ha_____

A. Mawshun B. Dewiong K. Umphniang D. Uranium.

Hangne ka jubab kaba dei ka hap ha u D. Phi hap ban buh dak (X) pom hi dalade pyrshah ka Nuksa Jingpyrshang No.II

Ha kane ka rukom phin ioh 6 tylli ki tynjuh-jingeh ha ka sla kaba bud. Ia ki jubab jong phi dei ban buh dak pom ha ka **Sla Jubab** ha ki jaka ba la mangkhnang na ka bynta jong kane ka Tynjuh ba IX, sla 5. La ai por tang *Shi* minit na ka bynta kane ka Tynjuh.

YM SHAH BAN PLIED IA KANE KA SLA TAD YNDA LA ONG IAPHI.

TYNJUH-----IX

(Por : 1 minit)

TYNJUH-JINGEH

Sl.No.

1. Ka Meghalaya ka ioh ia la ka jylla ba pura ha u snem—
   A. 1970 B. 1971 K. 1972 D. 1973

2. U bnai Khasi uba ngi juh tip kum u 'Naitung' u dei u bnai—
   A. May B. June K. July D. August

3. Ka doh ba ki Khasi ki bam bha –
   A. Dohblang B. Doh-syiar K. Dohmasi D. Dohsniang

4. U Nongialeh laitlud jong ki Pnar u dei u—
   A. Tirot-Sing B. Sajar Nangli K. Woh Ryndi D. Kiang Nongbah

5. U Myllung SoSo Tham u ia nujor ia u 'Dieng Bilat' bad u –
   A. 'Riew-ieit –ri B. Ingkhong-shalangmat
   K. 'Riew-kieng-atiar D. 'Riew-Rangbah.

6. U Lum Bah-Bo-Bah-Kong u don ha ka Distrik—
   A. East Khasi Hills B. Jaintia Hills K. West Khasi Hills D. Ri-Bhoi.

TYNJUH---X

NUKSA JINGPYRSHANG

JINGBATAI: Ha kane ka Tynjuh, ia ki jingkhein la ai ha ki shi ne ar synten. Phin hap ban wad ia ka jubab kaba dei na ki saw tylli ki ba la ai lypa.

NUKSA JINGPYRSHANG:

No. I. Ha ka shi klas ka karma don 37 tylli ki ben. Lada 6 ngut kikhynnah ki ia shong ha ka shi ben, katno ngut ki khynnah ki don ha ka karma?

A. 225 B. 222 K. 227 D. 229

Hangtei ka jubab kaba dei ka hap ha u B, ki khynnah kiba don ha ka karma ki long *222*. Mynta peit ha ka **Sla Jubab**, jong ka Tynjuh ba X, sla 6 phin lap ba la buh dak pom (X) ha u B pyrshah ka Nuksa Jingpyrshang No.I

No. II. Lada ka jain kaba jrong 10 mitar kan sah noh sa tang 7 mitar hadien ba la dep sait; sa katno mitar kan sah na ka jain kaba jrong 40 mitar?

A. 20 B. 22 K. 24 D. 28

Hangtei ka jubab kaba dei ka hap u D. Phin hap ban buh dak pom (X) hi da lade ha pyrshah ka Nuksa Jingpyrshang No. II.

Ha kane ka rukom phin hap ban leh ha ki 9 tylli ki tynjuh-jingeh ha ka sla kaba bud. Ia ki Jubab jong phi dei ban buh dak pom ha ka **Sla Jubab** ha ka jaka bala buh khnang ha ka Tynjuh ba X, sla 6. La ai por tang *Saw* minit na ka bynta kane ka Tynjuh.

YM SHAH BAN PLIED IA KANE KA SLA TAD YNDA LA ONG IA PHI

TYNJUH -X

(Por : 4 Minit)

TYNJUH-JINGEH

Sl. No.

1. Ha kano na kine ki rukom harum yn thep thik ia ki 198 tylli ki ball?
   A. 10 ki synduk bad18 ki ball ha kawei B. 18 ki synduk bad 17 ki ball ha kawei
   K. 18 ki synduk bad 11 ki ball ha kawei D. 10 ki synduk bad 19 ki ball ha kawei

2. U John u don katto katne ka pisa. U kpa jong u, u dang ai shuh sa san shah na ka pisa ba u don. Mynta u don T.60. Katno u don ha ka ba mynnyngkong.?
   A. Rs.12 B. Rs.15 K. Rs.20 D. Rs.30

3. Ka Shnong rit ka ba don 240 tylli ki ing ka donkam 12,000 litar ka um man la ka sngi. Katno litar ka um kawei- kawei ka ing ka donkam man ka sngi?
   A. 40 Litre B. 20 Litre K.30 Litre D.50 Litre

4. U briew u shim synniang ia ka kot ba mih man la u bnai ha ka dor Rs.180.00 shi snem. Katno ka dor jong ka kot?
   A. 10 B. 15 K.20 D.25

5. Katno tylli ki bus yn donkam na ka bynta 260 ngut ki nongleit jingleit lada kawei ka bus ka lah ban kit 52 ngut ?
   A. 4 B. 5 K.6 D.7

6. Katno ka jingjrong jong u radius jong ka dur pyllun lada u diamiter u dei 10 cm?
   A. 5cm B. 10cm K.15cm D.20cm

7. U nongtype u shim por shi kynta ban type 15 sla, katno un shim por ban type na ka bynta 25 sla?
   A. 1 kynta 20minit B. 1 kynta 40 minit K. 2 kynta D. 2 kynta 20minit

8. Lada ka dor jong 7 kilo u atta ka long Rs.63.00, katno ka dor jong 3 kilo?
   A. Rs.30. B. Rs.25 K. Rs.27. D. Rs.24.

9. Ia u tyllai la khap nyngkong 27 mitar, nangta sa 8 mitar bad kaba sah ka long sa 7 mitar Katno ka jingjrong jong u tyllai ?
   A. 40m B. 41m K.42m D.43m

(APPENDIX I B)

KA SONG BATAI

HALOR

KA TYNJUH JINGSTAD IA KI KHYNNAH BA HAPDENG 14 – 16 + SNEM KA RYTA.

DA I

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LECTURER,

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SHILLONG-MEGHALAYA.

KI THUP

1.0 KA SAINDUR IA KA TYNJUH

1.1 Jingthmu:

Ka jait bynriew Khasi kum kiwei pat ki jait bynriew ba la kiew ha ka thoh ka pule ka donkam ban don la ka jong ka Tynjuh Jingstad (standardized intelligence test) ban thew pyrla (measure) ia ka bor pyrkhat jong ki khynnah skul. Ka long kaba donkam ban sei ia ki sap pyrkhat bapher jong u khynnah ha ka por babiang ha shuwa ba un rung ha kino-kino ki jingpule ne jaka trei. Ka jingdon ia la ka Tynjuh, ha kajuk kaba mynta, kan iarap shibun ia u khynnah pule ban sngewthuh ia la ka bor pyrkhat hangno ba u ieng. Dei halor kane ka phang la shna ia ka "Tynjuh Jingstad na ka bynta ki khynnah Khasi jong ka jylla Meghalaya kiba pule ha ki klas VIII - X ba hapdeng 14 – 16 + snem ka ryta", kaba ha ka ktien phareng la tip kum ka 'Verbal Group Test of Intelligence for school-going children of the state of Meghalaya studying in classes VIII-X of the age-group 14 to 16 + (VGTI)

1.2 Ka Saindur:

La sdang (preliminary stage) ia ka Tynjuh (test) da kaba pynkhreh 200 tylli ki jingkylli (Items), ia kiba la bate ha ki 10 shnat (sub-tests) kiba ia pher kawei na kawei. Ha man la ki shnat la tyngkhap lang ia ki Jingbatai bad ki Nuksa Jingpyrshang. La pynkhreh ruh ia ki Lyngkdop Sla-Jubab (Answer sheet) bad Sla Ai- ksai (scoring key) ban pynbeit ia ki jubab.

Ha kaba sdang ka jingpyrshang (Try-out), ia ka Tynjuh la pyrshang shuwa ha ki 180 ngut ki khynnah skul. Ia ki jubab jong ki la pyndonkam ha kaba pynwandur biang ia ka Tynjuh. Hadien kane, ia ka Tynjuh, la pyrshang pat (First-try out) sa ha ki 555 ngut ki khynnah jong ki 10 tylli ki skul jong ka Sor Shillong. Ka jingthmu jong kane ka jingpyrshang ka long kumne harum:

(1). Ban pjiar ia ki jingkylli (da kaba kyntait noh ia kiba suk than bad jwat eh.)

(2). Ban buh tang ia ki jingkylli bala pjiar ha ka ka Tynjuh kaba pura.(final form)

(3). Ban pynbiang ia ka por jong kawei- pa-kawei ka shnat

(4). Ban buh ia ki jingkylli ba la pjiar kat kum ki kyrdan jingeh.

Ha kane ka jingpyrshang (First tryout), la ai kylluid ia ka por ha ki shahtynjuh ban jubab ia baroh ki jingkylli. La batai ruh ba ia ki jubab dei ban buh da u dak pom (X) ha ki jaka ba la buh ha ki Sla Jubab. La bthah ruh ba ki dei ban da thoh ia ka por ba ki shim ha trai jong man la ki shnat jong ka Tynjuh.

Ia ka shongsbai jong ki jingkylli (item validity) la kheindor da ka Kelley's Method kaba long 27 % na shalor bad 27 % na shatrai. Ia ka pjiar jingkylli (item difficulty) la buh

pud da kaba shim jingkhein tang ia ki khynhun kiba lah ban ai ia ki jubab badei. Ia kane la khein da ka phormula jong u H.E.Garrett[1] khnang ban kyndat sharud ia ki jubab antad. Ka phormula ka long kumne harum:

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

Ha kaba Pc = Ka ieng na ka bynta ka persentage ki jubab badei.

R = U ieng na ka bynta ki nombar kiba ioh ia ki jubab badei.

W = U ieng na ka bynta ki nombar kiba ioh ia ki jubab ba bakla

NR = U ieng na ka bynta ka kynhun bym lah ban jubab lut ia ki jingkylli

K = U ieng na ka bynta ki lad jingjied jubab (choices)

N = U dei u nombar ba ieng na ka bynta ki Shahtynjuh

Ia ki lyngkdop Sla Jubab jong ki 555 ngut ki khynnah la pyniakhlad ha ki ar-bynta; shispah sanphew shibynta (150) kaba mut 27% na shalor bad 27% na shatrai. Ia kawei pa kawei ka jingkylli la pjiar sani (difficulty value and discriminative power) da ka phormula jong u Davis[2] kaba long kumne harum:

$$DV = (P_u + P_l)/2$$

$$DP = P_u + P_l$$

Ha kaba,

P_U = U ieng na ka bynta ki jubab jong ka khynhun ba kham stad na shalor

P_L = U ieng na ka bynta ki jubab jong ka khynhun ba kham ba duna na shatrai.

Hadien jong ka jingpjiar sani ia ki jingkylli, ka Tynjuh na ka bynta ka pyrshang ba khatduh ((final try-out) ka kynthup sa tang 100 tylli ki jingkylli ha ki 10 shnat (sub-tests) ba la pyni ha ka Tebil harum:

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[1] H.E.Garett : *Statistics in Psychology and Education*; Valkis, Feffer and Simon Ltd P-364

[2] S.A.Sharma : *Essentials of Measurement in Education & Psychology*; Surya Publication, Meerut 2005 P-187

Tebil 1: Ki Shnat bad Por

Sl. No.	Ki Shnat (Sub-Test)	Ki Jingkylli babiang (No. of Items retained)	Por (Time-taken)
1	Ka Wad Kyrpang (Classification)	9	$1^{1}/_{2}$
2	Ka Khleh Dak (Coding)	11	4
3	Ka Wad Sani (General Comprehension)	10	3
4	Ktien Kynnoh (Akin Words)	12	3
5	Ka Byrshak Kyntien (Verbal Analogy)	10	$2^{1}/_{1}$
6	Ktik Jingmut (General Reasoning)	9	3
7	Ka Synjam Nombar (Number Series)	13	4
8	Ka Khynra Dei Kur/Dei Kha (Evaluation of Relationship)	11	4
9	Jingtip Kyllum (General Information)	6	1
10	Duriap Jingkhein (Arithmetic Reasoning)	9	4
Pura		100	30 mins

Ia ka por jong kawei-pa-kawei ka shnat (sub-test) la bate kat kum na ka por (average) ba la shim kyllum da baroh ki Shahtynjuh.

1.3: Ka Lyngkdop Tynjuh bynrap ka Sla Jubab (Test Booklet and Answer Sheet)

Ka Lyngkdop Tynjuh ba pura ka don 22 sla. Ka sla ba nyngkong bad ba-ar ki pyni ia ki rukom pyntrei kam ia ka Tynjuh; bad bud sa ki sla jong ki 10 shnat (100 tylli ki jingkylli) lem bad ki 10 tylli ki Nuksa Jingpyrshang. Ha man la ka shnat la buh ia ki jingbatai bad nuksa jingpyrshang bad bala pynbud da ka sla Tynjuh-jingeh. La ai por 30 minit ban jubab ia baroh ki 100 tylli ki jingkylli ia kiba la thoh ha man la ki sla jingkylli. Don ki shnat kiba donkam khambun minit bad don ruh kiba tang khyndiat minit. La buh por 5 minit na ka bynta ki Jingbatai bad Nuksa Jingpyrshang jong baroh ki 10 shnat. Kumta ia ka Tynjuh bapura la pyntreikam ha ka 35 minit kaba long shi period na ka por skul.

Ka Lyngkdop Sla Jubab ka don 7 sla. Ha ka sla ba nyngkong la buh ia ki jaka ban pyndap da u Shahtynjuh ia la ka kyrteng, class, rta bad kiwei-kiwei. Ka sla ba-ar haduh ba-hynriew ki kynthup ia ki jaka ban thoh ia ki jubab; bad ka sla kaba hynniew ka thew ia ka jaka ban thoh ia ki mark jong baroh ki shnat. Ha man la ka shnat - sla jubab don arbynta-

kawei sha ka diang bad kawei sha ka mon. Ha ka bynta basha ka diang la buh jaka ban jubab tang ia ki Nuksa Jingpyrshang kiba dei ban jubab da ki Shahtynjuh. Kaba sha ka mon ka khynthup ia ki jaka ban jubab ia ki shnat- jingkylli. Ia ki jubab dei ban buh da u dak pom (X) ha baroh ar ki bynta

1.4: Ka Rukom pyndonkam ia ka Tynjuh

Ia ka Tynjuh la saindur ban thew pyrla ia ka bor pyrkhat jong ki khynnah Khasi jong ka jylla Meghalaya kiba pule ha ki klas VIII –X kiba hapdeng ka 'ryta ba 14 haduh 16.

Ha ka Lyngkdop Tynjuh don 10 tylli ki shnat (sub-tests). Ha man la ka shnat don 2 tylli ki Nuksa Jingpyrshang kiba hap ban jubab da ki shahtynjuh ha ka Lyngkdop Sla Jubab. Ia ki nuksa jubab ym dei ban shim jingkhein namar ki dei tang ban shu pynmyllen ia ki khynnah ba kin lah ban sngewthuh bha shaphang ka jinglong jong ka Tynjuh. Katba ia ki jingkylli baroh dei ban jubab lut.

Ia ki jubab dei ban thoh tang ha ka Lyngkdop Sla Jubab ba la pynkhreh khnang. Ia ki Lyngkdop Tynjuh dei ban sumar bha, namar, ba ki dei ki ban pyndonkam biang. Ia ki jingbatai ban pyntreikam ia ka Tynjuh la thoh ha ka sla kaba nyngkong bad baar jong ka Lyngkdop Tynjuh ia kiba dei ban pule jam da u nongtynjuh (Tester) bad suki da ki nongshah tynjuh (testees).

Ia ka Tynjuh dei ban pyndonkam tang ha ki kamra klas. Ia ki shahtynjuh dei ban pynshong ha ka rukom ban ai lad ia ki ban buh la ka jong ka Lyngkdop-Tynjuh bad Lyngkdop-Sla Jubab khlem da pynwit ia kiwei pat. Kan bha ruh ia ki khynnah ban thoh da u let. Ia ka por jubab dei ban da kham pyrkhing bad kan kham bha ban pyndonkam da ka baje (stop watch).

Hadien ba la pynshong bha ia ki khynnah, u nongtynjuh u hap ban pynbna kumne harum:

'Mynta ka sngi ngan ai iaphi ka jingtynjuh ne test kaba sngewtynnad bad ba pher na kiwei pat ki jait jingtynjuh ha kaba phim donkam ban da khreh kot shuwa. Phi dei tang ban shu pule sngewthuh ia ki Jingbatai jong ki Nuksa Jingpyrshang, bad sa buh dak pom (X) ha ki alphabet A, B, K, bad D kiba don ha ki Sla Jubab. Ban pyndonkam ia ka Tynjuh dei ban bud thik ia ki kyndon harum:

1. Sam shuwa ia ki Lyngkdop- Sla Jubab ha ki shahtynjuh bad sa batai ia ki ba ki dei ban pyndap ia la ki kyrteng, klas, bad kiwei-kiwei ha ki jaka ba la buh khnang ha ka sla ba nyngkong jong ka Lyngkdop-Sla Jubab.
2. Shuwa ban sam ia ki Lyngkdop-Tynjuh dei ban pynbna shai kdar kumne, 'Ym shah ban plied ia kane ka Lyngkdop-Tynjuh kat haduh ban da ong iaphi.'
3. Pule bha ia ki Jingbatai ha ka sla ba nyngkong bad ba-ar jong ka Lyngkdop-Tynjuh.

4. Pule bha ia ki Nuksa Jingpyrshang bad Jingbatai jong kawei-pa-kawei ka bynta.
5. Plied ia ki Lyngkdop-Sla Jubab ban buh dak pom (X), ki ban long ki jubab ia ki jingkylli.
6. Kylli ia ki khynnah lada dang don kino-kino ki jingar-tatien.
7. Ong ia ki ban plied ia la ki Lyngkdop-Tynjuh bad ban 'Sdang'. Sdang ia ka baje (stop watch) bad sangeh kat kum ka por ba la buh ha kawei-pa-kawei ka bynta bad da ong ia ki ban plied ia ka sla katkum badonkam.
8. Iaid sawdong jong ka kamra-klas, peit ba kin thoh bha bad ban ym ia bud. Bud ia ki juh ki rukom ha baroh ki 10 shnat.
9. Ka long ruh kaba donkam ban pynshai/khmih bha ia ki khynnah ba kin ym jubab/ne buh dak (X) pom palat ia kawei na ka bynta kawei-kawei ka jingkylli.

1.5: Ka rukom pynbeit ia ki Jubab (Scoring the test):

La pynkhreh shi set ki kot stang ba lah ban iohi lyngba (tracing paper) ba la buh da ki dak sawdong kiba kdew ia ki jubab ba dei. Pyndonkam ia ki da kaba buh halor jong kawei-pa-kawei ka shnat ne subtest kaba iahap kat kum ha ki Sla Jubab. Dei ban pynshong bha ba ka page nombar bad ki jubab ba dei (dak pom X) kin paw bha. Ka long kaba donkam ban peit ia ki jubab ha ki Sla Jubab ioh don kiba jubab ne buh dak pom (X) tam na kawei. Lada don kiba buh tam na kawei ia kawei-kawei ka jingkylli, ym dei ban ai mark shuh ia kata ka jubab. Nangta sa khein ia ki jubab badei jong kawei-pa-kawei ka shnat bad thoh ha ka liang ka mon jong ka sla pyrshah jong ka shnat. Sa rah pat ia ki score na ki sla ba pher jong kawei-pa-kwei ka shnat ha ka Scoring Table kaba don ha ka sla kaba khatduh jong ka Lyngkdop-Sla Jubab bad sa khein lang ia baroh ki score ban ioh ia ka score ba pura (total). Ka mark baroh ka dei 100, kaba mut kawei ka jingkylli ka kit shi mark (iwei).

2.0 KA TYNJUH KAT KUM KI KYNDON (Standardization of the test)

2.1: Ki Shahtynjuh (Sample)

Ban pynieng ia ki kyndon, la shim 3000 ngut ki shahtynjuh na ki 42 tylli ki skul jong ki saw distriks jong ka jylla Meghalaya. Ia ki kyndon ban pyntreikam ia ka Tynjuh bad ban pynbeit ia ki jubab la pynshong nongrim na ki jingpyrshang (try-out experiments). Kine harum ki long ki skul kiba la shim na ki 4 distrik:

Tebil 2: Kine harum ki long ki skul kiba la shim na 4 distrik

Ki Distrik	Nombar ki skul	Kyrteng ki Skul
East Khasi Hills	19	Auxilium Convent's Girls H.S.S.
		Christian Academy H.S.S.
		Cherra Punjee Presbyterian S.S
		D.N.S Wahlang Memorial S.S.
		Good Shepherd H.S.S Jongksha
		Kyntiew Shaphrang S.S Laitlyngkot
		K.J.P.Girls's H.S.S.
		Laban Presbyterian S.S.
		Laitumkhrah Presbyterian H.S.S.
		Mawkhar Chriatian H.S.S.
		Mawsynram H.S.S.
		Nongkrem S.S.
		Pearly Dew S.S.
		Ram Krishna H.S.S. Cherra Punjee
		Seng Khasi S.S. Langkyrdem
		Smith H.S.S
		St. Peter's S.S. Laitlyngkot
		St.Dominic's H.S.S
		Tynring S.S.
West Khasi Hills	10	Anderson H.S.S
		Christ King S.S
		Langtor H.S.S
		Lyngngam Presbyterian S.S .Mawtyngkut
		Mairang Presbyterian H.S.S
		Nongstoin Public S.S
		Ri-Lyngngam H.S.S.
		St.Peter's H.S.S.
		St. Thomas H.S
		Tirot Singh Memorial H.S.S.
Jaintia Hills	10	Govt. Boy's H.S.S
		Govt. Girl's H.S.S.
		K.J.P. Synod Jowai
		Khasi Pnar S.S. Dawki
		Marian Hill S.S.
		Presbyterian S.S
		Sein Raj S.S
		Sohkha Govt. H.S.S.
		St. Mary Mazzaralo
		Tome Memorial S.S

Ri-Bhoi District	3	Mynken Christian H.S.S
		St. Michael H.S.S
		Umroi Presbyterian S.S
Barohlang	**42**	

2.2: Ka Jingpynbynta ia ki Shahtynjuh:

Ki Table 3 & 4 ki pyni ia ka jingbuh ia ki shahtynjuh kat kum ki 'rta bad ki klass bapher bapher jong ki:

Tebil 3: Ka Phiahlang Kat kum ki ryta jong ki 3000 ki Shahtynjuh

Ryta	Shynrang	Kynthei	Pura
13(12.6-13.5)	121	189	310
14(13.6-14.5)	389	542	931
15(15.6-16.5	378	562	940
16(16.6-17.5)	329	322	651
17(17.6 & shajrong)	81	87	168
PURA	1298	1708	3000

Tebil 4: Ka Phiahlang Kat kum ki klas jong ki 3000 ki Shahtynjuh

Klass	Shynrang	Kynthei	Pura
VIII	366	632	998
IX	530	473	1003
X	402	597	999
Pura	1298	1702	3000

2.3 Ka Buhryntih ia ki Khur Tynjuh:

Ki Tebil 5 – 8 ki pyni ia ka Buhryntih ia ki Khur kat kum ki ryta bad klas jong ki Shahtynjuh.

Tebil 5: Ka Buhryntih ia ka Khur-T kat kum ki ryta jong ki 1298 ki Shahtynjuh shynrang

Test score	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	Total
6 to 10	0	0	0	0	0	0
11 to 15	0	0	0	0	0	0
16 to 20	0	2	1	1	0	4
21 to 25	0	0	3	0	1	4
26 to 30	4	8	5	14	2	33
31-35	13	20	23	25	4	85
36-40	15	18	16	24	8	81
41-45	9	38	44	34	9	134
46-50	18	35	33	53	10	149
51-55	26	45	55	34	11	171
56-60	14	42	44	37	13	150
61-65	8	49	48	39	7	151
66-70	7	40	41	28	4	120
71-75	2	32	27	12	6	79
76-80	3	33	17	16	4	73
81-85	2	23	15	9	1	50
86-90	0	4	4	3	1	12
91-95	0	0	2	0	0	2
96-100	0	0	0	0	0	0
Total	121	389	378	329	81	1298
Mean	50.23	58.4	56.69	53.49	53.74	55.60
Median	51.23	58.41	56.82	52.59	53.36	54.72
SD	12.43	14.94	14.37	14.35	13.88	14.57

Tebil 6: Ka Buhryntih ia ka Khur-T kat kum ki ryta jong ki 1702 ngut ki Shahtynjuh kynthei

Test Score	13 yrs	14 yrs	15 yrs	16 yrs	17 yrs	Total
6-10	0	0	0	0	0	0
11-15	0	0	0	0	0	0
16-20	0	1	0	1	0	2
21-25	3	5	0	1	0	9
26- 30	1	6	10	11	2	30
31 – 35	14	30	22	24	3	93
36 – 40	16	43	43	28	12	142
41 – 45	27	61	42	26	12	168
46 – 50	30	71	72	36	11	223
51 – 55	33	75	65	41	11	222
56 – 60	26	71	64	46	11	218
61 – 65	13	50	61	45	10	179
66 – 70	10	37	63	24	9	143
71 – 75	40	40	42	17	2	115
76 – 80	2	22	41	10	4	79
81 – 85	0	24	25	7	0	56
86 – 90	0	6	10	5	0	21
90 – 95	0	0	2	0	0	2
96 – 100	0	0	0	0	0	0
Total	189	542	562	322	87	1702
Mean	51.25	55.11	57.99	54.04	52.60	55.30
Median	51.07	53.88	57.86	54.32	52.27	54.32
SD	11.85	14.27	14.55	14.16	12.32	14.18

Tebil 7: Ka Buhryntih ia ka Khur-T kat kum ki klas jong ki 1298 ngut ki Shahtynjuh shynrang

Test Score	VIII	IX	X	Total
6 to 10	0	0	0	0
11 to 15	0	0	0	0
16 to 20	1	0	3	4
21 to 25	2	1	0	3
26 to 30	14	7	11	32
31-35	36	24	25	85
36-40	31	20	33	84
41-45	51	49	36	136
46-50	48	57	44	149
51-55	61	78	38	177
56-60	39	66	43	148
61-65	37	61	50	148
66-70	28	59	34	121
71-75	6	38	33	77
76-80	11	35	26	72
81-85	1	29	19	49
86-90	0	5	6	11
91-95	0	1	1	2
96-100	0	0	0	0
Total	366	530	402	1298
Mean	50.35	55.40	56.48	55.48
Median	50.	57.76	57.02	54.54
SD	12.59	13.94	15.54	14.48

Tebil 8: Ka Buhryntih ia ka Khur-T kat kum ki klas jong ki 1702 ki Shahtynjuh kynthei

Test Score	VIII	IX	X	Total
6-10	0	0	0	0
11-15	0	0	0	0
16-20	1	1	0	2
21-25	6	3	1	10
26-30	19	6	5	30
31-35	51	20	21	92
36-40	75	39	27	141
41-45	85	43	38	166
46-50	104	61	58	223
51-55	96	64	57	217
56-60	78	61	82	221
61-65	46	58	76	180
66-70	31	45	67	143
71-75	28	27	61	116
76-80	11	13	55	79
81-85	1	21	36	58
86-90	0	10	12	22
91-95	0	1	1	2
96-100	0	0	0	0
Total	632	473	597	1702
Mean	49.8	56.07	60.81	55.4
Median	49.04	54.97	61.5	57.6
SD	12.12	14.17	14.15	14.24

2.4 Ka Biangthew (Reliability)

(i). Ka Tynjuh biangthew (Relaibility of the test)

Ka kyntien 'Biangthew' hangne ka kdew ia ka jinglong jong ka Tynjuh ka badon ka juh ka jingthew bad ka balah ban iai ai ia ka juh ka jinglong haman la ki jingpyrshang. Ban ioh ia ka Tynjuh babiangthew, la khein ia ka da ka Split-half bad Kuder-Richardson Method.

(a) Bate Biangthew (Split-half Reliability):

Ia ka Tynjuh la pyntreikam ha ki 3000 ngut ki Shahtynjuh. Ia ki khur (scores) jong ki la pyndonkam ha kaba khein ia ka Bate biangthew (Split-half Reliability) da kaba pynbynta ia ki khur (scores) ha ki ar bynta, kiba kynthup shi bynta ia ki odd nombar (nuksa.1,3,5,7) bad shibynta ia ki eben nombar (nuksa.2,4,6). Ia u Coefficient bad Correlation jong baroh ar bynta (odd & even) la shem ba u long 0.86 Kaba hap ha ka kyrdan .01.

(b) Kuder-Richardson Biangthew (Kuder-Richardson Reliability):

Ia ka 'Kuder-Richard Biangthew' la lap nyngkong da u Kuder Richardson ia kaba la tip ruh kum ka KR-21 Method. Ia ka Biangthew jong ka Tynjuh la thew da ka KR-21 phormula kaba la sot na ka kot jong u Henry Garrett. U Coefficient-Correlation jong ka Tynjuh u long 0.89 kaba hap ha ka kyrdan .01

(ii). Ka Biangthew jong ki Shahtynjuh (Reliability of the sample Tested):

Ban ioh iaka biangthew jong ki shahtynjuh, ia ka samliang jong ki khur (scores) ka Tynjuh bad ka Phiahlang-jingstad (DIQs) la pynshongnia da ka jingkhein statistic. La lap ba ka samliang kam shym la iapher na u Normal Probability Curve.

2.5 Ka Tynjuh Shongsbai (Validity)

Ka 'Shongsbai' hangne ka mut ba haduh katno ka Tynjuh ka kam ia ki kam ba ka dei ban kam. Ia ka shongsbai jong ka Tynjuh la thew bad kiwei pat ki Tynjuh kiba la pura. Kine ki long:

(i). Ka thew ka woh baryngkat bad ka Tynjuh u Ahuja:

Ia ka shongsbai jong ka Tynjuh la thew bad ka Tynjuh-Jingstad u Ahuja. Ia u Coefficient-Correlation jong baroh ar ki Tynjuh la khein la woh da ka Spearman Product-Moment Method. U Coefficient-Correlation jong ki u long r = 0.80. Kane ka pyni ia ka jingshongsbai ka Tynjuh ha ka kyrdan .01

(ii). Ka thew ka woh baryngkat bad ka Tynjuh jong u Cattell

Ia ka shongsbai jong ka Tynjuh la thew biang bad ka Tynjuh-Jingstad jong u Cattell. U Coefficient-Correlation jong baroh ar ki Tynjuh u long r = 0.66; kane ka pyni ia ka jingshongsbai jong ka Tynjuh ha ka kyrdan .01 Kane ka pyni shai kdar ba wat u r uba rit ruh u don la ka dor wat la ki shahtynjuh ki bun katno-katno. (Kat kum u Garrett)[3]

(iii). Tynjuh shongsbai ba halade hi (Construt Validity or Internal Validity):

Ban pynshongnia ia ka shongsbai ba halade hi (internal validity) jong ka Tynjuh la pyndonkam da ki khur (scores) balalum na ki 3000 ki shahtynjuh. Ia ka jinglongbaiaineh ha lade (internal consistency) jong ka Tynjuh la khein da ka jingiadei para shnat (inter- subtests correlation) bad ka Tynjuh bapura (total test); bad ba la pynshisha da ka Thurstone Centroid Method. Ia kane la khein da kaba pyndonkam ia ka computer software kaba khot ka Statistical Packages of Social Sciences (SPSS). La lap ba baroh ki shnat ba pher jong ka

[3] H.E.Garrett : *Statistics in Psychology & Education*; Valkis, Feffer and Simons Ltd, Bombay 1981 P-202

Tynjuh ki don ka jingiadei kawei na ka wei, kaba hap ha ka kyrdan .01 bala pyni ha ka Tebil 9 harum:

Tebil 9: Ka pyni ia ka Shongsbai ba halade hi jong ka Tynjuh

Sl. No.	Shnat	Internal consistency r with the total test	FirstCommon factor (Thurstone's Cantroid method)	Ranks order of the sub-test
1	Ka Wad Kyrpang	.527	.563	8
2	Ka Khleh Dak	.661	.620	5
3	Ka Wad Sani	.574	.601	7
4	Ktien Kynnoh	.555	.543	9
5	Byrshak Ktien	.632	.653	2
6	Ktik Jingmut	.643	.654	1
7	Synjam Nombar	.680	.625	3
8	Ka khynra dei kur/dei kha	.602	.604	6
9	Jingtip Kyllum	.363	.441	10
10	Duriap Jingkhein	.616	.621	4

* Kaba hap ha ka Kyrdan .01

2.6 Ki Kyndom ba Donkam: (Norms)

(i). Ka jingthew ia ki jubab (Standardization of the test result)

Ki khur (raw score) jong ki shahtynjuh ha lade hi kim don jingmut tad ynda la bud ryntih ia ki kat kum ki kyndon baiadei.

Ha ka Tynjuh-Jingstad kaba kum kane, ia ki kyndon la pynkhreh kat kum ki 'ryta bad klass ba pher. Ban wad ia ka jingiapher hapdeng ki kynthei bad shynrang, la buh da ki kyndon ba kyrpang (Tebil 5-8). Kane ka jingianujor bad ki kyndon, ka iarap ban kdew ia ka kyrdan-jingstad jong iwei-pa-iwei I shahtynjuh; kane ka kdew ruh ia ka kyrdan jong u shahtynjuh bad la ka jong ka kynhun ba ia ryngkat ka ryta ne bad kiwei pat ki ryta ne klass bapher. Ban pynshai ia ki ha ki kyrdan kiba kham kit jingmut, ia ki khur (score) jong iwei-pa-iwei i shahtynjuh la buh ia ki kat kum ki kyrdan jingstad.

(ii). Ka khur shimet: (individual's scores)

Ia ka jingbatai ba kham shai la pynshongnongrim ha ka khur phiahlang ba iahap bad ka kyndon ryta, kyndon sigma, kyndon Persentile, kyndon Phiahlang jingstad (DIQs), bad

kyndon Stannine ba la lah pynkhreh ha ki Tebil 5.18-5.33 (Chap.V). Kine ki Tebil ki long ki sakhi ban thew iadei bad ki ryta bad klas bapher.

(iii) Ka Khur- Sigma (Sigma Score):

Ia ka Phiahlang (Deviation) na u Mean bala pyni kum u Standard deviation units la khot ka Khur Sigma (Sigma Score) uba la tip ruh kum u Z-Scores ne Reduced Scores. Ki Standard Scores ne Z-Scores ki dei ki units jong u Normal Probality Curve uba sdang na -3 to + 3. U Mean jong u u long 0 bad SD u long 1.00 Kumba shiteng jong ki khur Sigma ki long kheinlang (positive) bad shiteng ki long shimnoh (negative). Ka khur Sigma ka ieng kum u SD, ka kdew haduh katno ka khur ka iapher na u Mean jong ka samliang (distribution). Ia ki khur (raw scores) la pynkylla sha u Z-Score ne Sigma Score da ka phormula harum:

$$Z = (X-M)/\sigma$$

Ka Table jong ka khur Sigma:

La pynshongnia ia ka phiahlang ki khur kat kum ka kyndon ryta/kyndon klas; la pynkhreh ruh ia baroh ki phiahlang bad ka khur Sigma jong ki khynthei bad shynrang.

Ban khein ia ka Khur Sigma (sigma score) na ka bynta ka Tebil ki shynrang, ia ka phiahlang (deviation) kat kum ki kyndon la khein da u SD jong ki shahtynjuhshynrang uba long (SD= 14.57 Tebil 5,7).

Ban khein ia ka Khur Sigma (sigma score) na ka bynta ka Tebil ki kynthei, ia ka phiahlang (deviation) kat kum ki kyndon la khein da u SD jong ki shahtynjuhkynthei uba long (SD = 14.18 Tebil 6,8).

Ki Tebil 5.18-5.33 (Chap.V) ki long ki sakhi ia ka Khur Sigma jong ki kynthei bad shynrang ha la ki jong ki jong.

(iv). Ka Kyrdan Percentile (Percentile Ranks)

Ka Kyrdan Persentile ka pyni ia ka kyrdan jong iwe-pa-iwei I shahtynjuh ha ka khynhun kat kum ka percentage jong u uba don ka khur kaba hapoh jong u. Kane ka pyni shai ia ka kyrdan jong uwei-pa-uwei u shahtynjuh ha ka khynhun ba hap hapoh ka jingpeitngor. Nuksa u khynnah u ba don ka kyrdan persentile balaiphew u hap ha ka persentage balaiphew jong ka khynhun ha kaba u long u dkhot.

Table jong ki Kyrdan Persentile:

Na ka bynta baroh ki phiahlang (deviation), ia ka kyrdan percentile jong ki khynthei bad shynrang ha la ka jong la lah ban pynkhreh. Ia ki phiahlang la pyni ha ka rukom ki Khur Sigma. Ia ka dor (value) jong kine ki Khur Sigma la shim na ka Tebil jong u Garrett (Tebil 'A')[4] kat kum ki jaka kiba hap ha ka Normal Probability Curve. Kumta la ioh ia ka persentage phiahlang na u mean. Ia ka kyrdan percentile ruh la pynieng da kaba kheinlang ia u 50 bad kine ki dor (values). Ki Tebil 5.18-5.33 (Chap.V) ki long kum ka sakhi ia ka kyrdan persentile jong ki khynthei bad shynrang.

(v). Ka Khur-T (T. Score):

Ki T. Score ki dei ki khur-kyndon kiba la pynkylla sha ka samliang (distribution) kiba u mean u long 50 bad SD 10 (kat kum na u Garrett). Lada ia kine ki khur-kyndon la sien da u 10 bad kheinlang lane shimnoh bad u 50 ki kylla long ki Khur-T (T-Score). Ha kane ka jingthew (scale) ka khur 50 ka iahap bad u mean, u khur 60 bad 1σ ha jrong u mean, bad kumta ter-ter. Ka phormula ban khein ia ka Khur-T (T-Score) ka long kumne harum:

$$\text{T-Score} = 50 \pm 10 \text{ (Z Score).}$$

Ki Table jong ka Khur-T (T-Score):

Ki Tebil 5.18-5.33 (Chap.V) ki long kum ki sakhi ban thew-iadei kat kum ki ryta bad klass jong ki kynthei bad shynrang.

.

(vi). Ka Phiahlang Jingstad (DIQ):

Ka Phiahlang Jingstad (DIQ) ka dei ka khur-kyndon ka bym don ka jingiadei bad ka ryta-pyrkhat (Mental Age) ne bad ryta-snem (C.A.) jong u khynnah.U mean jong ki shahtynjuh ba la biang ki kyndon u dei barabor 100 bad u SD 16.

Tebil jong ki Phiahlang Jingstad:

Ia ki khur (raw score) jong ka Tynjuh, nyngkong la pyni ha ka rukom ki Khur Sigma ne Khur- Z (Z-Score) bad nangta la pynkylla sha ka Phiahlang Jngstad (DIQ) da ka phormula harum:

$$\text{DIQ} = 100 + 16 \text{ (Z-Score).}$$

Ia ki khur jong ka Tynjuh bala pynkylla sha ka Phiahlang Jingstad (DIQs) la kdew ha ki Tebil 5.18-5.33 (Chap.V) kat kum ki rtya 13 haduh 17 kynthei/shynrang bad kat kum

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[4] H.E.Garrett.: *Statistics in Psychology and Education*; Vakils FefferAnd Simons Ltd, Bombay1966 P-458

ki klass VIII-X ha ka jong-ka jong. Ki Tebil 5.34 - 5.41 (Chap.V) ki pyni ia ka Samliang Jingstad (DIQ) ba kat kum ka ryta kynthei/shynrang ha la ki jong ki jong.

(vii). Ka Samliang Jingstad jong ki Shahtynjuh:

Ka Tebil 10 ka pyni ia ka samliang-jingstad ba kat kum ki ryta jong baroh ki 3000 ki shahtynjuh. La iohi ba u Mean bad u SD jong manla ka ryta u iajan bha bad u 100 bad u 16. U Mean bad SD na kabynta jong baroh ki 3000 ki shahtynjuh ki long 99.64 bad16.01.Kane ka pyni ba ka jingthew ia ka Tynjuh ka la long kaba la pura bad biang bha.

Tebil 10: Ka Samliang Jingstad jong ki 3000 ngut ki Shahtynjuh

DIQ	13yrs	14yrs	15yrs	16yrs	17yrs	Total
50-55	0	0	0	0	0	0
55-60	0	3	1	0	0	4
60-65	2	5	3	5	1	16
65-70	3	13	12	6	1	35
70-75	10	23	40	24	4	101
75-80	22	54	51	47	10	184
80-85	20	69	66	48	13	216
85-90	30	108	89	51	18	296
90-95	30	93	97	80	15	315
95-100	30	117	119	60	19	345
100-105	43	91	96	90	16	336
105-110	37	103	108	56	27	331
110-115	30	63	92	73	9	267
115-120	15	67	56	39	11	188
120-125	13	56	52	22	7	150
125-130	12	38	31	26	7	114
130-135	9	22	21	12	5	69
135-140	3	6	6	12	5	32
140-145	1	0	0	0	0	1
145-150	0	0	0	0	0	0
150-155	0	0	0	0	0	0
155-160	0	0	0	0	0	0
Total	310	931	940	651	168	3000
Mean	99.90	99.58	99.47	99.44	100.89	99.64
SD	16.09	16.07	15.77	16.17	16.46	16.01

(viii). Ka Buhryntih ia ka Samliang Jingstad:

Ia ka buhryntih jong ka samliang jingstad jong ka Tynjuh la pynbud kat kum ka Jingai jingmut jong ka Revised Standford-Binet IQs (Chauhan)[5]. Ka Tebil 11 ka pyni ia ka rukom buhryntih ia ka Samliang Jingstad jong ki 3000 ki shahtynjuh kat kum ka jingstad jong ki.

Tebil 11: Ka Buhryntih ia ka Samliang Jingstad jong ki 3000

DIQ Scores	Total	%	Classification
Below 70	55	1.83	Mentally Defective
70 -79	285	9.50	Borderline Defective
80 -89	512	17.07	Low Average
90 – 109	1327	44.23	Normal/Average
110 – 119	455	15.17	High Average
120 – 139	361	12.17	Superior
140 & above	1	0.03	Very Superior
Total	3000	100.00	

(ix). Ka Khur Stanine : (Stanine Score)

Ha ka jingthew (scale) Stanine, ia ki khur (raw score) la pynkylla sha ka Jingthew ba khyndai point (nine points scale) kaba sdang na 1-9 kaba u Mean u long 5 bad SD 1.96 (antad 2). Ia ki khur (raw scores) la pynkylla sha ka Jingthew Stanine (Stanine scale) da kaba pynlong ia ki sha ka samliang phrikwensi (frequency distribution) bad ai ia ka persentage jong kawei pa kawei ka Khur Stanine (Stanine score) kat kum ka dur u Normal Distribution Curve.

Tebil jong ka Khur Stanine (Stanine Scores):

Ia ki tduh jong ka Jingthew Stanine la khein da ka phormula harum jong u Normal Probability Curve bala sot na ka kot u Sharma[6]. **Nuksa** u Mean 55.43 bad u SD 14.34 Jong ka Tynjuh.

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[5] S.S.Chauhan : *Advanced Educational Psychology* ; Vikas Publishing House Pvt. Ltd. 1982 P -294

[6] R.A. Sharma: *Essential of Measurement in Education & Psychology*, Surya Publication, Meerut, 1995, p.306

$X_5 = M + .25 = 55.43 + .25 \times 14.34 = 59.$
$X_4 = M - .25 = 55.43 - .25 \times 14.34 = 52.$
$X_6 = M + .75 = 55.43 + .75 \times 14.34 = 66.$
$X_3 = M - .75 = 55.43 - .75 \times 14.34 = 55.$
$X_7 = M + .25 = 55.43 + 1.25 \times 14.34 = 73.$
$X_2 = M - .25 = 55.43 - 1.25 \times 14.34 = 38.$
$X_8 = M + .75 = 55.43 + 1.75 \times 14.34 = 81.$
$X_1 = M - .75 = 55.43 - 1.75 \times 14.34 = 30.$

Da kaba pyndonkam ia katei ka formula hajrong, ia ka Jingkhein Stanine jong iwei-pa-iwei I khur (raw score) la ioh bad buh ha ka Tebil. 5.18 to 5.33 (Chap.V).

(Appendix 1 C)

SLA JUBAB

KA TYNJUH JINGSTAD IA KI KHYNNAH SKUL BAHAPDENG 14 – 16 + SNEM KA RYTA

KYRTENG :_____KYRTA:_____

KLASS :_____ ROLL NO.:_____ SECTION :_____

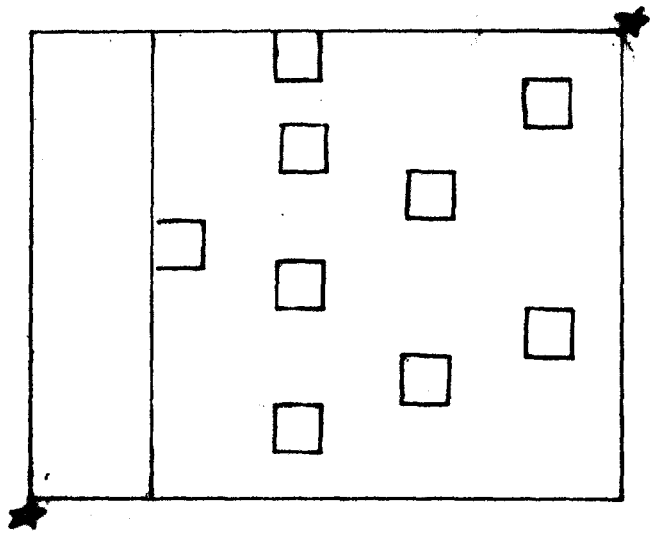
SCHOOL :_____

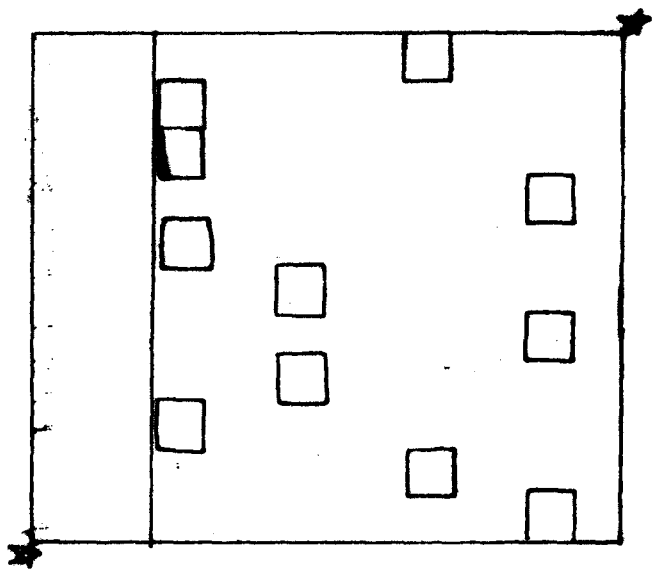
KYNTHEI/SHYNRANG SHNONG:

_____

TARIK :_____ CODE : _____

Stencil I





TYNJUH – 1

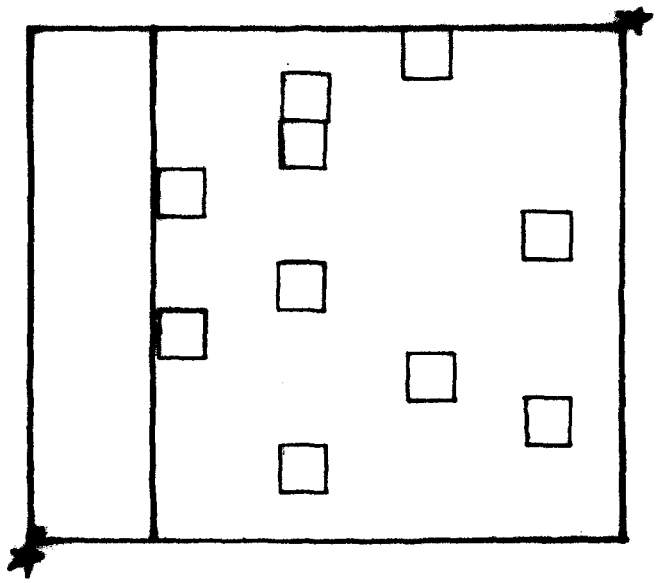
Entirna
Sla 3 (Nuksa Jingpyrshang) Sla 4 Tynjuh-Jingeh

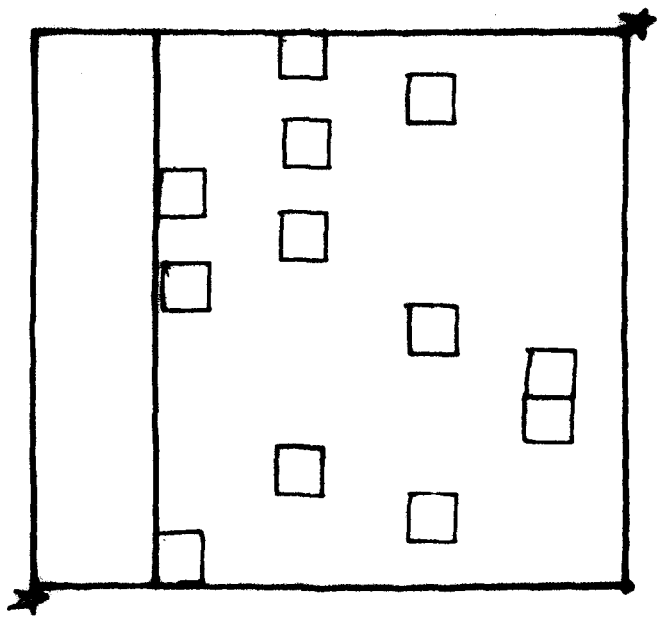
1. A B K ~~D~~	1	A	B	K	D
	2	A	B	K	D
2. A B K D	3	A	B	**K**	D
	4	A	B	K	D
(Buh dak pom (X)	5	A	B	K	D
ha u B)	6	A	B	K	D
	7	A	B	K	D
	8	A	B	K	D
	9	A	B	K	D

TYNJUH – II

Entirna
Sla 5 (Nuksa Jingpyrshang) Sla 6 Tynjuh-Jingeh

1. ~~A~~ B K D	1	A	B	K	D
	2	A	B	K	D
2. A B K D	3	A	B	K	D
(Buh dak pom (X)	4	A	B	K	D
ha u B)	5	A	B	K	D
	6	A	B	K	D
	7	A	B	K	D
	8	A	B	K	D
	9	A	B	K	D
	10	A	B	K	D
	11	A	B	K	D





TYNJUH – III

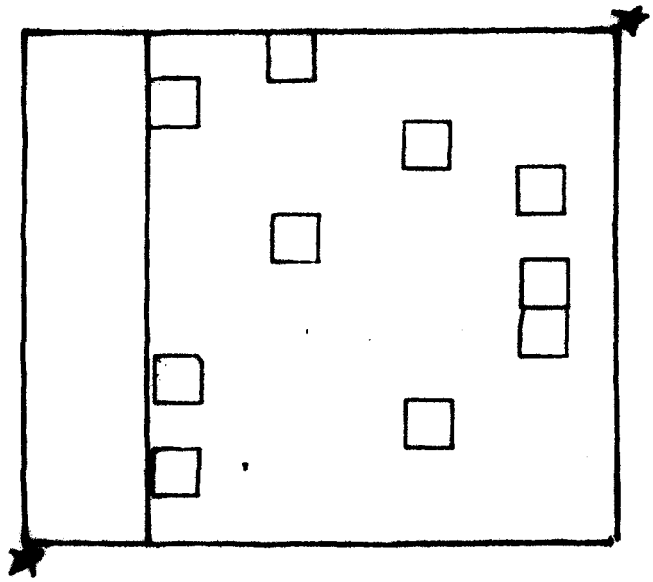
Entirna

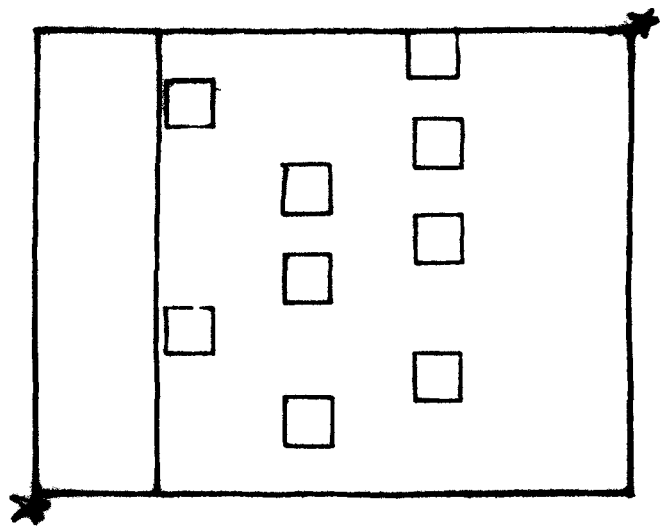
Sla 7 (Nuksa Jingpyrshang)	Sla 8 Tynjuh-Jingeh				
1. A B K ~~X~~	1	A	B	K	D
	2	A	B	K	D
2. A B K D	3	A	B	**K**	D
(Buh dak pom (X)	4	A	B	K	D
ha u A)	5	A	B	K	D
	6	A	B	K	D
	7	A	B	K	D
	8	A	B	K	D
	9	A	B	K	D
	10	A	B	K	D

TYNJUH – IV

Entirna

Sla 9 (Nuksa Jingpyrshang)	Sla 10 Tynjuh-Jingeh				
1. A B ~~K~~ D	1	A	B	K	D
	2	A	B	K	D
2. A B K D	3	A	B	**K**	D
(Buh dak pom (X)	4	A	B	K	D
ha u D)	5	A	B	K	D
	6	A	B	K	D
	7	A	B	K	D
	8	A	B	K	D
	9	A	B	K	D
	10	A	B	K	D
	11	A	B	K	D
	12	A	B	K	D





TYNJUH – V

Entirna

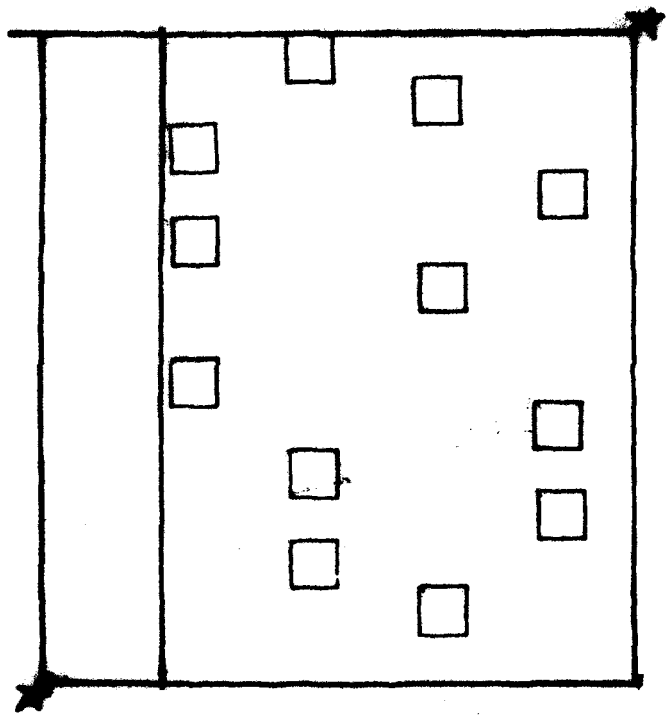
Sla 11 (Nuksa Jingpyrshang)		Sla 12 Tynjuh-Jingeh			
1. A ~~B~~ K D	1	A	B	K	D
	2	A	B	K	D
2. A B K D	3	A	B	K	D
(Buh dak pom (X)	4	A	B	K	D
ha u D)	5	A	B	K	D
	6	A	B	K	D
	7	A	B	K	D
	8	A	B	K	D
	9	A	B	K	D
	10	A	B	K	D

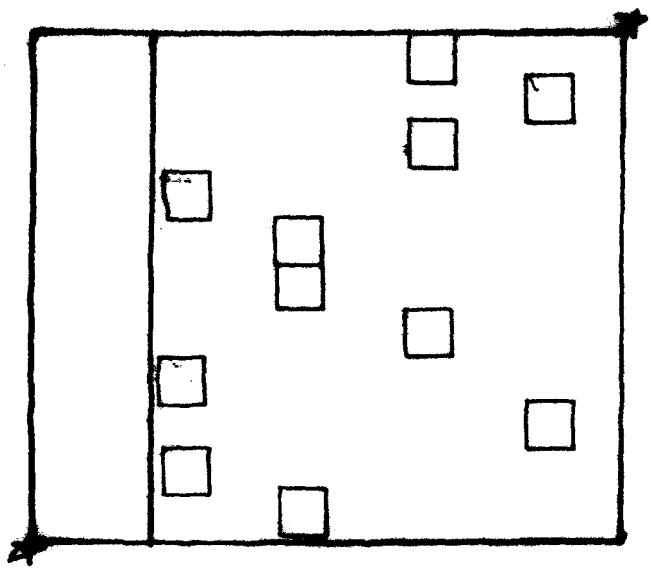
TYNJUH – VI

Entirna

Sla 13 (Nuksa Jingpyrshang)		Sla 14 Tynjuh-Jingeh			
1. A ~~B~~ K D	1	A	B	K	D
	2	A	B	K	D
2. A B K D	3	A	B	K	D
(Buh dak pom (X)	4	A	B	K	D
ha u B)	5	A	B	K	D
	6	A	B	K	D
	7	A	B	K	D
	8	A	B	K	D
	9	A	B	K	D

Stencil IV





TYNJUH – VII

Entirna

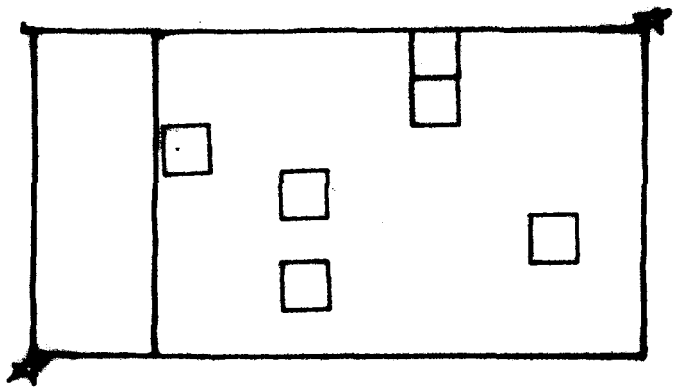
Sla 15 (Nuksa Jingpyrshang)		Sla 16 Tynjuh-Jingeh			
1. A B ~~K~~ D	1	A	B	K	D
	2	A	B	K	D
2. A B K D	3	A	B	**K**	D
(Buh dak pom (X)	4	A	B	K	D
ha u D)	5	A	B	K	D
	6	A	B	K	D
	7	A	B	K	D
	8	A	B	K	D
	9	A	B	K	D
	10	A	B	K	D
	11	A	B	K	D
	12	A	B	K	D
	13	A	B	K	D

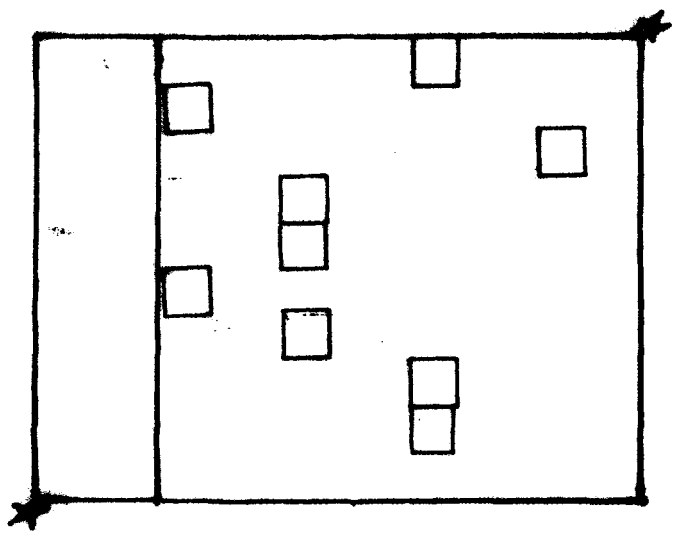
TYNJUH – VIII

Entirna

Sla 17 (Nuksa Jingpyrshang)		Sla 18 Tynjuh-Jingeh			
1. ~~A~~ B K D	1	A	B	K	D
	2	A	B	K	D
2. A B K D	3	A	B	**K**	D
(Buh dak pom (X)	4	A	B	K	D
ha u B)	5	A	B	K	D
	6	A	B	K	D
	7	A	B	K	D
	8	A	B	K	D
	9	A	B	K	D
	10	A	B	K	D
	11	A	B	K	D

Stencil V





TYNJUH – IX

Entirna

Sla 19 (Nuksa Jingpyrshang)		Sla 20 Tynjuh-Jingeh			
1. A ~~B~~ K D	1	A	B	K	D
	2	A	B	K	D
2. A B K D	3	A	B	**K**	D
(Buh dak pom (X)	4	A	B	K	D
ha u D)	5	A	B	K	D
	6	A	B	K	D

TYNJUH – X

Entirna

Sla 21 (Nuksa Jingpyrshang)		Sla 2 Tynjuh-Jingeh			
1. A ~~B~~ K D	1	A	B	K	D
	2	A	B	K	D
2. A B K D	3	A	B	**K**	D
(Buh dak pom (X)	4	A	B	K	D
ha u D)	5	A	B	K	D
	6	A	B	K	D
	7	A	B	K	D
	8	A	B	K	D
	9	A	B	K	D

Sla. 7

NO. TYNJUH	1	2	3	4	5	6	7	8	9	10	PURA
KHUR											

(Appendix 1 D)

KA SLA AI KSAI

Tynjuh-I
1.- B
2. -D
3. -B
4. -K
5. -A
6. -B
7. -D
8. -K
9. -B

Tynjuh-II
1.- K
2. - A
3. - A
4. - D
5. - A
6. - B
7. - D
8. - B
9. - A
10.-K
11.-D

Tynjuh -III
1.- K
2. - B
3. - B
4. - A
5. - D
6. - B
7. - A
8. - K
9. - D
10.-B

Tynjuh -IV
1. - B
2. - K
3. - B
4. - A
5. - B
6. - A
7. - K
8. - D
9. - D
10.-B
11.-K
12.-A

Tynjuh -V
1. - B
2. - A
3. - K
4. - D
5. - B
6. - D
7. - D
8. - A
9. - K
10.-A

Tynjuh -VI
1. - K
2. - A
3. - K
4. - B
5. - K
6. - B
7. - A
8. - K
9. - B

Tynjuh -VII
1. - B
2. - K
3. - A
4. - D
5. - A
6. - K
7. - B
8. - A
9. - D
10.-B
11.-D
12.-B
13.-K

Tynjuh -VIII
1. - K
2. - D
3. - K
4. - A
5. - B
6. - B
7. - K
8. - A
9. - D
10.- A
11.- B

Tynjuh -IX
1. - K
2. - K
3. - A
4. - B
5. - D
6. - B

Tynjuh -X
1. - K
2. - A
3. - D
4. - B
5. - B
6. - A
7. - B
8. - K
9. - K

(Appendix 2 A)

REUSABLE TEST BOOKLET

VERBAL GROUP TEST OF INTELLIGENCE

(VGTI)
(For 14 to 16 Years +)
(English Version)

Constructed by:

Mrs.Winnie Joice Shylla
Sr.Lecturer, Saint Mary's College
Shillong, Meghalaya

POINTS TO REMEMBER

1. Do not open or turn any page of this booklet until you are told to do so.
2. Do not make any mark in this Booklet and handle it with care.
3. Answers are to be marked on the separate Answer Sheet provided.
4. Write your name and other required information in the proper spaces provided on the Answer Sheet.

GENERAL INSTRUCTIONS

1. In this Test Booklet there are ten sub-tests. Each sub-test is to be done one by one. Important instructions and explaination are given with the help of Practical Examples. Be sure that you understand how to answer the questions.

2. In every test-problem there are three or four similar answers. Express your answer by putting a cross (X) mark at the space provided in the separate answer sheet to indicate the correct response. Where you mark the cross (X) will be considered as your answer. Put only one cross mark for each question, otherwise it will be treated as incorrect.

3. If you commit a mistake, put a round (O) circle over your wrongly marked response and mark the correct response again.

4. For each sub-test you will be instructed when to begin and when to stop. When you are instructed to stop at the expiry of the time limit, you have to stop writing immediately.

5. Try to attempt all the items. If you find a difficult item leave it and proceed further. Do not spend too much time on one test-problem

6. Try to do quickly and avoid mistake as far as possible.

7. Do not make any mark in this Test Booklet.

8. If you have any doubt get them clear before you start the test.

TEST ----- I

Classification

PRACTICE EXAMPLES

DIRECTIONS: Below are the four words/names given in each. Out of these, three are related to each other in some way or the other, but there is one, which has no relationship with the remaining three. You have to find out the odd one.

PRACTICE EXAMPLES:

I. A. BETEL-NUT B. BETEL-LEAVE C. LIME D. BASKET

Here the correct answer is at D (Basket), it is an odd one. It has no relationship with the remaining three. Now look at the Answer Sheet of Test I page 2 a cross (X) has been marked at D against the first Practice Example No. I

II. A. BENCH B. BRASS C. CHAIR D. TABLE

Here the correct answer is at B. You have to mark it yourself against Practice Example No. II

In this way, you will find 9 test- problems given on the next page. Answers are to be marked on the Answer Sheet at the space meant for this test (Test I, Page 2). You are given $1\frac{1}{2}$ minute for this test.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

TEST----I

(Time : $1^1/_2$ minute)

TEST-PROBLEMS

Sl.No.				
1.	A. Pen	B. Paper	C. Chalk	D. Pencil
2.	A. Quilt	B. Blanket	C. Bed-sheet	D. Carpet
3.	A. July	B. Mice	C. August	D. September
4	A. Rice	B. Meat	C. Basin	D. Vegetable
5.	A. Loofa	B. Wash the face	C. Wash	D. Bathe
6.	A. Cry	B.Laugh	C. Groan	D. Scream
7.	A. Valley	B. Paddy field	C. Plain	D. Playground
8.	A. Discussion	B. Lecture	C. Listen	D. Debate.
9.	A. Stone-cist	B. Diamond	C. Clan ossuary	D. Memorial stone

TEST --II

Coding

PRACTICE EXAMPLES

DIRECTIONS: In this test you will find some exercise which provide a code equivalent to a group of letters or numbers. You are to find out the correct one of the given group of letters or numbers out of the four alternatives given.

PRACTICE EXAMPLES:

No.I **If the word MEAI is coded as 4352, then how is IAME be coded?**
A. 2543 B. 2435 C. 2345 D. 2354

Here the word MEAI is to be coded as 2543. Thus the correct answer is at **A**. Now look at the Answer Sheet of Test II page 2, a cross (X) has been marked at A, against Practice Example No.1

No.II **In a certain code 326 is written as BAM and 879 as DOH. How is *the code 32826 be written?***
A. DAMMA B. BADAM C. MADAM D. DAMBA

Here the correct answer is at **B**. Mark it yourself against Practice Example No.II.

In this way, you will find 11 test problems given on the next page. Answers are to be marked on the **Answer Sheet** at the space meant for this test (Test II, page 2). You are given 4 minutes for this Test.

DONOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST II
(Time : 4 minutes)

TEST-PROBLEMS

Sl.No.

1. If A is coded as V, B as I, K as X, then how is KBA be coded?
   A. VIX B. IXV C. XIV D. XVI

2. In certain code 2567 is written as SHAD, 3418 as KMEN. How is 137426 be written?
   A. EKDMSA B. KESDMA C. MEKADS D. SMKDAE

3. If the word WEI is coded as 135, AR as 46 and LAI as 745. How is 134567 be written?
   A. WEAIRL B. RWEALI C. LWERIA D. AIRWEL

4. If the code number 3958612 is written as PYRKHAT. How is 983652 be written?
   A. TRYKPH B. HYTKPR C. PTHRYK D. YKPHRT

5. If the word RAT is coded as 453, DEM as 786.Then how is the word MATARAM be coded ?
   A. 6535456 B. 5653546 C. 3565654 D. 4656535

6. In a certain code 03124 is written as RBWSP and 69578 as MYNTD. Then how is BDPRMY be written?
   A. 906843 B. 384069 C. 630984 D. 490863

7. If the word KHASI is written as MGYLH, PNAR as JTYN. Then how is the word PARIAH be written in alphabet?
   A. GHYNYJ B. YHJNGY C. HYJGNY D. JYNHYG

8. In a certain code 612354 is written as KHMIED and 709 as TANG, then how is ATMIANG be coded?
   A. 090723 B. 072309 C. 029037 D. 0329097

9. If the code number 187 is written as ABK, 265 as DEG and 349 as NGHI. How is 741263 be coded ?
   A. KHADENG B. DANGKHE C. KHANGDE D. KHEDANG

10. If the word SNGI is coded as 021, BNAI as 6731. Then how is the word NGINSAN be Coded?
    A. 707312 B. 173702 C. 217037 D. 321770

11. In certain word SKUL is coded as BMNO and HIKAI as TPMWY. Then how is the Word KHASKI be coded?
    A.WTMYBM B. BYMTWM C. YMBTMW D. MTWBMY

TEST -III

General Comprehension

PRACTICE EXAMPLES

DIRECTIONS: In this test you will find an incomplete statement. You have to find out the best answer out of the four alternatives given, to complete the statement.

PRACTICE EXAMPLES

No.1 **We keep cats at home because they---**

A. Give us kitten **B. Entertain the family**

C. Are used for meat consumption. **D. Chase away mice**

Here the best answer is at D, they chase away mice.
Now look at the Answer Sheet of Test III, page 3 a cross (X) has been marked at D, against the first Practice Example No.1

No.II **We use umbrella mostly in summer because of the—**

A. Heat and rain **B. Wind and thunder**

C. Fresh- air **D. Cold and dry.**

Here the correct answer is at **A**. You have to mark it yourself against Practice Example No.II

In this way you will find I0 test-problems given on the next page.

Answers are to be marked on the **Answer Sheet** at the space meant for this test (Test III, page 3) . You are given 3 minutes for this test.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST – III
(Time : 3 Minutes)
TEST-PROBLEMS

Sl.No

1. We need the help of Traffic Police because it—
   A. Eases our works B. Punishes the culprit
   C. Prevents road accident D. Is the Goverment.'s order

2. Khasis do not marry within the same clan because —
   A. It is illegal B. It is an incest
   C.It leads to consanguineous error. D. It is not right

3. When ever a visitor visits the Khasi family they offer betel nut-betel leave because it -
   A. Is a custom B. It is a sign of equality among the rich & poor
   C. Is cheaper and easier to prepare. D. Is available only in Khasi land

4. Multi-storeyed buildings are found only in big cities because__
   A. They occupy less land B. Of the availability of raw materials
   C. Land is cheaper D. They are safer in crowded places.

5. Locality has its own Headman because to-
   A. Assist the Goverment. B. Represent the locality
   C. Judge the works of the residents D. Look into the welfare of the locality.

6. We should not pay much attention to rumors because they are—
   A. Gossiping news B. Just hearsay and unreliable
   C. News from the New-spapers only D. Fairy-tales.

7. We see a flash lightning a few seconds before we hear the thunderclap because—
   A. Light travels faster than sound B.Noise takes a longer time to reach us
   C. Lightening happens first. D. Our eyes work faster than our ears.

8. Some baloons float up in the air because—
   A. Ballons are lighter than air B. Holder lets go the string
   C. Filled with gas that is lighter than air D. Pumped up very full of air

9. In Khasi society females do not outshined in politics because she __
   A. Has no political right B. Is a woman only
   C. Is not fit to be a politician D. Is seen as the ancestress of the clan

10. The Khasis used to say "Give obeisance to your meikha (father's mother) because—
   A. She is the father's bread-earner B.She possesses deified stature
   C. Father is the head of the house D. She is older than the father

TEST--IV

Akin/Imitative words

PRACTICE EXAMPLES

DIRECTIONS: Below four choices are given in each, out of those four, one is an akin or imitative word. You have to find the correct akin or imitative word to match the other one. (This sub-test cannot be translated into English)

PRACTICE EXAMPLES:

No.I **Khohsiew** __

A. Khohshain **B. Khohluh**
C. Khohnub **D. Khohwah**

Here the correct answer is at **C**, Knee (Khohnub), because it is the akin or Imitative word of Knee (Khohsiew). Now look at the Answer Sheet of Test IV page 3, a cross (X) has been marked at C against the first Practice Example No.I

No.II **Ka sneng** ____

A. Snar **B. Khyrkhu**
C. Snait **D. Ka kraw.**

Here the correct answer is at D. Mark it yourself against Practice Example No.II

In this way you will find 12 test problems given on the next page. Answers are to be marked on the **Answer Sheet** at the space meant for this test (Test IV, page 3) . You are given 2 minutes for this test.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST-----IV

(Time : 2 Minutes)

TEST-PROBLEMS

Sl.No.

1. Kular (Promise)	A. Kulia	B. Madar	K. Kumah	D. Kutin
2. Ngap (Bee)	A. Kyieng	B. Dkhiew	K. Lwai	D. Khniang
3. Iap-khlam (Plague)	A. Iap-ler	B. Iap-ngoh	K. Iap-kyndit	D. Iapsuk
4. Ing-basa (Temporary Shelter/ Lodge)	A. Ing-basun	B. Ing-dulan	K. Ing-shongneh	D. Ing-trep
5. Jajah (Cold rice)	A. Jaton	B. Jatngam	K. Jatah	D. Jadoh
6. Lyntang (Plank)	A. Thaboh	B. Lynther	K. Lyngngot	D. Lyngknot
7. Minot (Industrious)	A. Adkar	B. Mutia	K. Ador	D. Trei shitom
8. Myntri (Minister)	A. Myntor	B. Daloi	K. Bakhraw	D. Korbari
9. Nongkhynraw (Earns while unmarried)	A.Nongkitni	B. Nong-kynti	K. Nong-muna	D. Nong-khyndein
10. Oh-kuna (A fine)	A. Ot-kad	B. Oh-kaid	K. Oh-nong	D. Oh-shrup
11. Raitong (Poor man)	A. Rangli	B. Rajon	K. Rai-not	D Raibi
12. Synniang (Contribution)	A. Bynhei	B. Synri	K. Synsher	D. Synlar

TEST--- V

Verbal Analogy

PRACTICE EXAMPLES

DIRECTIONS: In this Test you will find an incomplete statements, in which the first two words are related to each other in some way or the other. You have to find out that word which is related in the same way to the third word from the choices given.

PRACTICE EXAMPLES:

No.1 **A turban is to a male as female is to a:**
A. Quiver **B. Crown** **C. Whisk** **D. Sword**

Here the correct answer is at B, because a turban is meant for a male not for a female. Now look at the Answer Sheet of Test V page 4 a cross (X) has been marked at B against the first Practice Example No.I

No.II **Author: Pen _____ _____**

A. Pencil : Erasor **B. Printing Machine : Paper**
C. Gun : Hunter **D. Carpenter : Saw**

Here the correct answer is at D. You have to mark it against Practice Example No. II.

In this way you will find 10 test-problems given on the next page. Answers are to be marked on the **Answer Sheet** at the space meant for this test (Test V, page 4). You are given $2\frac{1}{2}$ minutes for this.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST---V
(Time : $2^1/_2$ Minutes)

TEST-PROBLEMS

1. Church is to Christians as Gurudwara is to--
   A. Hindus B. Sikhs
   C. Muslims D. Buddhists

2. Behdiengkhlam festival is to Pnar as Nongkrem Dance is to:
   A. Khyrim B. Lyngngam
   C. Bhoi D. War

3. Black is to white as night is to—
   A. Darkness B. Morning
   C. Day D. Black

4. Bow and arrow is to a son as daughter is to –
   A. Cane basket and cane winnower B. Apron and shawl
   C. Pen and paper D. Cone and (cane) headstrap

5. Cunning is to fox as proud is to a -
   A King B. Peacock
   C. Monkey D. Man

6. Light and Darkness: _____ _____
   A Happiness and Misfortune B. Success and Lost
   C. Hope and Failure D. Victory and Defeat

7. An illegitimate child is to an abandoned child as Pet child is to --
   A. Only child B. Orphan child
   C. Well off child D. Youngest child

8. Nai khatsaw -synnia is to a handsome young man as Panshandi-dem-lorkhah is to a—
   A. Lady expecting her profligate husband to attend function entertainment B. Well dressed lady who fails C. Lady who attends every D. Lady given to match making

9. Weights and measures: _____ _____
   A. Chair and bench B. Umbrella and knub (leafy shield)
   C. Bamboo cone and a headstrap D. Knife and handle

10. Knub (leafy shield) is to rain as Ryngien (large suspended wooden tray above the hearth) is to —
   A. Drying firewoods B. Drying clothes
   C. Keeping belongings D. Storing food

TEST --- VI

General Reasoning

PRACTICE EXAMPLES

DIRECTIONS: In this test, a problem is given in two or three sentences. Find out the answer of the problem from the choices provided.

PRACTICE EXAMPLES:

No. I **Phyrnai's grandfather is 50 years older than Phyrnai, if Phyrnai is 15 years of age, what is the age of Phyrnai's grandfather?**
A. 60 **B. 65** **C. 70**

Here the correct answer is at B, the age of grandfather is 65 years old. Now look at the Answer Sheet of Test VI page 4 a cross (X) has been marked at B against the first Practice Example No. I.

No.II **In an examination Barikor got more marks than Saphimo but less than Darity. Who got the highest marks?**
A. Barikor **B. Darity** **C. Saphimo**

Here the correct answer is at B.Mark it yourself against Practice Example No.II.

In this way, you will find 9 test problems given on the next page. Answers are to be marked on the **Answer Sheet** at the space meant for this test (Test VI, page 4). You are given 3 minutes for this test.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST---VI

(Time: 3 Minutes)

TEST-PROBLEMS

Sl.No.

1. Saralang is older than Biangka but Biangka is older than Teiri, who is the youngest?
   A. Saralang B. Biangka C.Teiri

2...Lari is born before Bari, Bari is born before Nari, who is the oldest?
   A. Lari B. Bari C. Nari

3. Kyrmen is taller than Rosa and Kyrmen is shorter than Risha. Who is the tallest?
   A. Rosa B. Kyrmen C. Risha

4. Tynshain is younger than Khraw and Khraw is older than Sanbor. Who is the oldest?
   A. Sanbor B. Khraw C. Tynshain

5 . Mihpli is shorter than Sonisha, Sonisha is shorter than Daphi. Who is the shortest?
   A. Soinsha B. Mihpli C. Daphi

6. Dakmen is smaller than Saralin, but bigger than Lapynshai. Who is the smallest?
   A. Saralin B. Lapynshai C. Lapynshai Dakmen

7. If one boy eats one apple in one minute, in how many minutes will 100 boys eat 100 apples?
   A. 1 B. 2 C. 3

9. The second day of a month is a Friday. Which of the following would be the last day of the month that has 31 days?
   A. Monday B. Tuesday C. Saturday

9. In a drawing competition Hunlang is beter than Iaineh but poorer than Rosalin. Who is the best?
   A. Hunlang B. Rosalin C. Iaineh

TEST—VII

Number Series

PRACTICE EXAMPLES

DIRECTIONS: Below are given some numbers series. In each of the series one number or a group of letters is missing as shown by (.). Find out the missing number or group of letters from the four given choices.

PRACTICE EXAMPLES:

No.1. **6, 12, 18, 24, (.)**
A. 26 B. 28 C. 30 D. 32

The required number is 30, because numbers are increasing by 6. Hence the correct answer is at C. Thus the series become 6,12,18,24,30. Now look at the Answer Sheet of Test VII page 5, a cross (X) has been marked at C against the first Practice Example No.I

No. II **2, 4, 7, 11, (.)**
A. 12 B. 14 C. 15 D. 16

Here the correct answer is at D. Mark it yourself against Practice Example No.II.

In this way, you will find 13 test problems given on the next page. Answers are to be marked on the **Answer Sheet** at the space meant for This test (Test VII, Page 5). You are given 4 minutes for this test.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST--VII

(Time : 4 Minutes)

TEST-PROBLEMS

Sl.No.					
1.	16,	15,	13,	10,	( )
	A. 5	B.6	C.7	D. 8	
2.	10,	20,	40,	80	( )
	A. 100	B. 140	C. 160	D. 180	
3.	15,	20,	30,	45,	( )
	A.65	B. 75	C. 85	D. 95	
4.	4,	8,	16,	32,	( )
	A. 61	B. 62	C. 63	D. 64	
5.	21,	19,	17,	15,	( )
	A.13	B. 14	C. 15	D. 16	
6.	12,	10,	9,	7,	( )
	A. 7	B. 5	C. 6	D. 8	
7.	4,	5,	7,	10	( )
	A. 12	B.14	C.16	D. 18	
8.	8,	10,	13,	17,	( )
	A. 22	B. 21	C.20	D.23	
9.	54,	48,	41,	33,	( )
	A. 21	B. 22	C. 23	D. 24	
10.	10,	6,	3,	1,	( )
	A.2	B. 0	C. 5	D. 4	
11.	21,	17,	14,	12,	( )
	A. 8	B. 9	C. 10	D. 11	
12.	3,	6,	10,	15,	( )
	A. 19	B. 21	C. 23	D. 25	
13.	7,	8,	10,	13,	( )
	A. 15	B.16	C. 17	D. 18	

TEST – VIII

Evaluation of Relationship

PRACTICE EXAMPLES

DIRECTIONS: In this test different relationship of people is given in two or three sentences. You have to find out the correct relationship of the people from the choices given.

PRACTICE EXAMPLES:

No.1.Rilang is the grand-daughter of Thom's brother. Who is Rilang to Thom?
A. Grand-father B. Uncle C. Father D. Cousin

Here the correct answer is at **A**. Thom is also a grandfather of Rilang. Now look at the Answer Sheet of test VIII, page 5 a cross (X) has been marked at A in the Practice Example No.1.

No.11 Iba says, "The lady in the picture is the wife of my mother's youngest brother". Who is Iba to the lady in the picture?
A. Sister-in-law B. Aunt C. Cousin D. Niece

Here the correct answer is at B. You have to mark it yourself in the *Practice Example No.11*

In this way, you will find 11 test-problems given on the next page. Answers are to be marked on the **Answer Sheet** at the space meant for this test (Test VIII, page 5). You are given 4 minitues for this test

DO NOT TURN THE PAGE UNTIL YOU ARE TOLD TO DO.

TEST – VIII
(Time : 4 Minutes)

TEST-PROBLEMS

1. Wadlashem is Phila's husband and Wanrap is Phila's son. Who is Wanrap to Wadlashem?
   A. Nephew B. Uncle C. Father D. Son

2. Mariada told her friend that Sanbor is her brother's son. Who is Shanbor to Mariada?
   A. grand mother B. Mother in law C. Cousin D. Aunt

3. Damanbha is Mawkordor's grand daughter; Banbet is another grand daughter of Mawkordor from another daughter. Who is Damanbha to Banbet?
   A. Sisters B. Niece C. Cousin D. Aunt

4. Ibakordor and Bansara are cousins-sister, Bansara is Phiba's daughter. Who is Ibakordor to Phiba?
   A. Aunt B. Elder cousin C. Friend D. Niece

5. Janai introduces Kyrshan as her mother's youngest sister's husband; who is Janai to Kyrshan?
   A. Uncle B. Uncle (mother'side) C. Brother in law D. Great uncle

6. Sharida is Panbor's daughter, Baiamon is Sharibha' granddaughter. Who is Baiamon to Panbor?
   A. Father in law B. Great grand father C. Great grand uncle D. Uncle

7. Sani is Kitlang's daughter; Deidor is Kitlang's second wife. Who is Sani to Deidor?
   A. Mother in law B. Grand mother C. Step mother D. No relation

8. Iada is Iohkynti's grandmother; Donbok and Iohkynti is brother and sister, Mebanjop is Donbok's son. Who is Mebanjop to Iada?
   A. Greatgrandmother (father's side) B. Great grandmother (mother's side)
   C. Mother in law D. Aunt

9. Wandahun is Banjop's sister; Mebanshan is Wandahun's husband and Rikynti is Banjop's wife.Who is Rikynti to Mebanshan?
   A. Sister and brother B. In-laws C. Cousin D. Married to the same family

10. Kupar when pointing at the picture and says, "This lady in the picture is my elder sister's Daughter". Who is the lady in the picture to Kupar?
    A. Uncle B. Cousin C. Cousin (father'side) D. Uncle (father's side)

11. Rimeka told her friend, "Pynbha is the only daughter from her father and I have no other child from the present husband Meban". Who is Pynbha to Meban?
    A. Father in law B. Step father C. Grandfather D. Uncle

TEST ---- IX

General Information

PRACTICE EXAMPLES

DIRECTIONS: In this test you have to complete the incomplete statement. Find out the correct answer from the choices provided to complete the statement.

PRACTICE EXAMPLES—

I. **The term 'Meghalaya' means_____.**
A. Scenic beauty **B. Abode of clouds**
C. Land of rain **D. Land of Peace.**

Here the correct answer is at B. It means 'the abode of clouds' Now look at the Answer Sheet of Test IX, Page 6 a cross (X) has been marked at B against the first Practice Example No. I.

II. **Domiasiat at West Khasi Hills is rich in_____**
A. Lime-stone **B. Coal** **C. Oil** **D. Uranium.**

Here the correct answer is at D. Mark it yourself against Practice Example No.II

In this way you will find 6 test problems given on the next age.Answers are to be marked on the **Answer Sheet** on the space meant for this test (Test IX, page 6). You are given 1 minute for this test.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST---IX

(Time : 1 Minute)

TEST-PROBLEMS

Sl.No.

1. Meghalaya got its Statehood in the year---
   A.1970 B.1971 C.1972 D.1973.

2. The Month of the year which is known in the Khasi language as "Evil Smelling" is—
   A.May B.June C.July D.August.

3. The meat that is commonly eaten by the Khasis is –
   A. Beef B.Chicken C. Mutton D.Pork

4. The Freedom-Fighter of the Jaintias is---
   A.Tirot Singh B.Kiang Nongbah C.Who Ryndi D. Sajar Nangli

5. The renounced Khasi Poet SoSo Tham compared the cryptomeria japonica with a -
   A.Patriot B.Traitor C.Soldier D.Gentleman

6. The Mount Bah Bo-Bah Kong is situated at---
   A.East Khasi Hills B.Jaintia Hills C.West Khasi Hills D.Ri-Bhoi District

TEST ---- X

Arithmetic Reasoning

PRACTICE EXAMPLES

DIRECTIONS: In this test, problems are given in one or two sentences. You have to find out the correct answer from the choices provided.

PRACTICE EXAMPLES

I. **In a classroom there are 37 benches, if 6 students sit in one bench: how many students are there in the classroom?**
A. 225 B. 222 C. 227 D. 229

Here the correct answer is at B, i.e 222. Now look at the Answer Sheet of Test IX, page 6 a cross (X) has been marked at B against the first Practice Example No. I.

II. **If a cloth of 10 metres long will remain 7 metres after washing, how many metres left if it is 40 metres long?**
A. 20 B. 22 C. 24 D. 28

Here the correct answer is at D. Mark it yourself against Practice Example No.II

In this way you will find 9 test problems given on the next page. Answers are to be marked on the **Answer Sheet** at the space meant for this test (Test X, page 6). You are given 4 minutes for this test.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST -----X

(Time : 4 Minutes)

TEST-PROBLEMS.

Sl.No.

1. In which of the following ways could 198 Balls packed?
   A. 10 boxes with 18 balls each B. 18 boxes with 17 balls each
   C. 18 boxes with 11 balls each D. 10 boxes with 19 balls each

2. John had some money. His father gave him four times of the money he had. Now he had Rs. 60. How much had he at first?
   A. 12 B. 15 C.20 D.30

3. A village of 240 houses needs 12,000 liters of water everyday. How much water each
   House used everyday?
   A. 40 Liters B. 20 Liters C.30 Liters D.50 Liters

4. A man subscribed a monthly Journal for Rs. 180.00 in a year. What is the cost of this
   Journal?
   A. 10 B. 15 C.20 D.25

5. How many buses will be required for 260 passengers if a bus has a capacity of 52 Passengers?
   A. 4 B. 5 C.6 D.7

6. What is the length of a radius of a circle whose diameter is 10 cm?
   A. 5cm B. 10cm C.15cm D.20cm

7. A typist takes 1hr. to type 15 pages, how long will he take to type 25 pages?
   A. 1hr.20mns B. 1hr.40mns C. 2hrs. D. 2hrs.20mns

8. If the cost of 7 kgs of flour is Rs. 63.00, what is the cost of 3kgs of flour?
   A. Rs.30. B. Rs.25. C. Rs.27. D. Rs.24.

9. From a rope, it was first cut off 27 meters, then 8 meters and there is 7 meters left. What was the length of the rope?
   A. 40m B. 41m C.42m D.43m

(APPENDIX 2 B)

MANUAL

FOR

VERBAL GROUP TEST OF INTELLIGENCE (VGTI)

FOR 14 to16 + YEARS (IN ENGLISH)

BY

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CONTENTS

1.0: CONSTRUCTION OF THE TEST:

1.1 Purpose:

The Khasis of the state of Meghalaya like other communities need to have its own standardized Intelligence test to measure the general intelligence of the Khasi School going children. A child's potential or talent needs to be measured, or at least identified before he enters into any course of training or discipline. Tests of abilities and other personal characteristics play a large role in modern life, contributing to countless decisions that shape individual's upbringing, schooling and careers. With this intention, the investigator constructed the Verbal Group Test of Intelligence (VGTI) in the Khasi language to assess the Intelligence of the School going Children of the State of Meghalaya studying in Classes VIII – X of age-group 14 to 16 +

1.2 Construction:

At the preliminary stage the test was prepared in 200 items, placing them under different ten sub-tests. Each sub-test was provided with instructions, explanations and practice examples. A separate answer sheet and scoring key were also made ready. For the preliminary try-out stage, a sample of 180 Khasi students was taken. The items prepared were administered to them. The responses recorded were used for modification of the test. The modified test was then used for the first try-out on a sample of 555 Khasi students drawn randomly from ten schools of Shillong town. The purposes of the first try-out were:

(i) To obtain objective information concerning each and every item.

(ii) To select only the items to be retained in final form

(iii) To fix the time limit for each sub-test.

(iv) To arrange the selected items in an ascending order of difficulty.

At this stage, enough time was given to the testees to complete the test. Instructions were provided to the testees that they should mark their responses in the seperate answer sheets provided and to write down the time taken at the end of each sub-test.

The item validity was determined by the application of Kelley's method of 27% upper top and 27 % lower bottom dichotomy. The item difficulty was determined by taking into account the proportion of the groups which can solve an item correctly. The following formula suggested by H.E. Garrett[1] was used to get the proportion after correction of guessing.

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[1] H.E.Garett : *Statistics in Psychology and Education*; Valkis, Feffer and Simon Ltd P-364

$$P_c = \frac{R - W/(K-1)}{N - HR}$$

Where Pc = The percentage who actually know the right answer

R = The number who get the right answer

W = The number who get the wrong answer

NR = The number of examinees who do not reach the item

K = Number of choices or options

N = Number of examinees in the sample.

The answer sheets of 555 testees were divided into two groups of 150 each on the basis of 27 % upper top and 27 % lower down. The difficulty value and discriminative power for each item was determined by the following formula as suggested by Davis[2]:

$$DV = (P_u + P_l)/2$$

$$DP = P_u + P_l$$

Where P_U = Proportion of correct answers on an item of high group examinees

P_L = Proportion of correct answers on the item of low group examinee

The 100 best possible items were finally selected and retained under ten subtests for the final try-out as given in Table 1.

[2] S.A.Sharma : *Essentials of Measurement in Education & Psychology*; Surya Publication, Meerut 2005 P-187

Table 1: No. of items and Time-limits for each sub-test

Sl. No.	Sub-tests	No. of Items retained	Time-limits in minutes
1	Classification (CL)	9	$1^1/_2$
2	Coding (CO)	11	4
3	General Comprehension (GC)	10	3
4	Akin/Imitative Words (AW)	12	3
5	Verbal Analogy (VA)	10	$2^1/_2$
6	General reasoning (GR)	9	3
7	Number Series (NS)	13	4
8	Evaluation of Relationship (ER)	11	4
9	General Information (GI)	6	1
10	Arithmetic Reasoning (AR)	9	4
		100	30 minutes

The time allotment in each sub-test has been calculated on the basis of the average time taken by all testees in each of the ten sub-tests

The Test Booklet and Answer sheet

The Test Booklet contained of twenty-two pages. The first two pages show the title and general instructions of the test. It is then followed by all the ten sub-tests (spreading in hundred items) and ten practice examples. Each subtest was provided with suitable instructions and two practice examples on one page which is followed by test-problems on another page. Each test-problem has been alloted with a fixed time. The total testing time for all the ten sub-tests is 30 minutes, in which some test-problems require more time while some require less time. The time required for instructions and practice examples is approximately 5 minutes. Thus the whole test can be administered within 35 minutes only i.e. within one school period

The Answer Sheet has seven pages. The first page provides the spaces for filling up the particulars by the testees. Pages two to six have been devoted for places to mark the responses of the test-problems; and page seven is meant for writing down the scores of all the subtests. The answer sheet of every subtest is divided into two parts- left and wright. The left part is meant for marking the answers of practice examples; while the wright part is meant for marking the responses of the test-problems.

1.4: Administering the test.

The present test is meant for assessing the intelligence of the Khasi speaking pupils of the state of Meghalaya studying in classes VIII to X, of the age group 14 to 16 yrs +.

The test booklet contains of ten sub-tests. In every sub-test there are two practice examples that have to be answered in the separate answer sheet at the space meant for them. These are not to be taken into account in the scoring, because they are meant only to develop confidence and help the pupils to become adjusted with the nature of the task. All the remaining items in the test are to be attempted by the testees. Answers are to be marked on the separate answer sheets provided. The test booklets are reusable. Directions for taking the test are printed on the test booklet. They are to be read silently by the pupils while the tester reads them aloud.

The test may be administered in the regular classroom. The pupils to be tested should be seated properly with enough space in between so as to allow them to handle the test booklet and answer sheet conveniently. It is advisable for pupils to take the test with pencils. The time limit should be strictly observed. For this, a stop watch should be used.

After having made the pupils seated properly, the tester has to present the following orientation address:

'I am going to give you today a very interesting and simple task to do. Unlike other tests, this test is not to be prepared in advance. You are to simply read the booklet and practice examples carefully and mark the answer that you know to be correct in the answer sheet by crossing (X) on any of the letters A, B, C, and D'. For administering the test, the following steps should be observed:

1. Distribute the answer sheets and instruct the testees to fill in the requested information in the proper spaces.
2. Before distributing the booklets make the announcemence, 'Do not open the booklet until it is told to you to do so.'
3 Read the directions carefully on the first and second page of the test booklet.
4 Read the practice examples and general instructions carefully in each sub test
5 Open the answer-sheet for marking answers to the test problems.
6. Ask the pupils to have their doubts cleared (if any).
7 Tell them to turn the page of the test booklet and say 'start'. Start the stopwatch and stop after the time allotted in each Sub-test is over and tell them to turn the next page.
8. Go around seeing that each pupil is doing properly. Follow the same procedure for all the ten sub-tests.
9. It is also necessary to inspect the answer sheets to determine that the pupils should not mark more than one answer.

1.5: Scoring the Test

A set of scoring stencils of tracing paper with squares upon each corrected answer has been prepared. The relevant stencil key has to be placed on top of each answer sheet. It should be so adjusted that the page numbers and the corrected answers (with cross marks) will be visible through the squares. Then, count the right answers and write them in the right margin against each sub-test of that page. Transfer the scores from the different pages of each sub-test to the table on the last page of the answer sheets, and find out the total scores. If in the same item, more than one answer is marked, score it as wrong. The same procedure is to be followed in all the ten sub-tests. The total score of the test is 100 i.e. each item carries one mark.

2.0: STANDARDIZATION OF THE TEST

2.1 Sample:

For establishing the norms, a large representative sample of 3000 Khasi students drawn from 42 High Schools of four Khasi speaking districts of Meghalaya state. A standardized procedure for administration and scoring of the test was formulated on the basis of the try-out experiments. The numbers of schools taken for sample on final try out were as follows:

Table 2: Number of Schools taken for the sample of the test

District	No. of Schools in Each District	School Names
East Khasi Hills	19	Auxilium Convent's Girls H.S.S.
		Christian Academy H.S.S.
		Cherra Punjee Presbyterian S.S
		D.N.S Wahlang Memorial S.S.
		Good Shepherd H.S.S Jongksha
		Kyntiew Shaphrang S.S Laitlyngkot
		K.J.P.Girls's H.S.S.
		Laban Presbyterian S.S.
		Laitumkhrah Presbyterian H.S.S.
		Mawkhar Chriatian H.S.S.
		Mawsynram H.S.S.

		Nongkrem S.S.
		Pearly Dew S.S.
		Ram Krishna H.S.S. Cherra Punjee
		Seng Khasi S.S. Langkyrdem
		Smith H.S.S
		St. Peter's S.S. Laitlyngkot
		St.Dominic's H.S.S
		Tynring S.S.
West Khasi Hills	10	Anderson H.S.S
		Christ King S.S
		Langtor H.S.S
		Lyngngam Presbyterian S.S .Mawtyngkut
		Mairang Presbyterian H.S.S
		Nongstoin Public S.S
		Ri-Lyngngam H.S.S.
		St.Peter's H.S.S.
		St. Thomas H.S
		Tirot Singh Memorial H.S.S.
Jaintia Hills	10	Govt. Boy's H.S.S
		Govt. Girl's H.S.S.
		K.J.P. Synod Jowai
		Khasi Pnar S.S. Dawki
		Marian Hill S.S.
		Presbyterian S.S
		Sein Raj S.S
		Sohkha Govt. H.S.S.
		St. Mary Mazzaralo
		Tome Memorial S.S
Ri-Bhoi District	3	Mynken Christian H.S.S
		St. Michael H.S.S
		Umroi Presbyterian S.S
Total	**42**	

2.2: Analysis of the sample tested

The following Tables 3 & 4 present the age-wise and class-wise distribution of the sample tested for standardizing the test:

Table 3: Age-wise distribution of the sample No. = 3000

Age range	Boys	Girls	Total
13 (12.6-13.5)	121	189	310
14 (13.6-14.5)	389	542	931
15 (15.6-16.5)	378	562	940
16 (16.6-17.5)	329	322	651
17 (17.6 and above)	81	87	168
TOTAL	1298	1702	3000

Table 4: Class-wise distribution of the sample No. 3000

Classes	Boys	Girls	Total
VIII	366	632	998
IX	530	473	1003
X	402	597	999
Total	1298	1702	3000

2.3 Distribution of Test Scores:

Tables 5 to 8 present the Age-wise and Class-wise distribution of test scores of Boys and Girls.

Table 5: Age-wise Distribution of Test scores: Boys N= 1298

Test score	13 Yrs	14 Yrs	15 Yrs	16 Yrs	17 Yrs	Total
6 to 10	0	0	0	0	0	0
11 to 15	0	0	0	0	0	0
16 to 20	0	2	1	1	0	4
21 to 25	0	0	3	0	1	4
26 to 30	4	8	5	14	2	33
31-35	13	20	23	25	4	85
36-40	15	18	16	24	8	81
41-45	9	38	44	34	9	134
46-50	18	35	33	53	10	149
51-55	26	45	55	34	11	171
56-60	14	42	44	37	13	150
61-65	8	49	48	39	7	151
66-70	7	40	41	28	4	120
71-75	2	32	27	12	6	79
76-80	3	33	17	16	4	73
81-85	2	23	15	9	1	50
86-90	0	4	4	3	1	12
91-95	0	0	2	0	0	2
96-100	0	0	0	0	0	0
Total	121	389	378	329	81	1298
Mean	50.23	58.4	56.69	53.49	53.74	55.43
Median	51.23	58.41	56.82	52.59	53.36	54.86
SD	12.43	14.94	14.37	14.35	13.88	14.57

Table 6: Age-Wise Distribution of Test Score: Girls No. 1702

Test Score	13 yrs	14 yrs	15 yrs	16 yrs	17 yrs	Total
6-10	0	0	0	0	0	0
11-15	0	0	0	0	0	0
16-20	0	1	0	1	0	2
21-25	3	5	0	1	0	9
26- 30	1	6	10	11	2	30
31 – 35	14	30	22	24	3	93
36 – 40	16	43	43	28	12	142
41 – 45	27	61	42	26	12	168
46 – 50	30	71	72	36	11	223
51 – 55	33	75	65	41	11	222
56 – 60	26	71	64	46	11	218
61 – 65	13	50	61	45	10	179
66 – 70	10	37	63	24	9	143
71 – 75	40	40	42	17	2	115
76 – 80	2	22	41	10	4	79
81 – 85	0	24	25	7	0	56
86 – 90	0	6	10	5	0	21
90 – 95	0	0	2	0	0	2
96 -100	0	0	0	0	0	0
Total	189	542	562	322	87	1702
Mean	51.25	55.11	57.99	54.04	52.60	55.30
Median	51.07	53.88	57.86	54.32	52.27	54.32
SD	11.85	14.27	14.55	14.16	12.32	14.18

Table 7: Class-Wise Distribution of Test Score: Boys No. 1298

Test Score	VIII	IX	X	Total
6 to 10	0	0	0	0
11 to 15	0	0	0	0
16 to 20	1	0	3	4
21 to 25	2	1	0	3
26 to 30	14	7	11	32
31-35	36	24	25	85
36-40	31	20	33	84
41-45	51	49	36	136
46-50	48	57	44	149
51-55	61	78	38	177
56-60	39	66	43	148
61-65	37	61	50	148
66-70	28	59	34	121
71-75	6	38	33	77
76-80	11	35	26	72
81-85	1	29	19	49
86-90	0	5	6	11
91-95	0	1	1	2
96-100	0	0	0	0
Total	366	530	402	1298
Mean	50.35	55.40	56.48	55.43
Median	50.	57.76	57.02	54.86
SD	12.59	13.94	15.54	14.48

Table 8: Class-Wise Distribution of Test Score of Girls No. 1702

Test Score	VIII	IX	X	Total
6-10	0	0	0	0
11-15	0	0	0	0
16-20	1	1	0	2
21-25	6	3	1	10
26-30	19	6	5	30
31-35	51	20	21	92
36-40	75	39	27	141
41-45	85	43	38	166
46-50	104	61	58	223
51-55	96	64	57	217
56-60	78	61	82	221
61-65	46	58	76	180
66-70	31	45	67	143
71-75	28	27	61	116
76-80	11	13	55	79
81-85	1	21	36	58
86-90	0	10	12	22
91-95	0	1	1	2
96-100	0	0	0	0
Total	632	473	597	1702
Mean	49.8	56.07	60.81	55.40
Median	49.04	54.97	61.5	57.6
SD	12.12	14.17	14.15	14.24

2.4 Reliability:

(i) Reliability of the Test:

Reliability means the extent to which a test is consistent and stable in what it measures and gives dependable and reliable results. For the present study, the reliability of the test was studied by the Split-half and Kuder-Richardson method.

(a) Split-half reliability:

The test was administered on the sample of 3000 pupils; its reliability was studied by split-half method. The scores collected from the 3000 testees were divided into two halves, one half containing odd items and the other even items. The coefficient of correlation between the scores of odd and even items was found to be 0.86. It was found to be significant at .01 level

(b) Kuder-Richardson reliability.

This method of estimating reliability of the test was developed by Kuder-Richardson. The method was also known as K-R method. The reliability of the present test was estimated by the KR-21 formula as suggested by Garrett. The coefficient of correlation was found to be 0.89 It was also found to be significant at .01 level.

(ii). Reliability of the Sample Tested.

To study the representative character of the standardization sample, the distribution of the test scores and DIQs were checked statistically. The results revealed that the distribution did not deviate significantly from the normal probability curve.

2.5 Validity:

Validity refers to the degree to which a test measures what it purports to measure. It provides a direct check on how well the test fulfills its function. The empirical validity of the test was studied by the following methods:

(i). The Concurrent Validity with respect to Ahuja's Group Test of Intelligence.

The test has been validated with external criterion test of Ahuja's group test of Intelligence. The coefficient of correlation between the two tests was then calculated by Pearson's Product-Moment Method. The coefficient of correlation was found to be $r = 0.80$ which revealed that the test is valid and significant at.01 level.

(ii). The Concurrent Validity with respect to Cattell's Culture Fair Test of Intelligence

The test has been validated with Cattell's Culture Fair Test. The coefficient of correlation was found to be $r = 0.66$ which revealed that the test was a valid one and significant at .01 level. It is clear that even a small r may be significant if computed from a very large sample (Garrett)[3].

(iii). Construct Validity:

The construct validity or internal consistency of the test was studied by calculating the Inter-subtest Correlation. The inter-subtest correlation among the scores on each subtest with total scores of the test were estimated by using computer software called Statistical Packages of Social Sciences (SPSS). On computation it was found that all the sub-tests were inter correlated and significant at .01 level. The factor validity of the test was further verified by Thurstone's Centroid method.It was found to be a unifactor test having the following loadings as presented in Table 9

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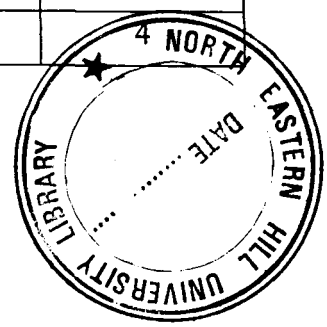
[3] H.E.Garrett : *Statistics in Psychology & Education*; Valkis, Feffer and Simons Ltd, Bombay 1981 P-202

Table 9: Showing the Internal Validity and Factorial Validity of the present test

Sl. No.	Sub-test	Internal consistency r with the total test	FirstCommon factor (Thurstone's Centroid method)	Ranks order of the sub-test
1	Classification	.527	.563	8
2	Coding	.661	.620	5
3	General Comprehension	.574	.601	7
4	Akin Words	.555	.543	9
5	Verbal Analogy	.632	.653	2
6	General Reasoning	.643	.654	1
7	Number Series	.680	.625	3
8	Evaluation of Relationship	.602	.604	6
9	General Knowledge	.363	.441	10
10	Arithmetic_Reasoning	.616	.621	4

* Significant at .01 Level



2.6: Norms

(i) Standardization of the Test Results.

The raw score obtained by an individual on a test does not in itself have much significance unless tables of norms have been provided to facilitate interpretation.

In the case of an intelligence test like the present one, the norms are generally worked out for the different age-groups and class-groups. To study the sex differences, separate norms were provided for both the sexes (Table 5-8). On comparison with the table of norms it enables to rank an individual pupil's performance and indicates the level reached by the pupil relative to his own and other age or class-groups. To express the results in more meaningful forms, the individual scores are represented in one or more of the indices of brightness.

(ii) Some more procedures of expressing the individual scores in units of brightness.

The provision for further interpretation based on the deviation of scores from the corresponding class norms/age norms in the form of Sigma, Percentile Ranks, Deviation IQs

and Stanine scores (Table 5.18-5.33 Chap.V) have been made. These tables served as reckoners for all purposes of age-groups/classes-groups.

(iii) Sigma Score.

Deviations from the mean expressed in standard deviation units are called Sigma Scores. These are also known as Z-Scores or Reduced Scores. The standard Scores or Z-Scores are the units of a normal probability curve which range from -3 to + 3. Its Mean is 0 and S.D is 100. About half of the Sigma scores turn out to be positive and half negative. The Sigma score that expressed in terms of standard deviation indicated how far a particular score is deviated from the mean of the distribution. The raw scores are transformed into Z-score or Sigma score by applying the following formula:

$$Z = (X-M)/\sigma$$

Table of Sigma Scores

The deviation of a score from the corresponding age norm/class norm can readily be obtained. For all possible deviation the sigma scores have been worked out separately for boys and girls.

For estimation of Sigma score for the table of boys, the deviation from the corresponding norms were divided by the standard deviation of the sample of the boys (SD =14.57 vide table 5 & 7)

For estimation of the sigma score for the table of girls, the deviation from the corresponding norms were divided by the standard deviation of the entire sample of girls (SD 14.18 vide table 6 & 8).

Tables 5.18 to 5.33 (Chapter V) were thus prepared for boys and girls respectively. These tables served as ready reckoners for obtaining the sigma scores of Boys and Girls.

(iv). Percentile Ranks.

A Percentile Rank indicates a pupil relative position in a group in terms of percentage of pupil scoring below him. This provides a direct statement of the individual's relative position in the group under reference. For example a person having a percentile rank of 30 is situated above thirty percent of the group of which he or she is a member.

Tables of Percentile Ranks

For all possible deviations, the percentile ranks have been worked out separately for boys and girls. The deviations were first expressed in Sigma Scores. The value of these

Sigma Scores was taken from Garrett's Table 'A'[4] of areas under the Normal Probability Curve. Thus the percent deviation from the mean was obtained. The percentile ranks were then established by adding 50 to these values. Table 5.18-5.33 (Chap.V) serve as the reckoners for obtaining the percentile ranks of boys and girls. These can be obtained with reference to the deviation of a score from the corresponding age norm/class norm.

(v). T-Score

T-Score are normalized standard scores converted into the distribution with a mean of 50 and SD of 10 (Garrett). If normalized standard score is multiplied by 10 and added to or substracted from 50, it is converted into T-Score. On this scale a score of 50 corresponds to the mean, a score of 60 to 1σ above the mean, and so forth. Thus the formula used for calculating T-Score is as follows:

$$\text{T-Score} = 50 \pm 10 \text{ (Z score)}.$$

Tables of T-Score

Tables 5.18-5.33 (Chap.V) serve as ready reckoners with reference to age-groups and and class-groups of boys and girls respectively.

(vi). Deviation Intelligence quotients

Deviation Intelligence Quotient is a normalized standard score which does not involve the mental age of a child. It is not the ratio of mental and chronological ages. The standardized sample mean is 100 and S.D is usually 16. In the present test, the raw score is first expressed into a sigma score (Z-Score) and then transformed into DIQ by applying the following formula:

$$\text{DIQ} = 100 + 16 \text{ (Z-Score)}$$

The DIQ scores for each raw score were calculated and presented for different age groups of both the sexes and class group and presented in Table 5.18-5.33 (Chap.V). The separate Tables for DIQ scores in classified forms for all age groups and sex-wise were also worked out and presented in Table 5.34- 5.41 (Chap.V).

(vii). Distribution of Deviation IQ of the sample.

The following Table 10 presents the age-wise distribution of deviation IQs of the entire sample 3000 . It is observed that the Mean and SD of every age-group of the present

[4]H.E. Garrett: *Statistics in Psychology and Education*; Vakils FefferAnd Simons Ltd, Bombay1966 P-458

study was very close to 100 and 16. The Mean and S.D.for the entire sample of 3000 pupils were found to be 99.64 and 16.01 respectively. This shows that the process of standardization adopted in the present study was quite satisfactory.

Table 10: Age-wise Distribution of DIQs of the total sample No =3000

DIQ	13yrs	14yrs	15yrs	16yrs	17yrs	Total
50-55	0	0	0	0	0	0
55-60	0	3	1	0	0	4
60-65	2	5	3	5	1	16
65-70	3	13	12	6	1	35
70-75	10	23	40	24	4	101
75-80	22	54	51	47	10	184
80-85	20	69	66	48	13	216
85-90	30	108	89	51	18	296
90-95	30	93	97	80	15	315
95-100	30	117	119	60	19	345
100-105	43	91	96	90	16	336
105-110	37	103	108	56	27	331
110-115	30	63	92	73	9	267
115-120	15	67	56	39	11	188
120-125	13	56	52	22	7	150
125-130	12	38	31	26	7	114
130-135	9	22	21	12	5	69
135-140	3	6	6	12	5	32
140-145	1	0	0	0	0	1
145-150	0	0	0	0	0	0
150-155	0	0	0	0	0	0
155-160	0	0	0	0	0	0
Total	310	931	940	651	168	3000
Mean	99.90	99.58	99.47	99.44	100.89	99.64
SD	16.09	16.07	15.77	16.17	16.46	16.01

(viii). Classification of the Distribution of IQs:

The suggested classification of Revised Standardford-Binet IQs has been followed for the present test (as suggested by Chuahan)[5]. Table 11 presents the classification Deviation Intelligence Quotients of the entire sample.

Table 11: Classification of DIQs of the entire sample No. 3000

DIQ Scores	Total	%	Classification
Below 70	55	1.83	Mentally Defective
70 -79	285	9.50	Borderline Defective
80 -89	512	17.07	Low Average
90 – 109	1327	44.23	Normal/Average
110 – 119	455	15.17	High Average
120 – 139	361	12.17	Superior
140 & above	1	0.03	Very Superior
Total	3000	100.00	

(ix). Stanine Score.

In Stanine scale, raw scores are converted to a nine points scale (ranging from 1-9) with a mean of 5 and SD of 1.96 (approximately 2). The raw scores are transformed into the Stanine scale by organizing them in frequency distribution and then giving the percentage of each Stanine score points according to the normal distribution curve

Tables of Stanine scores:

The limits of the Stanine were calculated by using the following formula probability curve (Sharma)[6]. For example, Mean was 55.43 and SD 14.34 in the total sample of the present test.

[5] S.S.Chauhan : *Advanced Educational Psychology* ; Vikas Publishing House Pvt. Ltd. 1982 P -294

[6] R.A. Sharma: *Essential of Measurement in Education & Psychology*, Surya Publication, Meerut, 1995, p.306

$X_5 = M + .25 = 55.43 + .25 \times 14.34 = 59.$
$X_4 = M - .25 = 55.43 - .25 \times 14.34 = 52.$
$X_6 = M + .75 = 55.43 + .75 \times 14.34 = 66.$
$X_3 = M - .75 = 55.43 - .75 \times 14.34 = 55.$
$X_7 = M + .25 = 55.43 + 1.25 \times 14.34 = 73.$
$X_2 = M - .25 = 55.43 - 1.25 \times 14.34 = 38.$
$X_8 = M + .75 = 55.43 + 1.75 \times 14.34 = 81.$
$X_1 = M - .75 = 55.43 - 1.75 \times 14.34 = 30.$

By using the above formula, Stanine norms for each raw score were calculated and presented in Table No. 5.18 to 5.33 (Chap.V).

(Appendix 2 C)

ANSWER SHEET

VERBAL GROUP TEST OF INTELLIGENCE FOR 14 TO 16 + YRS.

NAME :_____ AGE :_____

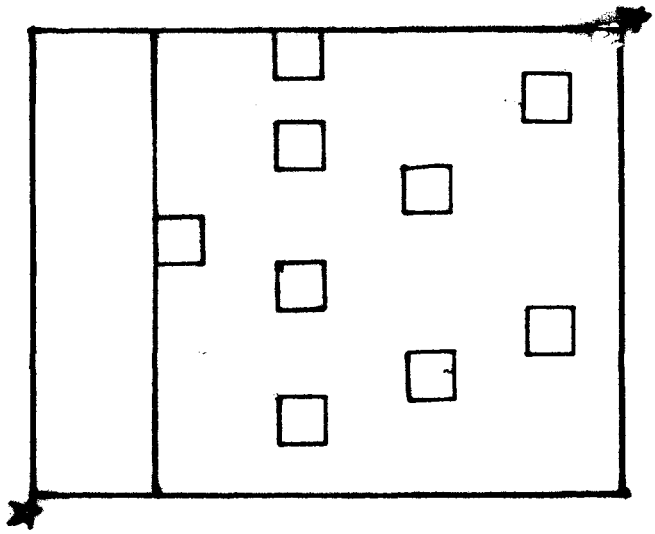
CLASS :_____ ROLL NO.:_____ SECTION :_____

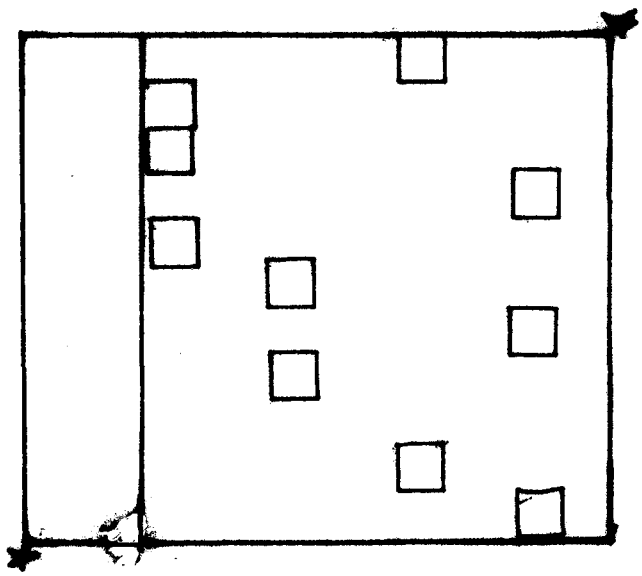
SCHOOL :_____

SEX : M/F R/U LOCALITY: _____

DATE :_____ CODE : _____

Stencil I





TEST – 1

Entirna

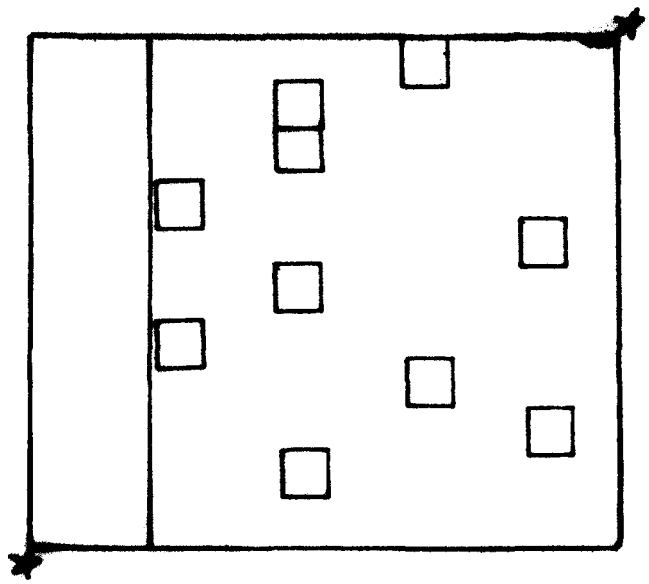
Page 3 (Practice Example)	Page 4 Test Problems				
1. A B C ~~D~~	1	A	B	C	D
	2	A	B	C	D
2. A B C D	3	A	B	**C**	D
(Mark a X on B)	4	A	B	C	D
	5	A	B	C	D
	6	A	B	C	D
	7	A	B	C	D
	8	A	B	C	D
	9	A	B	C	D

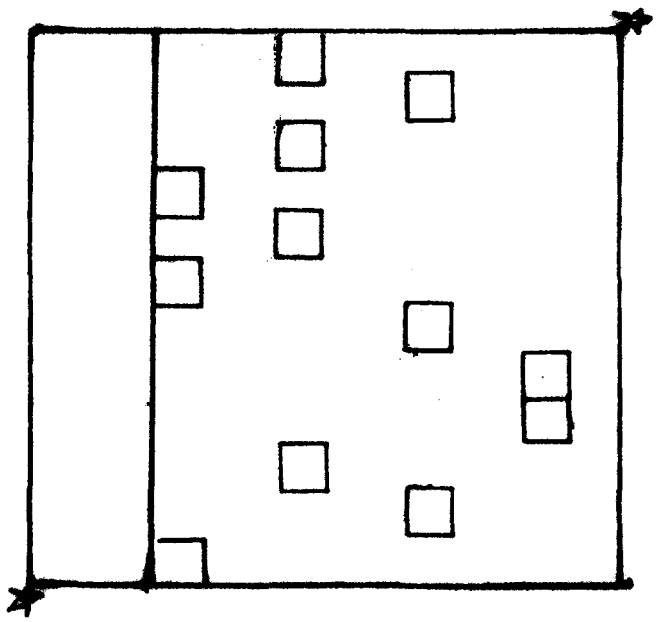
TEST – II

Entirna

Page 5 (Practice Example)	Page 6 Test Problems				
1. ~~A~~ B C D	1	A	B	C	D
	2	A	B	C	D
2. A B C D	3	A	B	**C**	D
(Mark a X on B)	4	A	B	C	D
	5	A	B	C	D
	6	A	B	C	D
	7	A	B	C	D
	8	A	B	C	D
	9	A	B	C	D
	10	A	B	C	D
	11	A	B	C	D

Stencil II





TEST – III

Entirna

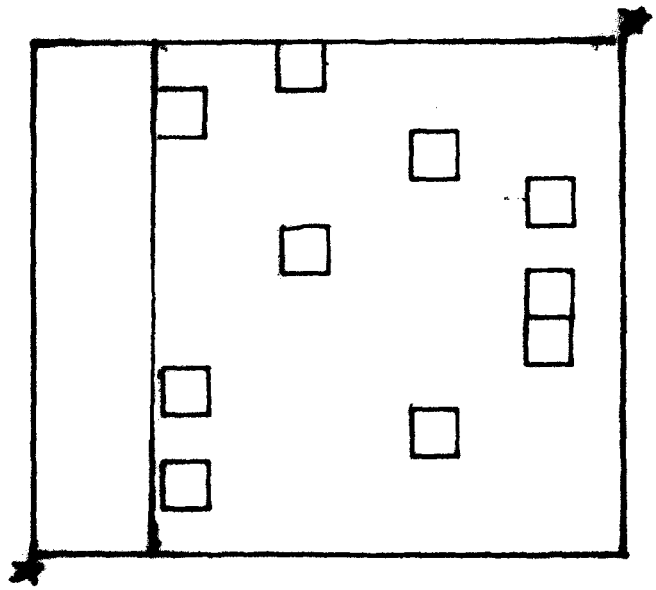
Page 7 (Practice Example)		Page 8 Test Problems			
1. A B C ~~D~~	1	A	B	C	D
	2	A	B	C	D
2. A B C D	3	A	B	**C**	D
(Mark a X on A)	4	A	B	C	D
	5	A	B	C	D
	6	A	B	C	D
	7	A	B	C	D
	8	A	B	C	D
	9	A	B	C	D
	10	A	B	C	D

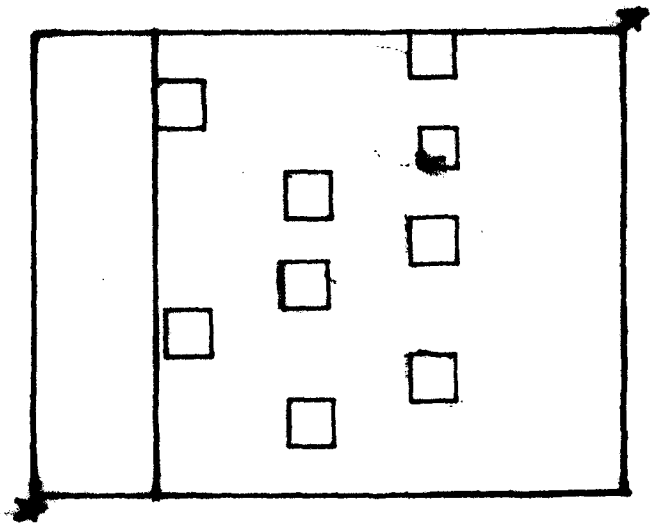
TEST – IV

Entirna

Page 9 (Practice Example)		Page 10 Test Problems			
1. A B ~~C~~ D	1	A	B	C	D
	2	A	B	C	D
2. A B C D	3	A	B	**C**	D
(Mark a X on D)	4	A	B	C	D
	5	A	B	C	D
	6	A	B	C	D
	7	A	B	C	D
	8	A	B	C	D
	9	A	B	C	D
	10	A	B	C	D
	11	A	B	C	D
	12	A	B	C	D

Stencil III





TEST – V

Entirna

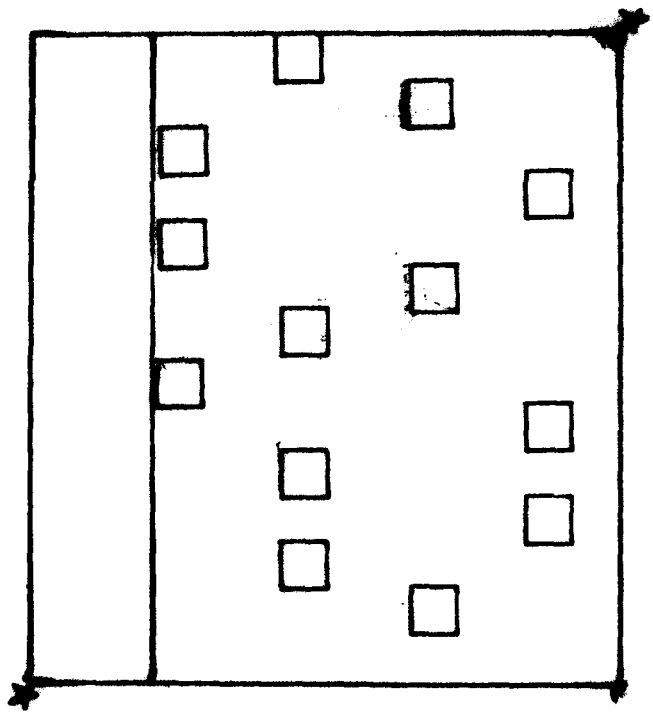
Page 11 (Practice Example)		Page 12 Test Problems			
1. A ~~B~~ C D	1	A	B	C	D
	2	A	B	C	D
2. A B C D	3	A	B	**C**	D
(Mark a X on D)	4	A	B	C	D
	5	A	B	C	D
	6	A	B	C	D
	7	A	B	C	D
	8	A	B	C	D
	9	A	B	C	D
	10	A	B	C	D

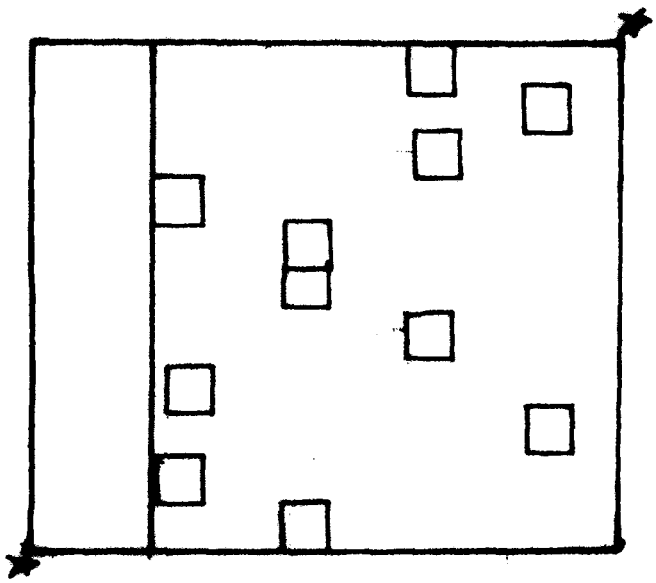
TEST – VI

Entirna

Page 13 (Practice Example)		Page 14 Test Problems			
1. A ~~B~~ C D	1	A	B	C	D
	2	A	B	C	D
2. A B C D	3	A	B	**C**	D
(Mark a X on B)	4	A	B	C	D
	5	A	B	C	D
	6	A	B	C	D
	7	A	B	C	D
	8	A	B	C	D
	9	A	B	C	D

Stencil IV





TEST – VII

Entirna

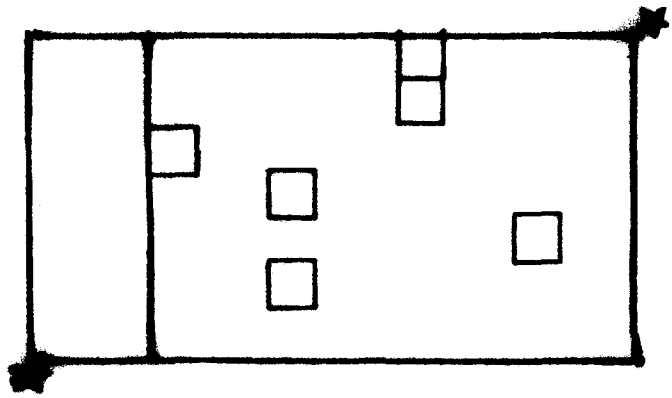
Page 15 (Practice Example)	Page 16 Test Problems			
1. A B ~~C~~ D	1	A	B	C	D
	2	A	B	C	D
2. A B C D	3	A	B	**C**	D
(Mark a X on D)	4	A	B	C	D
	5	A	B	C	D
	6	A	B	C	D
	7	A	B	C	D
	8	A	B	C	D
	9	A	B	C	D
	10	A	B	C	D
	11	A	B	C	D
	12	A	B	C	D
	13	A	B	C	D

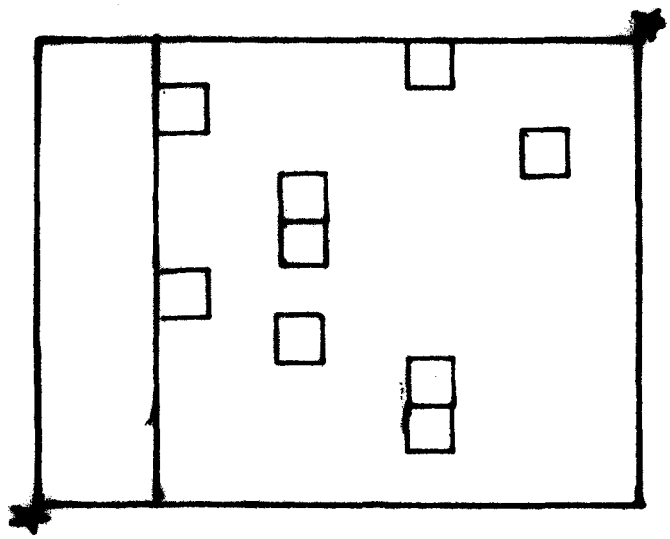
TEST – VIII

Entirna

Page 17 (Practice Example)	Page 18 Test Problems			
1. ~~A~~ B C D	1	A	B	C	D
	2	A	B	C	D
2. A B C D	3	A	B	**C**	D
(Mark a X on B)	4	A	B	C	D
	5	A	B	C	D
	6	A	B	C	D
	7	A	B	C	D
	8	A	B	C	D
	9	A	B	C	D
	10	A	B	C	D
	11	A	B	C	D

Stencil V





TEST – 1X

Entirna

Page 19 (Practice Example)		Page 20 Test Problems			
1. A ~~B~~ C D	1	A	B	C	D
	2	A	B	C	D
2. A B C D	3	A	B	**C**	D
(Mark a X on D)	4	A	B	C	D
	5	A	B	C	D
	6	A	B	C	D

TEST – X

Entirna

Page 21 (Practice Example)		Page 22 Test Problems			
1. A ~~B~~ C D	1	A	B	C	D
	2	A	B	C	D
2. A B C D	3	A	B	**C**	D
(Mark a X on D)	4	A	B	C	D
	5	A	B	C	D
	6	A	B	C	D
	7	A	B	C	D
	8	A	B	C	D
	9	A	B	C	D

TEST NO.	1	2	3	4	5	6	7	8	9	10	TOTAL
SCORING											

(Appendix 2 D)

SCORING KEY

Test-I
1.- B
2. -D
3. -B
4. -C
5. -A
6. -B
7. -D
8. -C
9. -B

Test-II
1.- C
2. - A
3. - A
4. - D
5. - A
6. - B
7. - D
8. - B
9. - A
10.-C
11.-D

Test-III
1.- C
2. - B
3. - B
4. - A
5. - D
6. - B
7. - A
8. - C
9. - D
10.-B

Test-IV
1. - B
2. - C
3. - B
4. - A
5. - B
6. - A
7. - C
8. - D
9. – D
10.-B
11.-C
12.-A

Test-V
1. - B
2. - A
3. - C
4. - D
5. - B
6. - D
7. - D
8. - A
9. - C
10.-A

Test-VI
1. - C
2. - A
3. - C
4. - B
5. - C
6. - B
7. - A
8. - C
9. - B

Test-VII
1. - B
2. - C
3. - A
4. - D
5. - A
6. - C
7. - B
8. - A
9. - D
10.-B
11.-D
12.-B
13.-C

Test-VIII
1. - C
2. - D
3. - C
4. - A
5. - B
6. - B
7. - C
8. - A
9. - D
10.-A
11.-B

Test-IX
1. - C
2. - C
3. - A
4. - B
5. - D
6. - B

Test-X
1. - C
2. - A
3. - D
4. - B
5. - B
6. - A
7. - B
8. - C
9. - C

Appendix – 3

T. M. No. 458715

Dr. G. C. Ahuja *(Mysore)*

Resuable Booklet

of

G G T I

(English Version)

Points to Remember

A. Do not open or turn any page of this booklet until you are told to do so.

B. Do not make any mark in this booklet and handle it with care.

C. Answers are to be written on the separate answer-sheet Provided.

D. Place this booklet to your left and the answer-sheet to your right.

E. On your separate answer-sheet, write your name and other required informations in the proper spaces.

Estd. 1971 (0562) 364926

NATIONAL PSYCHOLOGICAL CORPORATION

4/230, KACHERI GHAT, AGRA – 282 004 (U. P.) INDIA

GENERAL INSTRUCTIONS

1. There are eight tests in this booklet. Each test will be taken one by one. Necessary instructions for marking the answers are given and explained with the aid of practice examples. be sure that you understand how to work out the problems.

2. Mark all your answers on the ANSWER SHEET only, and at the appropriate space meant for each test against the same serial number of each test-problem.

3. Work quickly, but try not to make mistakes. Each test is to be finished within the prescribed time. Do not waste time on any one problem, if it is difficult for you, leave it and proceed further. If you finish a test before time, revise your answers but do not turn the page till you are instructed to do so.

4. If you have at any time marked a wrong answer, encircle it and mark the other answer. Do not waste time in using rubber.

5. For each test you will be instructed when to begin and when to stop. At the expiry of the time-limit, when you are instructed to stop, put down your pencil or pen immediately adn turn over the page.

6. Get your doubts cleared before the start of each test, but once the test starts, you are not allowed to ask anything.

7. Do not make any mark in this TEST BOOKLET.

8. All these instructions are to be very strictly observed.

[Now look at page number 3]

TEST I

PRACTICE EXAMPLES

EXAMPLES :

S. No.

1. I-F.E.V.

   A. Wife B. Few C. If We D. Five E. Fine

2. I-G-T-H-L

   A. Sight B. Fight C. Light D. Tight E. Right

EXPLANATION :

1. Here four letters are given, which are to be arranged in such a way that every letter should be used. The letters are : I-F-E-V. Now observe the given answers which are marked A, B, C, D and E. The correct answer is 'Five'. From the letters I-F-E-V, only 'Five' can be formed, which is at 'D'. Look at the ANSER SHEET for TEST I (Practice Examples in the first column at the space meant for page 3 of the Test Booklet) against Serial Number 1, a cross mark (like the Multiplication Sign x) is made on D.

2. The Correct answer is at 'C'. Mark it yourself. In the ANSWER SHEET against Serial Number 2, make a cross (x) on C.

HOW TO MARK THE TEST PROBLEMS :

You have to make a cross (x) on any of the five answers which are : A, B, C, D and E, where you make a cross (x) that would be considered your answer. Put one cross mark only, otherwise, you would not be given any credit. Make a cross against the same Serial Number of the Test Problem on the ANSWER SHEET only.

FOR TEST I, WHERE TO MARK :

You have to mark on the ANSWER SHEET at the space meant for TEST I PROBLEMS AT TEST BOOKLET PAGE 4.

NUMBER OF PROBLEMS AND TIME-LIMIT

You are to answer 9 Test Problems in FOUR Minutes.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST I

TEST PROBLEMS

S. No.

1. H-I-E-S-M-I-F-C

A.	B.	C.	D.	E.
Semicircle	Mischief	Knife	Scientific	Handkerchief

2. A-T-L-E-C-B-S-O-N

A.	B.	C.	D.	E.
Stable	Table	Subtraction	Capable	Constable

3. T-U-A-C-P-U-N-T-I-O-N

A.	B.	C.	D.	E.
Station	Recapitulation	Punctuation	Repetition	Television

4. H-G-T-I-H-E

A.	B.	C.	D.	E.
Eight	Highest	Tiger	Height	Tight

5. G-E-N-A-L-A-G-U

A.	B.	C.	D.	E.
Gauge	Luggage	Old Age	Language	Longitude

6. C-T-A-D-I-N-O-O-M-M-O-A-C

A.	B.	C.	D.	E.
Commodity	Recommendation	Accommodation	Declatation	Communication

7. N-O-P-I-S-R

A.	B.	C.	D.	E.
Piston	Prime	Prisoner	Pioneer	Prison

8. R-E-N-A-T-S-I-G-U

A.	B.	C.	D.	E.
Singer	Signature	Singular	Restaurant	Resignation

9. E-D-E-I-N-D-E-N-P-T-N

A.	B.	C.	D.	E.
Dependent	Development	Independent	Implement	Intruduction

STOP HERE

TEST II

PRACTICE EXAMPLES

EXAMPLES :

S. No.					
1.	A. Blade	B. Razor	C. Axe	D. Knife	E. Crow
2.	A. Iron	B. Silver	C. Vegetable	D. Gold	E. Copper
3.	A. Monday	B. July	C. Tuesday	D. Friday	E. Sunday

EXPLANATION :

1. In the first example, look at all the five words. Out of these five, four words are related to each other in some way, but there is one such work which is absurd and has nothing to do with the other four words. As you know that : Blade, Razor, Axe and Knife are instruments, but the word Crow which is at 'E' has nothing to do with these. Now look at the ANSWER SHEET for TEST II (Practice Eamples in the first column at the space meant for page 5 of the Test Booklet) against Serial Number 1, a cross mark (x) is made on E.
2. Similarly, the work Vegetable at 'C' is not related to the remaining four words. Mark it your self. Against Serial Number 2, make a cross (x) on C.
3. Mark it yourself. Against Serial Number 3, make a cross (x) on B.

FOR TEST II WHERE TO MARK :

You have to mark on the ANSWER SHEET at the space meant for TEST II PROBLEMS AT TEST BOOKLET PAGE 6.

NUMBER OF PROBLEMS AND TIME-LIMIT

You are to answer 20 Test Problems in FOUR Minutes.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST II

TEST PROBLEMS

S. No.					
1.	A. Cow	B. Horse	C. Donkey	D. Pigeon	E. Buffalo
2.	A. Delhi	B. Bombay	C. Calcutta	D. New York	E. Madras
3.	A. Brother	B. Uncle	C. Grand Mother	D. Niece	E. Servant
4.	A. Labourer	B. Lawyer	C. Doctor	D. Professor	E. Engineer
5.	A. Scholar-ship	B. Prize	C. Freeship	D. Needy	E. Award
6.	A. Discus-sion	B. Lecture	C. Debate	D. Speech	E. Soliloquy
7.	A. Indian	B. Japanese	C. Russian	D. American	E. Bengali
8.	A. Century	B. Gross	C. Enough	D. Score	E. Dozen
9.	A. Building	B. Mansion	C. Resid-ence	D. Bunga-low	E. Den
10.	A. India	B. Pakistan	C. England	D. Goa	E. China
11.	A. English	B. Mathem-atics	C. Hindi	D. French	E. Latin
12.	A. Photo	B. Snap	C. Reflec-tion	D. Portrait	E. Picture
13.	A. Explain	B. Relate	C. Speak	D. Sing	E. Reveal
14.	A. Leg	B. Knee	C. Toe	D. Ankle	E. Palm
15.	A. Classfe-llow	B. Colleague	C. Compa-nion	D. Coworker	E. Neighbour
16.	A. Article	B. Kind	C. Category	D. Grade	E. Class
17.	A. Knife	B. Sword	C. Dagger	D. Gun	E. Razor
18.	A. Godown	B. Stable	C. Meadow	D. Garage	E. Store
19.	A. Sailor	B. Passen-ger	C. Mahout	D. Driver	E. Pilot
20.	A. Favour	B. Affection	C. Love	D. Liking	E. Regards

STOP HERE

TEST III

PRACTICE EXAMPLES

EXAMPLES :

S. No.

1. Shoe is to Foot, as Cap is to :

   A. Hand B. Head C. Hat D. Cloth E. Uniform

2. To be Rich one must have :

   A. Wealth B. Goodluck C. Friends D. Business E. Locker

3. Train is to Passengers as School is to :

   A. Teachers B. Parents C. Students D. Players E. Naughty

EXPLANATION :

1. Shoe is meant for the Foot, similarly, Cap is for the Head. The word Head is at 'B'. Now look at the Answer Sheet for Test III (Practice Examples in the first column at the space meant for Page 7 of the Test Booklet) against Serial Number 1, a cross mark (x) is made on B.

2. To be Rich, one must have 'Wealth' because, without it no one can be said to be Rich. Mark it yourself. Against Serial Number 2, make a cross (x) on A.

3. The correct answer is at 'C'. Mark it yourself. Against Serial Number 3, make a cross (x) on C.

FOR TEST III WHERE TO MARK :

You have to mark on the ANSWER SHEET at the space meant for TEST III PROBLEMS AT TEST BOOKLET PAGE 8 and 9.

NUMBER OF PROBLEMS AND TIME-LIMIT

You are to answer 20 Test Problems in FOUR Minutes.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST III

TEST PROBLEMS

S. No.

1. Train is to Wheels, as Bird is to :

   A. Air B. Wings C. Flesh D. Bones E. Beak

2. Failure is to Sadness, as Victory is to :

   A. Work B. Happiness C. Player D. Soldier E. Enemy

3. Coal is to Black, as Grass is to :

   A. Animal B. Green C. Meadow D. Nature E. Graze

4. Dog is to Nose, as Elephant is to :

   A. Trunk B. Circus C. Emperor D. Ears E. Teeth

5. Water is to sea, as Sand is to :

   A. Camel B. Desert C. Stone D. Building Material E. Heat

6. Iron is to Heavey, as Cotton is to :

   A. Weight B. Cloth C. Light D. Mill E. Farmer

7. Lock is to Key, as Bottle is to :

   A. Fill B. Label C. Cork D. Shape E. Screw

8. Foot is to Socks, as Hand is to :

   A. Gloves B. Finger C. Ring D. Arm E. Cripple

9. To be a scholar, one must have :

   A. Health B. Library C. Monkey D. Spectacles E. Ability

10. Camera is to photo, as Tap is to :

    A. Pipe B. Metal C. Height D. Water E. Children

(Continued to the next page)

11. Alive is to Awake, as Dead is to :

A. Conscious B. Unconscious C. Brave D. Coward E. Asleep

12. Former is to Later, as Elder is to :

A. Older B. Aged C. Younger D. Next E. Tailor

13. Taxi is to Hire, as House is to :

A. Occupant B. House Tax C. Homeless D. Rent E. Owner

14. Principal is to vice Principal, as Monitor is to :

A. Teacher B. Head Master C. Second Monitor D. Student E. Class

15. Friendship always involves :

A. Courtesy B. Enthusiasm C. Contention D. Agreement E. Co-operation

16. Theatre is to Spectators, as Police Station is to :

A. Constable B. Inspector C. Gentleman D. Court E. Accused

17. Blood is to veins, as Pencil is to :

A. Lead B. Write C. Rubber D. Pen E. Eye

18. Copying in the Examination Hall is an act of :

A. Kindness B. Bravery C. Foolishness D. Entertainment E. Indiscipline

19. Beautiful is to Ugly, as Love is to :

A. Handsome B. Parents C. Enjoy D. Hate E. Soul

20. Hair is to Head, as Finger is to :

A. Hand B. Body C. Palm D. Thumb E. Point

STOP HERE

TEST IV

PRACTICE EXAMPLES

EXAMPLES :

S. No.

1. How many pencils can be bought for Rs. 3, if each pencil costs 30 Ps. ?

   A. 20 B. 15 C. 1 D. 25 E. 10

2. There are three packets of biscuits. Each packet contains one biscuit more than the other in order. In the first packet, there are 22 biscuits. How many biscuits are there in the third packet ?

   A. 28 B. 24 C. 23 D. 20 E. 21

EXPLANATION :

1. Each pencil costs 30 Ps. and there are three rupees, or we may say 300 Ps. Thus 10 pencils can be bought. The correct answer is at 'E'. Look at the Answer Sheet for Test IV (Practice Examples in the first column at the space meant for page 10 of the test booklet) against Serial Number 1, a cross mark (x) is made on E.

2. Each biscuit packet contains one biscuit more than the other, and the first packet contains 22 biscuits. Thus the second packet would contain 23. Similarly, the third packet would contain 24. the correct answer is at 'B'. Mark it yourself. Against Serial Number 2, make a cross on B.

FOR TEST IV WHERE TO MARK :

You have to mark on the ANSWER SHEET at the space meant for TEST IV PROBLEMS AT TEST BOOKLET PAGE 11.

NUMBER OF PROBLEMS AND TIME-LIMIT

You are to answer 6 Test Problems in FOUR Minutes.

NOTE–For Test IV, no calculations are to be shown anywhere.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST IV

TEST PROBLEMS

S. No.

1. In an Arithmetic test, a student attempted 6 questions and secured 60 percent marks. How many questions did he miss ?

   A. 6 B. 8 C. 4 D. 12 E. 2

2. If a piece of cloth 10 metres long will shrink to 7 metres when washed how many metres long will a 40 metres long cloth be after shrinking ?

   A. 21 B. 20 C. 24 D. 28 E. 35

3. In which of the following ways could 192 pens packed ?

   A. 17 boxes with 16 pens each

   B. 14 boxes with 13 pens each

   C. 28 boxes with 19 pens each

   D. 16 boxes with 12 pens each

   E. 12 boxes with 11 pens each

4. A boy sold his pen and with that amount purchased 4 pencils for 19 Ps. each. He had a balance of 24 Ps. with him. For how many Rs. & Ps. did he sell his pen ?

   A. 1.50 B. 1.00 C. 0.90 D. 2.20 E. 2.00

5. Three students utter a whole number each. Each speaks the square of the other in order, but the number remains the same. What was such number ?

   A. 3 B. 16 C. 27 D. 0.1 E. 1

6. How many oranges can be bought for Rs. 5 at the rate of 2 for 25 Ps. ?

   A. 20 B. 100 C. 40 D. 10 E. 5

STOP HERE

TEST V

PRACTICE EXAMPLES

EXAMPLES :

	SAME	OPPOSITE	NEITHER
S. No.	S	O	N
1. Sit .....Stand	?	?	?
2. Look ..... See	?	?	?
3. Yes .....No	?	?	?
4. Go .....Sorry	?	?	?
5. Fast .....Quick	?	?	?

EXPLANATION :

1. Sit means the opposite of stand. Look at the Answer Sheet for Test V (Practice Examples in the first column at the space meant for page 12 of the Test Booklet) against Serial Number 1, a cross is made on O (Meaning Opposite).
2. Look means the same as See. There fore, against Serial Number 2, a cross is made on S (Meaning Same).
3. Yes means the opposite of No. mark it your self. Against Serial Number 3, make a cross on O (Meaning Opposite).
4. Go means neither the Same, nor the Opposite of Sorry. Mark it yourself. Make a cross against Serial Number 4, on N (Meaning that the pair of words is neither the Same nor the Opposite, that is, it is Neither).
5. Mark it yourself. You have to make a cross against Serial Number 5 on S (Meaning Same).

FOR TEST V WHERE TO MARK :

You have to mark on the ANSWER SHEET at the space meant for TEST V PROBLEMS AT TEST BOOKLET PAGE 13.

NUMBER OF PROBLEMS AND TIME-LIMIT

You are to answer 40 Test Problems in FOUR Minutes.

Note : Remember that if pair of words is Same, you have to make a cross on S. If it is Opposite, then on O. If it is neither Same, nor Opposite, then on N.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST V

TEST PROBLEMS

S. No.

1. Broad .....Narrow
2. Victory .....Defeat
3. Net .....Neck
4 Vanish .....Disappear
5 Quality .....Stretch
6 Excellent .....Splendid
7. Ancient .....Modern
8. Recite .....Ring
9. confused .....Puzzled
10. Declare .....Announce
11. Organ .....Ounce
12. Spy.....Invert
13. Pardon .....Forgive
14. Pyre .....Petrol
15. Clarity .....Military
16. Mingle .....MIx
17. Queer .....Strange
18. Mend .....Repair
19. Danger .....Risk
20. Vanquish.....Root

S. No. (Continued)

21. Satisfied .....contended
22. Fresh .....Stale
23. Confess .....Oral
24. Diminish .....Lessen
25. Lend .....Borrow
26. Maximum .....Mature
27. Relate .....Narrate
28. Retain .....Keep
29. Frank.....Filthy
30. Permit .....Prohibit
31. Harsh .....Severe
32. Perplex .....Puzzle
33. Dejected .....Depressed
34. Generous .....Liberal
35. Exile .....banish
36. Prestige .....Reputation
37. Breadth .....Width
38. Humble .....Meek
39. Obvious .....Evident
40. Omit .....Exit

STOP HERE

TEST VI
PRACTICE EXAMPLES

EXAMPLES :

PASSAGES :

A. Character consists in little acts honourably done. We should build it up by doing well our daily duties and forming good habits.

B. Through newspaper we come to know what is happening not only in our country, but all over the world. In short, it brings the picture of the whole world before our eyes.

C. Socrates resolved never to make a show of his temper. He believed that an angry man was just like a beast.

PRACTICE EXAMPLES : (Questions based on the above passages.)

S. No.

1. The word 'Temper' here means :
   A. Ship B. Fever C. Voice D. Anger E. Tongue
2. The most suitable title for the first Passage 'A' is :
   A. Good habits B. Character C. Honor D. Duty E. Little acts
3. To what does Socrates compare an angry man ?
   A. Beast B. Human being C. Tree D. Shadow E. An empty show

EXPLANATION :

1. Here you have to answer questions which are based on the above passages. This question has been taken form passage 'C'. According to it, the meaning of the word 'Temper' is 'Anger', which is at 'D'. Look at the ANSWER SHEET for TEST VI (Practice Examples in the first column at the space meant for page 14 of the Test Booklet) against Serial Number 1, a cross is made on D.
2. The correct answer is at 'B'. Mark it yourself. Against Serial Number 2, make a cross on B.
3. mark it yourself. The correct answer is at 'A'. You have to make a cross on A.

FOR TEST VI WHERE TO MARK :

You have to mark on the ANSWER SHEET at the space meant for TEST VI PROBLEMS AT TEST BOOKLET PAGE 15 and 16.

NUMBER OF PROBLEMS AND TIME-LIMIT

You are to answer 8 Test Problems in FOUR Minutes.

Note : For Test VI, in the beginning you are given four passages, then eight questions follow. The questions are based on the given passages. First of all read all the four passages and then take questions one and go on marking. Work quickly.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST VI

TEST PROBLEMS

PASSAGES :

A. The real life of India is not in the cities; it is in the homes of the ordinary people; it is in the villages. The cities present only, one side of the picture, but the majority of the people of India live almost on the borderline of starvation.

B. Once a poor widow who had lost her only son came to Buddha and prayed to him to bring her dead child back to life. The holy man, touched by the great sorrow of the poor woman, said, "There is only one medicine that can restore your son to life. Bring me a handful of rice form a house where death has never taken place."

C. Cheerfulness and health go hand in hand. The healthy are cheerful and those who are cheerful are also found healthy. The singing birds fill us with pleasure. Objects of nature like fountains, lakes and rivers, also produce pleasing ideas in our minds. Therefore, everything in the universe is a source of joy.

D. Our ancestors had great difficulty in obtaining books. Ours is what to select. We must be careful what we read. There are indeed, books and books, and there are books which Lamb said, are not books at all. Bacon remarked to an unfortunate author, "I will lose no time in reading your book." Others are more than useless, and poison the mind with suggestions of evil. Few perhaps realise how much the happiness of life, and the formation of Character depend on a wise selection of books we read.

TEST PROBLEMS (QUESTIONS BASED ON THE ABOVE PASSAGES)

S. No.

1. What did Buddha ask the woman to bring ?

   A. Wood B. Child C. Rice D. Gold E. Death

2. What request did she make to Buddha ?

   A. To bless her with a child

   B. To kill her also

   C. To give her plenty of wealth

   D. To make her son alive again

   E. To give life to her husband

(GO ON TO THE NEXT PAGE)

3. The statement, "There are books which are not books at all" means :
   A. These are useful books
   B. The authors of these books are dead
   C. These are not books
   D. These are holy books
   E. These books contain filthy matter
4. Where do we find the real picture of the Indian people ?
   A. In the films
   B. In the nature
   C. In the hospitals
   D. In the villages
   E. In the cities
5. The word 'Restore' means :
   A. Birth B. Alive C. Store D. Chemist E. Bring back
6. Our fore-fathers faced difficulty in :
   A. Reading books
   B. Writing books
   C. Getting books
   D. Selling books
   E. Selecting books
7. 'The cities represent only an incomplete picture'. Which word or words have been used to express an incomplete picture ?
   A. Narrow
   B. Full
   C. One side of
   D. Half
   E. Ordinary people
8. The most suitable title for the fourth passage 'D' is
   A. Reading of books
   B. Character and books
   C. Selection of books
   D. Abundance of books
   E. An unfortunate author

STOP HERE

TEST VII

PRACTICE EXAMPLES

EXAMPLES :

S. No.						
1.	2	4	(?)	8	10	
2.	P	(?)	R	S	T	
3.	10	11	13	16	(?)	25

EXPLANATION :

1. You have to write in the bracket on the ANSWER SHEET the number that has been omitted from the series. Here the number that has been omitted is 6. Look at the ANSWER SHEET for TEST VII (Practice Examples in the first column at the space meant for Page 17 of the Test Booklet) against Serial Number 1, 6 is written in the bracket.
2. Mark it yourself. Against Serial Number 2, write Q in the bracket "(Q)"
3. You would observe that there is a certain order or arrangement. The increase or decrease is in a systematic manner. Look at the following :

The first number is	:	10
The second number is	:	10 plus 1 (11)
The third number is	:	11 plus 2 (13)
The fourth number is	:	13 plus 3 (16)
The fifth number should be	:	16 plus 4 (20)

Mark it yourself. Against serial Number 3, write 20 in the bracket

FOR TEST VII WHERE TO MARK :

You have to write in the bracket on the ANSWER SHEET the number that has been omitted from the series at the space meant for TEST VII PROBLEMS AT TEST BOOKLET PAGE 18.

NUMBER OF PROBLEMS AND TIME-LIMIT

You are to answer 12 Test Problems in FOUR Minutes.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST VII

TEST PROBLEMS

S. No.										
1.	101	(?)	121	131	141					
2.	63	56	49	(?)	35	28				
3.	1	7	13	19	(?)					
4.	2	9	(?)	23	30					
5.	11.9	10.8	9.7	8.6	(?)					
6.	Z-A	Y-B	X-C	W-D	(?)					
7.	D	H	(?)	P	T					
8.	P	R	T	V	(?)					
9.	119	102	85	68	(?)					
10.	3	4	5	10	11	12	17	18	19	(?)
11.	1	4	2	8	3	(?)	4	16		
12.	25	35	44	(?)	59					

TEST VIII

PRACTICE EXAMPLES

EXAMPLES :

S. No.

1. He who teaches in a school is called :

   A. Student B. Teacher C. Officer D. Scholar E. Professor

2. The saying 'Think before you speak' means :

   A. Silence is golden.

   B. Don't speak and be quiet.

   C. Slow and steady wins the race.

   D. Think over it, after you have spoken.

   E. Before starting to speak, think over it.

3. He who steals is called :

   A. Fool B. Poor C. Clever D. Thief E. Begger

EXPLANATION :

1. Here you have to select the best out of the five given answers. In a School, it is the Teacher who teaches. The correct answer is at 'B'. Look at the ANSWER SHEET for TEST VIII (Practice Examples in the first column at the space meant for page 19 of the Test Booklet) against Serial Number 1, a cross is made on B.

2. The correct answer is at 'E'. Mark it yourself. Against Serial Number 2, make a cross on E.

3. Mark it yourself. You have to make a cross on D.

FOR TEST VIII WHERE TO MARK :

You have to mark on the ANSWER SHEET at the space meant for TEST VIII PROBLEMS AT TEST BOOKLET PAGE 20 and 21.

NUMBER OF PROBLEMS AND TIME-LIMIT

You are to answer 20 Test Problems in FOUR Minutes.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

TEST VIII

TEST PROBLEMS

S. No.

1. He who tells a lie is called :

   A. Lawyer B. Disobedient C. Honest D. Liar E. Naughty

2. He who writes books is called :

   A. Teacher B. Publisher C. Scholar D. Author E. Steno

3. He who is always in time is called :

   A. Punctual B. Optimist C. Lazy D. Serious E. Good

4. He who is new to a certain place is called :

5. A. Constable B. Thief C. Robber D. Prisoner E. Foreigher

6. That which remains unaffected by water is called :

   A. Water Proof B. Umbrella C. Raincoat D. Plastic E. Leather

7. A woman whose husband is not alive is called :

   A. Widower B. Unfortunate C. Married D. Widow E. Maiden

8. He who slaughters animals is called :

   A. Cruel B. Animal C. Non-vegetarian D. Customer E. Butcher

9. The saying 'A word for the wise and rod for the foolish' means :

   A. All men are wise

   B. Give desirable treatment to all

   C. For a wise man only a hint would do, but not for the fool who is subject to punishments.

   D. It is no use to cry over spilt milk.

   E. Fools are wiser than the wise

10. He who does not believe in God is called :

    A. Thiest B. Preacher C. Athiest D. Worried E. Prophet

(GO ON TO THE NEXT PAGE)

5. One who was locked up in jail is called:
A. Constable B. Thief C. Robber D. Prisoner
E. Foreigner

11. When we think, we :
A. Dram B. Sing C. Concentrate D. Sit E. Sleep

12. He who serves in a hotel is called :
A. Cook B. Waiter C. Manager D. Servent E. Tray

13. He who ploughs the land is called :
A. Worker B. Landlord C. Labourer D. Villager E. Peasant

14. The saying 'Nip the evil in the bud' means :
A. Honesty is the best policy
B. We should avoid doing bad acts
C. Evil is in the bud
D. Nip the bud in the evil
E. To Stop bad actions at the initial stage.

15. A gentleman is one who does not :
A. Go to see pictures
B. Like others
C. Inflict pain on others
D. Marry
E. Steal

16. The saying 'A rolling stone gathers no moss' means :
A. We should not shirk work
B. Moss cannot be collected by the stones
C. We should move from place to place
D. If we keep shifting, we cannot achieve much
E. Change is the law of nature

17. The voice that can be heard is called :
A. Audible B. Clear C. Loud D. Visible E. Low

18. A child born after the death of his father is called :
A. Innocent B. Poor C. Unfortunate D. Orphan E. Posthumous

19. He who compiles words in the printing press is called :
A. Pressman B. Compositor C. Manager D. Client E. Builder

20. That which is hated is called :
A. Injurious
B. Painful
C. Disfigured
D. Contemptible
E. Disastrous

GENERAL INSTRUCTIONS

1. There are eight tests in this booklet. Each test will be taken one by one. Necessary instructions for marking the answers are given and explained with the aid of practice examples. be sure that you understand how to work out the problems.
2. Mark all your answers on the ANSWER SHEET only, and at the appropriate space meant for each test against the same serial number of each test-problem.
3. Work quickly, but try not to make mistakes. Each test is to be finished within the prescribed time. Do not waste time on any one problem, if it is difficult for you, leave it and proceed further. If you finish a test before time, revise your answers but do not turn the page till you are instructed to do so.
4. If you have at any time marked a wrong answer, encircle it and mark the other answer. Do not waste time in using rubber.
5. For each test you will be instructed when to begin and when to stop. At the expiry of the time-limit, when you are instructed to stop, put down your pencil or pen immediately adn turn over the page.
6. Get your doubts cleared before the start of each test, but once the test starts, you are not allowed to ask anything.
7. Do not make any mark in this TEST BOOKLET.
8. All these instructions are to be very strictly observed.

~~[Now look at page number 3]~~

Appendix - 4.

IPAT

Test of "g" : CULTURE FAIR

Scale 2, Form A

Prepared by R. B. Cattell and A. K. S. Cattell

Name _____ Sex _____
First Last (Write M or F)

Name of School (or Address) _____

Today's Date _____ Grade (or Class) _____

Date of Birth _____ Age _____
Month Day Year Years Months

Test	Score	Remarks
1		
2		
3		
4		
		Total Score

M. _____

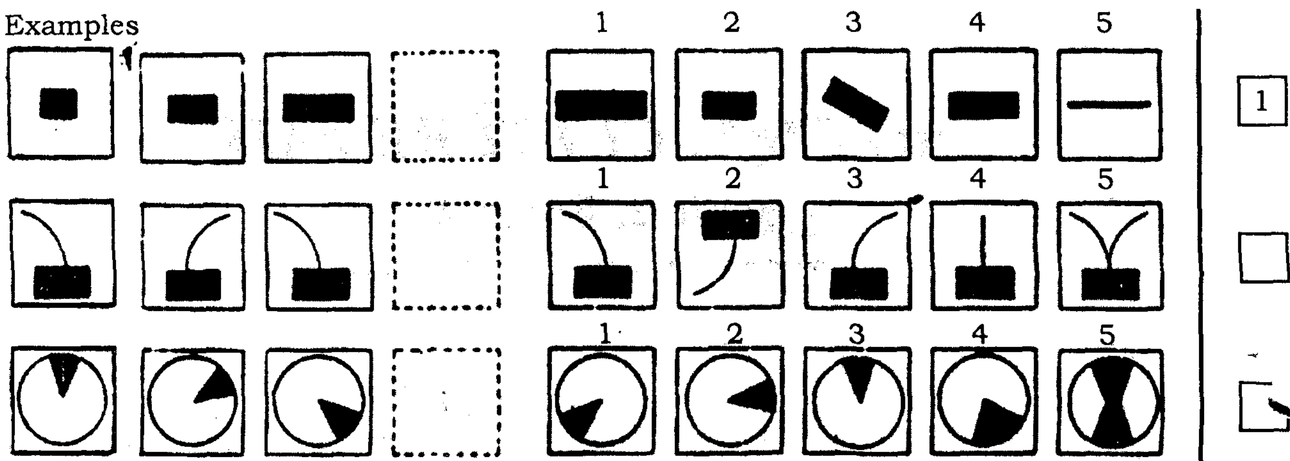
Q. _____

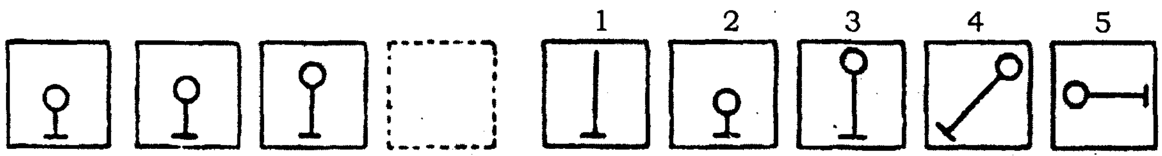
Do not turn the page until told

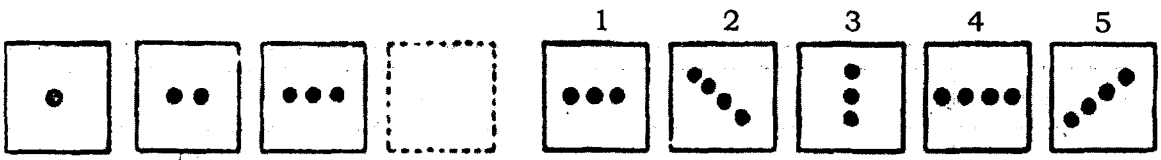
TEST 1

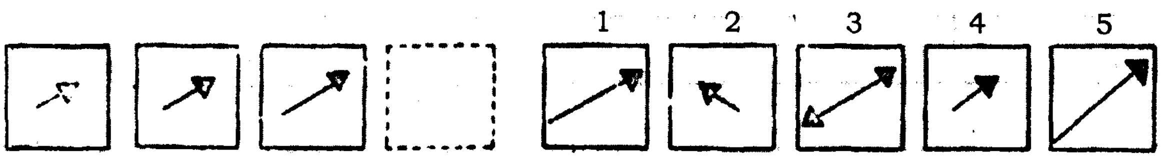
Answers

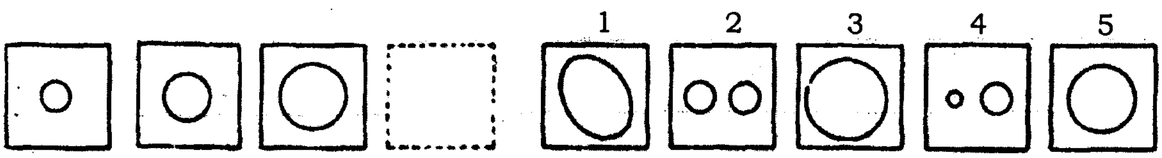
Examples

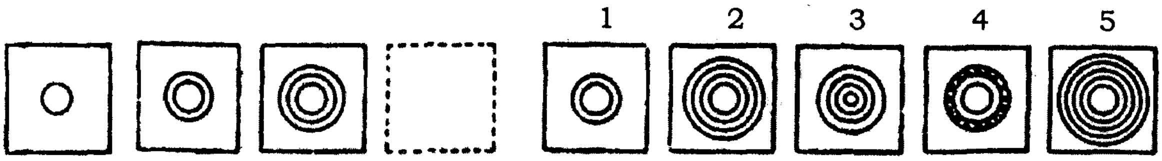


1. 

2. 

3. 

4. 

5. 

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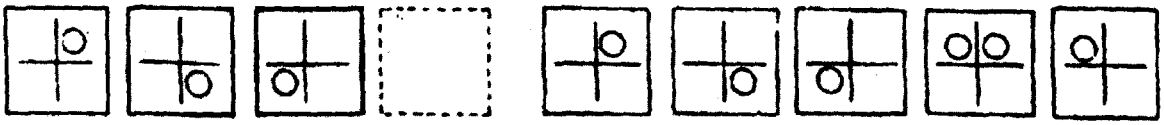
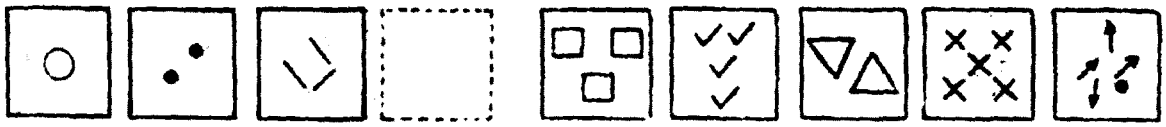
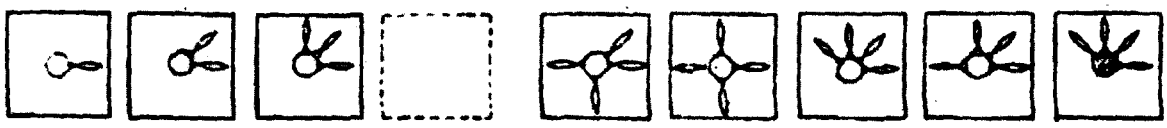
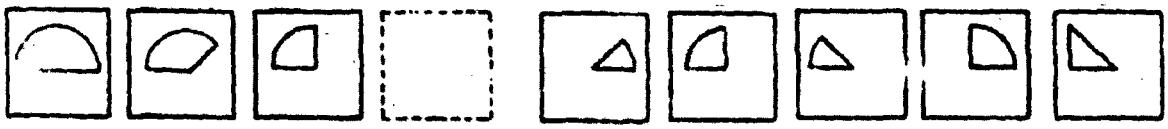
Answers

6. 

7. 

8. 

9. 

10. 

11. 

12. 

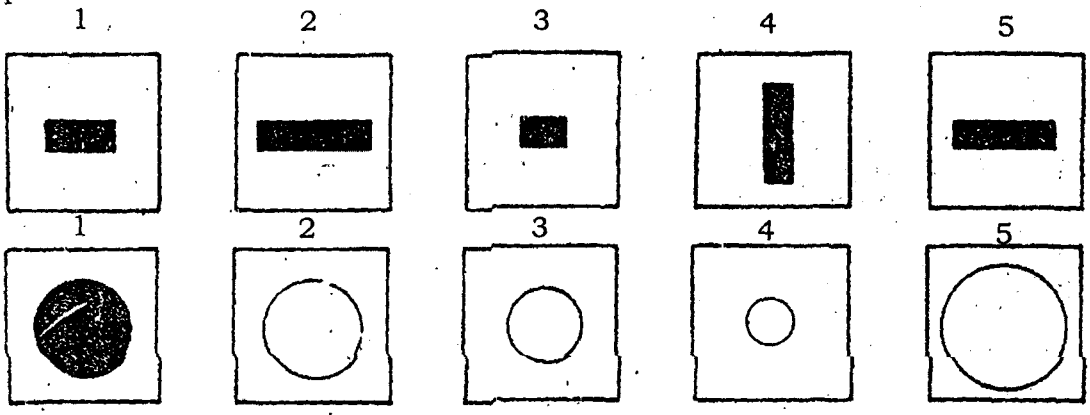
End of Test 1

2.

STOP! Do not turn the page until told to do so.

TEST 2

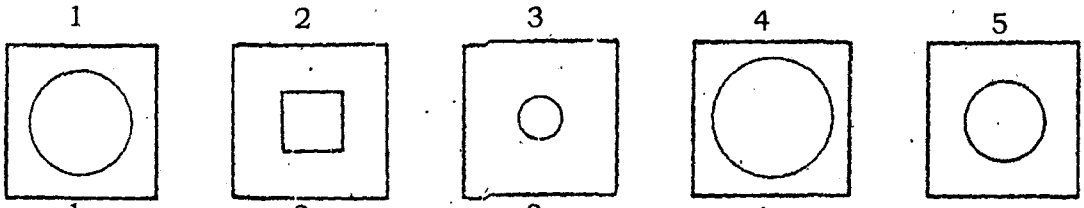
Examples



Answers

4

1.



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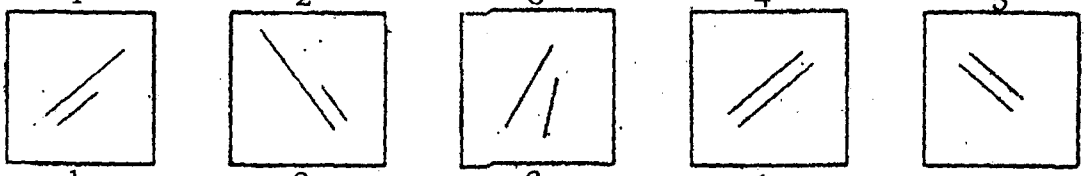

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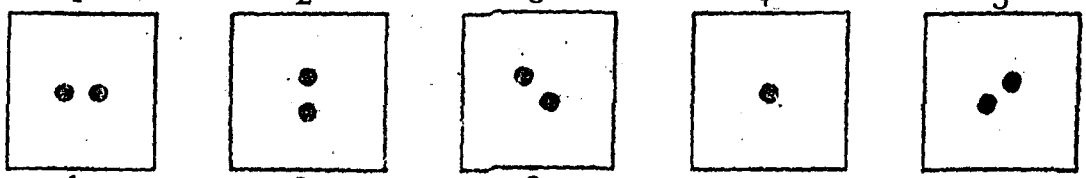

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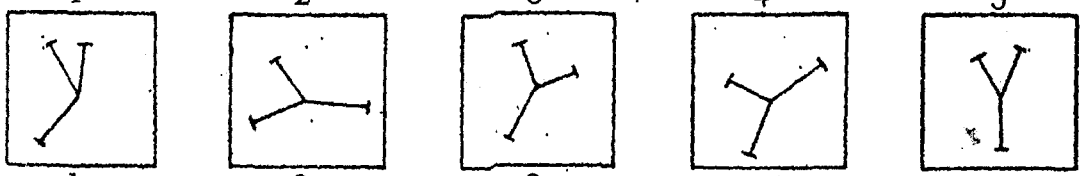

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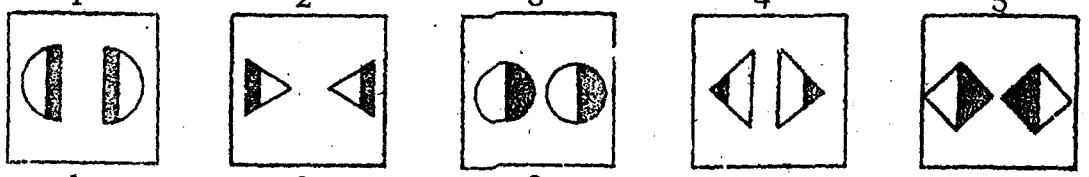

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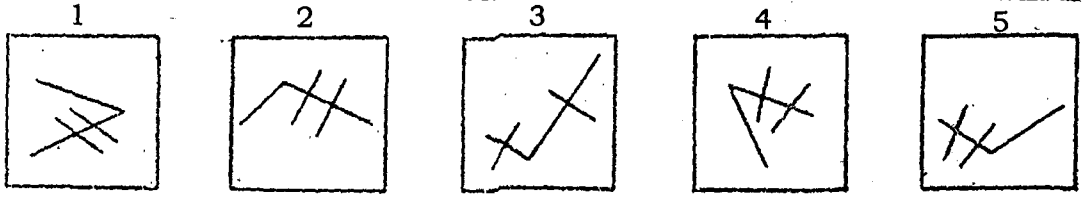
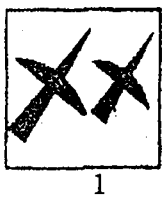
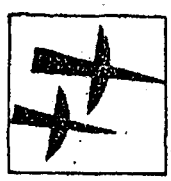
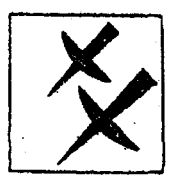
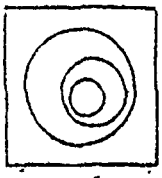
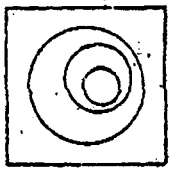
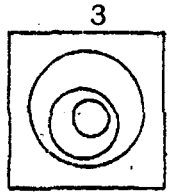
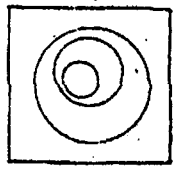
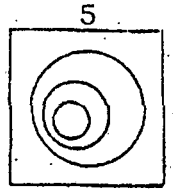
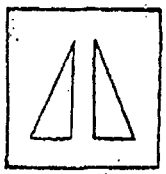
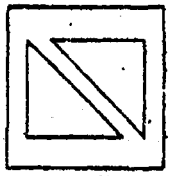
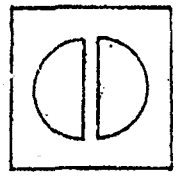
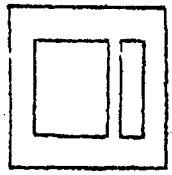
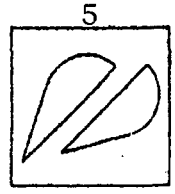
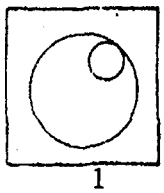
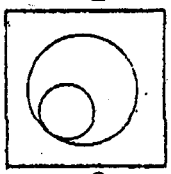
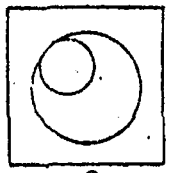
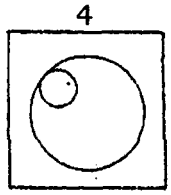
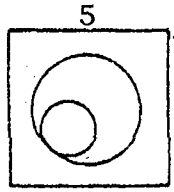
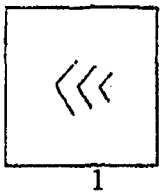
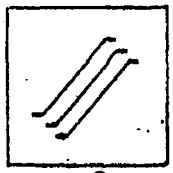
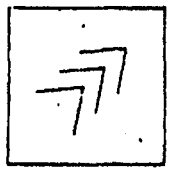
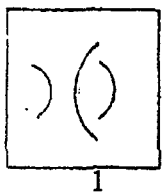
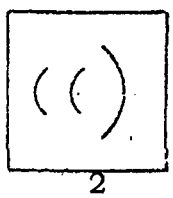
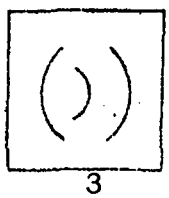
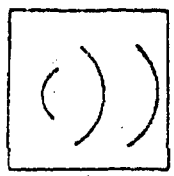
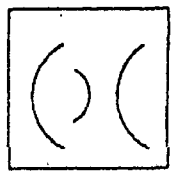
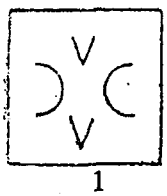
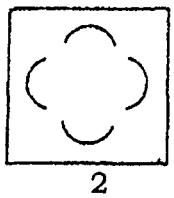
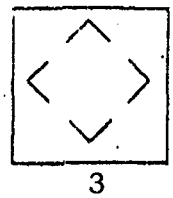
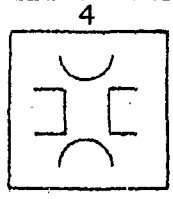
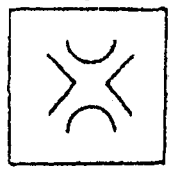
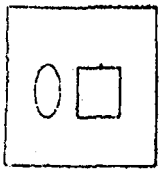
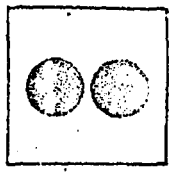
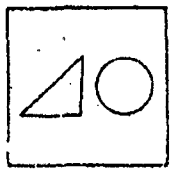
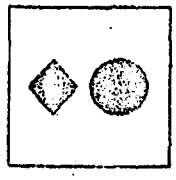
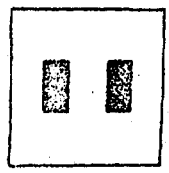


3.

Go on to the next page.

Answers

	1	2	3	4	5	
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						

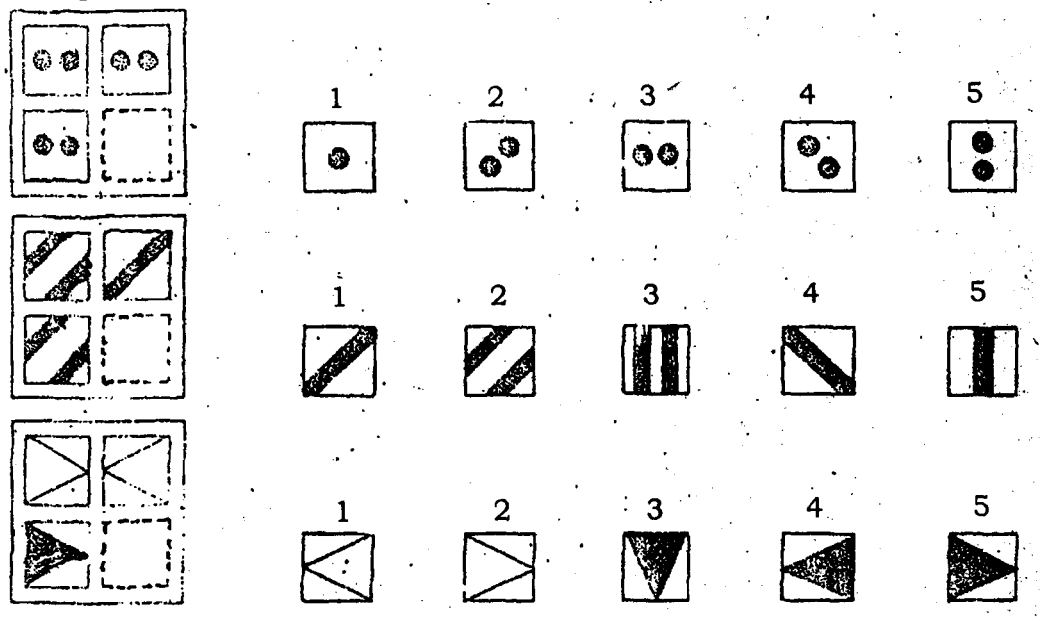
4.

End of Test 2

STOP! Do not turn the page until told to do so.

TEST 3

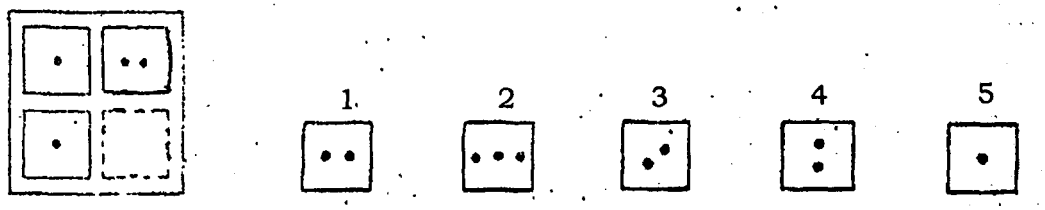
Examples



Answers

3

1.



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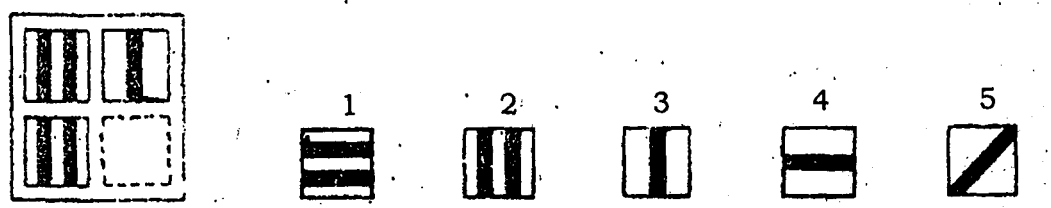

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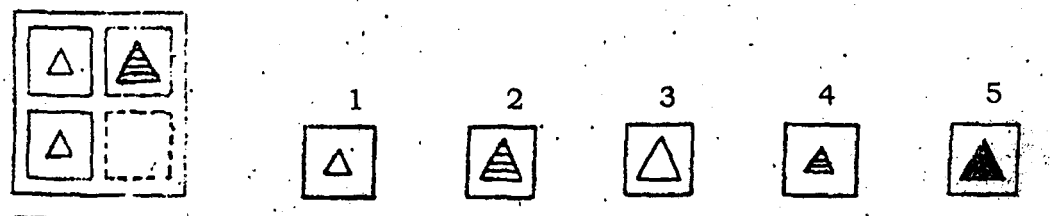
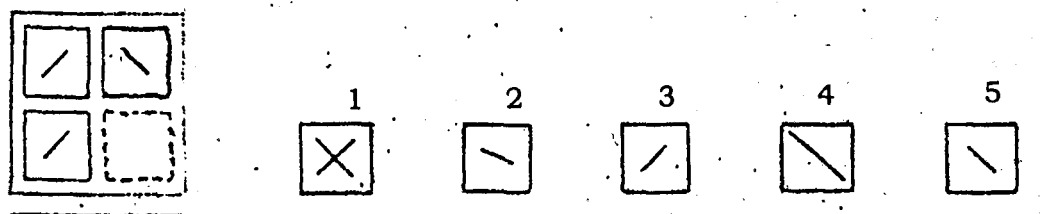


4.



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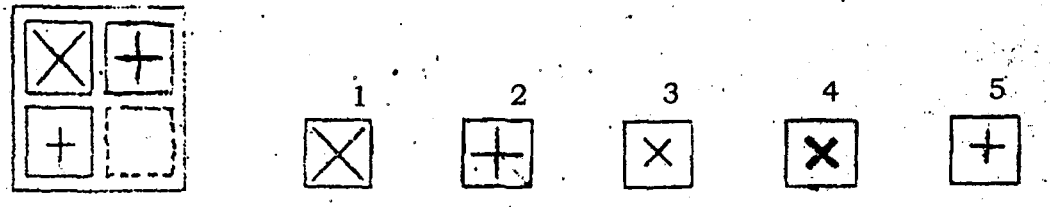
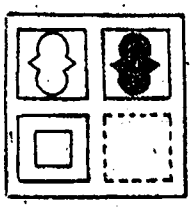


5.

Go on to the next page.

Answers

6. 

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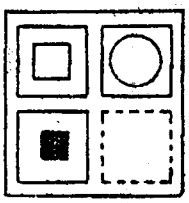
7. 

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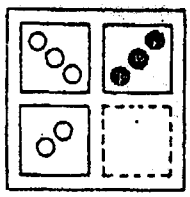
8. 

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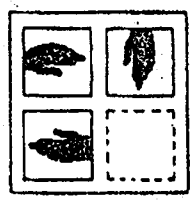
9. 

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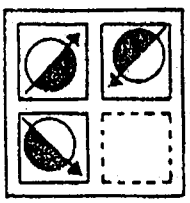
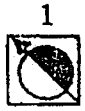
10. 

1 
2 
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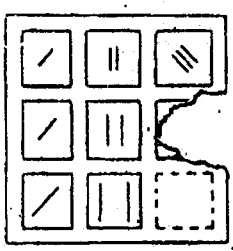
4 
5 

11. 

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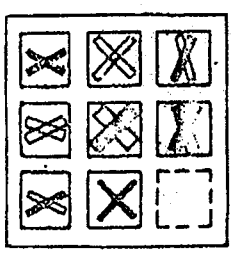
12. 

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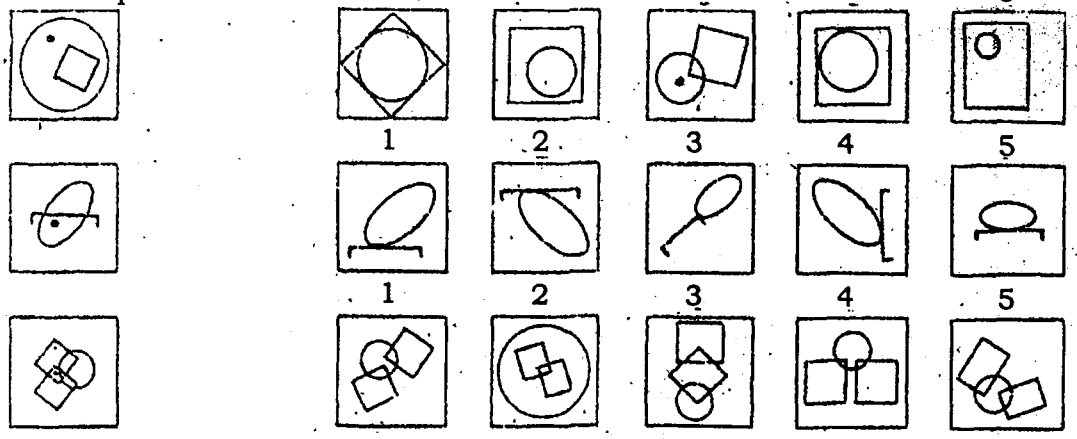
6.

End of Test 3

STOP! Do not turn the page until told to do so.

TEST 4

Examples



Answers

Examples: 3

1.

2.

3.

4.

5.

6.

7.

8.

End of Test 4

(Appendix -5)

Rating Scale for Estimating the Content Validity of the Test under Construction

The investigator constructed a rating scale to estimate the content validity of the intelligence test under construction. It contained seven items as given below:

1. How far the items listed in the test are representative of intellectual abilities of children?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

2. Do you think that items listed in the test under reference would be able to measure the level of Intelligence of children?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

3. To what extent have the test items covered the various components of intellectual abilities of children under different sub-tests?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

4. Are the items suitable for school going children of the age group 14-16+ (Cl..VIII-X) in terms of the content presented?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

5. Are the items suitable for school-going children of the age group 14-16+ (Cl..VIII-X in terms of items difficulties?

2	3	4	
To a great extent	To quite an extent	To some extent	Not at all

6. Are the items suitable for school-going children of the age group 14- 16 + (Cl. VIII-X) in terms of the language used?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

7. To what extent are the test items related to the Khasi community?

1	2	3	4
To a great extent	To quite an extent	To some extent	Not at all

(Appendix 6)

List of Experts consulted in the Rating Scale for Content Validity (Appendix-6)

1. Prof. (Mrs) K.S.Lyngdoh: Dept. of Education, NEHU Shillong
2. Prof. (Mrs.) A. Kharmalki: Dept. of Khasi, NEHU Shillong.
3. Dr. (Ms) C. Nongbri: Reader Dept. of Education. NEHU
4. Dr.(Mrs.) B. Bazley Rymbai : Lecturer, Dept. of Education, NEHU Shillong
5. Dr.(Sr.) P. Kharakor : Rtd. Principal, Saint Mary's College
6. Dr.(Sr.) B. Shadap : Principal, Saint Mary's, Teacher Education, shillong
7. Dr. (Mrs) V. Kharmawphlang: Principal, College Teacher Education, (PG).Shillong
8. Dr. (Ms.) Dr.(Mrs.) E.R.Basawiawmoit, Head Dept.Of Education Saint Mary's College.
9. Dr. (Mrs) I. Lapang: Synod College, Shillong
10. Dr. (Ms.) R. Dkhar: Sr. Lecturer, Shillong College.
11. Dr.(Mrs.) D. Shullai : Headmistress, 'Tall Pines'H.S. School, Mawlai Mawroh, Shillong
12. Dr (Mrs.) R.N.Tongper: Sr. Lecturer, College Teacher Education, (PG).Shillong
13. Dr. (Mrs.) A. Nongbri: Sr. Lecture, Shillong College
14. Shri. A.Sunn: Joint Director of Elementary and Mass Education, Govt. of Meghalaya.
15. Smit. T.Lyngdoh: Inspector of School, East Khasi Hills, Shillong
16. Smit. T. Marbaniang: Head Dept.Khasi, Saint Mary's College, Shillong
17. Smit. M. War: Sr. Lecturer, Dept. of Education, Saint Mary's College
18. Smit. J.M.Dkhar: Lecturer, DERT, Shillong
19. Smit. F.A. Wahlang: Sr. Lecturer Dept. of Education, Lady Kean College Shillong
20. Miss. R. Lamare: Research Scholar Dept of Education, NEHU, Shillong

Bio-data:

Name: Mrs. WINNIE JOICE SHYLLA

Date of birth: 2nd September 1968

Husband's name: Shri.Bloomingstar Wahlang

Community: Jaintia (ST)

Nationality: Indian

Home adds: Mawroh, Shillong-8, Meghalaya.

Educational details:

Sl No.	Examination	Board	Year	Div.	%
1	HSLC	MBOSE	1983	2nd	51.%
2	P.U (Arts)	NEHU	1985	3rd	41.%
3	B.A. (Pass)	NEHU	1987	Simple	42.%
4	Honours Education	NEHU	1990	2nd	51.%
5	M.A.Edu	NEHU	1992	1st	62.19%
6	B.Ed	NEHU	1993	1st	60.%

Designation: Lecturer in Education (Selection grade)

Institution: Saint Mary's College, Shillong-3, Meghalaya.

Date of Admission (Ph.D): 3rd Oct. 2005

Date of Registration: 16th May 2006