

PART-II AGENDA FOR THE FORTY-FIVE ACADEMIC COUNCIL
MEETING.

(To be read in continuation to item No. 5:2:1-Syllabi for the Three Year Integrated Degree Course)

9. Assamese - At Annexure-I i.e. pages 163-168
10. Bengali - At Annexure-J i.e. pages 169-174
11. Mizo - At Annexure-K i.e. Pages 175-181
12. Psychology-At Annexure-L i.e. pages 182-204
13. Hindi - At Annexure-M i.e. pages 205-212
14. Pol.Science-At Annexure-N i.e. pages 213-236
15. Physics - At Annexure- O i.e. pages 237-294
16. English-At Annexure- P i.e. pages 298-307
17. Geology - At Annexure-Q i.e. pages 308-319
18. Botany - At Annexure- R i.e. pages 320-342
19. Economics- At Annexure-S i.e. pages 343-358
20. Khasi-At Annexure-T i.e. pages 359-361
21. Home Science-At Annexure U i.e. page 362-387
22. Zoology-At Annexure V i.e. pages
23. Education-At Annexure W i.e. pages

TDC Syllabus in Assamese

Annexure - I.

B.A. : M.I.L. : Assamese

(General Compulsory)

1st Paper ; 100 Marks

Part : A

- 1) Poetry - 30 marks : Kabita Manjari
 - (a) Old - (1) Sankardev - Sarat Barnana
(2) Ram Saraswati - Dhritarastra-
Bidur Sambad.
(3) Pitambar Kali - Chitra Lekhar
Pata Nirman
 - (b) Modern-
 - (1) L.N. Bezbarus - Priyatama.
 - (2) C.K. Agarwala - Niyar
 - (3) A.K. Roychowdhury - Garha Kari
Mok Jharudar
 - (4) Nabakanta Barua - Palas.
- 2) Drama - 30 marks.
 - (a) Old - Madhabdev - Chordhara.
 - (b) Modern - Chandradhar
Barua - Meghnad Badh.

Part: B - 40 marks.

- 3) Essay - 15 marks.
- 4) Fesis - 10 marks.
- 5) Grammar - 15 marks.

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B.A. M.I.L. : Assamese

(Compulsory for non-honours Students)

IIInd Paper : 100 marks.

- 1) Short Story : 25 marks : Asamiya Galpa Guccha.
Selected Pieces
 - (a) L.N. Bezbarua - Dhowakhowa
 - (b) L.N. Phukan - Medhi.
 - (c) Roma Das - Achal Taka
 - (d) Bhaben Saikiya - Prahari.
- 2) Novel : 30 marks: Miri Jiyari - Rajanikanta Bordoloi.
- 3) Prose - 45 marks : Sratakar Kathabandha
Selected Pieces :
 - (a) Guru Siswarmani Kanchan Sangjog.
 - (b) Tripurat Madan Puja.
 - (c) Namghosa.
 - (d) Maniram Dewanar Phaci.

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(Assamese)

B.Com. M.I.L. : 100 marks.

1. Asamiya Galpa Guccha : 40 marks
 - (a) Dhowakhowa - L.N. Bezbarua.
 - (b) Nadaram - S.C. Goswami.
 - (c) Chiraj - L.D. Sarma.
 - (d) Dutakiyanot - T.N. Goswami.
 - (e) Kal Patuar Mrittyu - J. Das.
2. Business Correspondence - 15 marks
3. Precis Writings - 10 marks
4. Commercial terms - 15 marks
5. Essay - 20 marks

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5.2 (166)

Elective Assamese

1st Paper - 100 marks

A) Poetry - 50 marks : Kabita Manjari.

Selected Pieces :

Old - (1) Sankardev - Nandotsava

(2) Madhabdev - Tejare Kamala Pati

(3) Durgabar - Maya Ajodhyar Sristi

Modern : (1) Ratna Kanta Barkakati - Biswaharan

(2) Nalinibala Devi - Baram Trishna.

(3) J.N. Dhara - Sonowali Desh

(4) Hem Barua - Mamataarchithi

(5) Hiren Bhattacharya - Mordesh

B) Kumar Haran Karya : Ananta Kanduli - 30 marks.

*C) Rhetoric Prosody : 20 marks.

1) Kavya (Principle, different sub-divisions)

2) Rasa (Principle, different sub-divisions)

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* Books -recommended :

(a) Asamiya Sahityar Saj - Sonapati Dev Sarma.

(b) Sahitya Bidya Parikrama - Tirtha Nath Sarma.

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B.A. Elective Assamese : 100 marks
II nd Paper

A) Drama : (Old and Modern) - 50 marks.

- 1) Kaliya Daman Nat - Sri Sri Sankardev.
- 2) Rupalim * - Jyoti Prasad Agarwala.

B) Prose ; 50 marks (Snatakar Kathbandha)
Selected Pieces :

- 1) Sangkhepe Krishna Lila.
- 2) Ramar Bana Gaman
- 3) Biman Bihar
- 4) Jiwanav Anieya
- 5) Ram Navami Natak

Book Recommended :- Asamiya Natya Sahitya : S.N. Sarma.

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B.A. Elective Assamese III Paper : 100 marks

A. History of Literature - 50 marks

B. History of Language and Grammar :- 50 marks.

1st Half : A Group

History of Literature:

- (a) Asamiya Maukhik Sahitya : Bihugeet, Biyanam, Jikir, Ainam.
- (b) Prak-Sankariyug: Madhav Kandali, Harihar Vipra,
- (c) Sankariyug : Vaishnav and Pachali Sahitya
(Sankardev, Madhavdev, Ananta Kandali, Ram Saraswati, Bhattadeva, Mankar, Durgabor and Pitambar)
- (d) Adhunikyug: Jonakiyug (L.N. Bezbarua, Chandra Kumar Agarwala, Padmanath Gohain Barua, Rajanikanta Bordoloi, Ambikagiri Roychoudhury, Jatin Duara, Nalinibala Dewi)

Books recommended:- (1) Asamiya Sahityar Samikshatmak
Itibritta - Dr. S.N. Sarma.

(2) Asamiya Sahityar Ruprekha

- Dr. M. Neog.

(3) Asamiya Sahityar Dristipat -

- Dr. Hemanta Kr. Sarma.

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III. Paper II Ind Half : B Group : 50 marks

History of Language and Grammar : 30 marks

- (i) Bhasa, Upabhasa (Standard Assamese and it's dailect)
Sabdartha Vijyan (Semantic Variation)
Saldamala (Vocabulary)

Assamese Swaradhani, Vyanjanddhani (their specialities in pronunciation) Dhanir Paribartan (Srutiddhani, Swaragam, Samibhaban, Bisamibhaban, Swarabhakti, Apinihiti)

- 30 marks

(ii) Essay :- 15 marks

(iii) Bhab Samprasaran :- 5 marks.

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Amalendu J.

T.D.C. SYLLABUS IN BENGALI
BA . M.I.L. BENGALI
ELECTIVE BENGALI
Paper-I
100 MARKS

Poetry - 75 marks

1. Charypada :-

Kaya Tarubara Panchabi dala; Bhabanai gohona
gambhir bege bahi; bharati karuna nabi;
Ucha Ucha pabata tahi basai sabari bali;
Mana taru pancha indi tashu saha.

2. Baisna padabali :-

Gharer bahire dante satabar; Kantaka
gari kamala Sama padatal; Esakhi Hamari
Dhukero nahi or; Bahadin pare badhua ele;
Madhava bahut minati kari toi.

3. Brajangana Kabya - Michael Madhusudhan Dutta-

- a) Bangshi-Dhvani b) Mayuri c) Prithibi d) Pratidhvani
e) Usha f) Gobardhan-Giri h) Krshna Chura
i) Nikumjabani j) Sakhi.

4. Sonar Tari - Rabindranath Tagore.

- a) Jeti-Nahi-Diba, b) Basundhara c) Sonar Tari-
d) Baishnab Kabita e) Jhulan f) Atmasamarpan.

5. Grammar - 25 marks

a) Alankar - (Anuprash, Slesh, Jamak, Bakrokti, Upama,
Rupak, Atisayokti, Utprekshya, Bitirik, Apanhuti, Bejostuti,
Samasokti, Savhabokti.)

6. Chanda - Ianpradhan, Dhanipradhan, Sasaghatpradhan.
(with definations)

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T.D.C. SYLLABUS IN BENGALI
B.A. : M.I.L: BENGALI
Paper I (General Compulsory)
100 Marks

Part A

1) Peetry - 30 marks

a) Birangana Kavya - Mickael Madhusudan

a) Duryyadhaner Prati Bhanumati

b) Niladhvajer Prati Jana

c) Lakshmaner Prati Surpanakha

b) Manashi - Rabindranath Tagore

a) Duranta Asha b) Ekal-o-Sekhal

c) Meghdut d) Badhu

2) Prose - 15 marks

Ramalakanter Daptar - Bankim Chandra Chatto Padhyay

a) Manushya Phal b) Basanter Kookil

c) Dheki d) Phukel Bibaha

3) Drama - 15 marks

Sajahan - Dwijendralal Roy

Part B:

Essay & Grammar - 40 marks

a) Essay - 15 marks

b) Precis - 10marks

c) Grammar - 15 marks

(Karak-bibhakti; Samas; Bagbidhi)

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BENGALI

B.A: M.I.L.

Paper II(Compulsory for non-Honours)

100 marks

1. Poetry - 30 marks

a. Sauchita - Naznel Islam (15 marks)

i) Aaj Sristi Sukher Ullashe

ii) Kaudari Hushiar

iii) Manush

iv) Nari

v) Daridra

Contd.....2/-

Bengal
BA: M.I.L. Paper II

- b. Rupashi Bangla - Jibanananda Das (15 marks)
- i) Banglar Mukh Ami dekiachi
 - ii) Abar Ashiba Phire daneshiritir tire
 - iii) Bhije haye ashe meghe e-dupur-chil aka naditir pashe
 - iv) Ai Prithibite ami abasar niye shudu ashiyachi
 - v) Akdin Kuyashar ai mathe amare pabe na keu khuje ar, jani
2. Prose - 40 marks
- a. Lipika - Rabindranath Tagore (20 marks)
- i) Meghdut ii) Akti Chauni iii) Patham Shok
 - iv) Rajputtar v) Tota Kahini
- b. Prarandhe Sangraha - Pramathar Choudhury (20 marks)
- i) Banga Sahitye Navayng ii) Sabuj Patra
 - iii) Birbal iv) Mahabharat -o-Geeta
 - v) Amader Bhasa Sankat
3. Novel - 30 marks
- Anandamath - Baukim Chandra Chattopadhyay

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BENGALI

B.Com : M.I.L. - 100 marks

1. Bichitra Prabandha by Rabindranath Tagore
- Pieces to be read : 40 marks
- a) Chotanagpur
 - b) Library
 - c) Ma - Bhoi
 - d) Paraninda
2. Business correspondence - 15 marks
3. Precis Writings - 10 marks
4. Commercial terms - 15 marks
5. Essay - 20 marks

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ELECTIVE BENGALI
PAPER -II
100 MARKS

Prose

1. Kamatakantir Daptar - Bankim Chandra Chattapadhaya.
a) Biral b) Kamatakanter Jobanbandi c) Eka.
2. Buro Saliker Ghare.ro - Michael Madhusudhan Dutta.
3. Nildarpan - Dinabandhu Mitra.
4. Muktadhara - Rabindranath Tagore.
5. Galpa Guccha - (2nd part) - Rabindranath Tagore
a) Apad b) Atithi c) Durasa d) Nisithi.
6. Srikanta - (1st part) - Saratchandra Chottopadhyaya.
(Six questions are to be answered).

Ref.books:-

1. Kamatakanter Daptar - Dr. Skhetra Gupta.
2. Bangta Nataya Sahityer Itihas - Dr. Ashutosh Bhattacharjee.
3. Rabindra Nataya Parikrama - Upendra Nath Bhattacharjee
4. Rabindra Sahityer Bhumika - Dr. Nihar Ranjan Roy.
5. Saratchandra - Subudh Chandra Sen Gupta.
6. Bangla Sahitye Upanyaser Dhara - Srikumar Bandyopadhaya.

ELECTIVE BENGALI
III rd Paper
(History of Bengali Literature Modern & Language).
100 marks.

1st half (50 marks).

Bangla Sahityer Itihas (Adhunik Yuga).
Gadyariti -O-Prabandha :Bangla gadyer
Suchana parbe patra patrikar Bhumika
(Digdarshan thiki tattwabodhini parjanta),
Srirampur mission-O-fortwilliam kotejer
lekhakgosthi, Rammohan Roy,Vidyasagar,
Pyarichand Mitra, Kaliprasarna Singha,
Bankimchandra, Rabindranath Tagore.

Kavya -O- Kavita -Iswar Gupta,Rangalal,
Madhusudhan,Hemchandra,Navinchandra,
Biharilal,Rabindra Nath.
Natak-Ramnarayan Tarkaratna,Madhusudhan,
Dinabandhu Mitra, Giris Chandra, Rabindra Nath,
Dwijendra Lal Roy.

Upanyasa-O-Chotagalpa-Bankimchandra,
Rameshchandra Dutta,Rabindra Nath,Saratchandra,
Chottapadhaya,Prabhat Kumar Mukhapadhaya.

ELECTIVE BENGALI

IIIrd Paper

IIInd half

Bangla Bhasar Itihas - 30 marks.
Prachin -o -Madhaya Bharatiya Arya Bhasa,
Bangla Bhasar Bivinna Yuger bibartan,
Dhani paribartan; Bangla Sabda Bhandar,
Sadhu Bhasa-O-Chalita Bhasa, Bhasa-O-
Upabhasa. Sabdartha Paribartan
Unseen - 20 marks
(Essay).

BENGALI -MAJOR

4th PAPER

100 MARKS.

Bhasa tatwer Itihas.

1. Sabdartha tatwa
2. Indo-Europeo Bhasa.
3. Prachin Bharatiya Arya
4. Madhya Bharatiya Arya
5. Nabya Bharatiya Arya
6. Bangla Saradhawni 3 Benjandhani Samuher
Uccharan Sthan.

Ref. Books:-

1. Bhasar Itibritiya - Dr. Sukumar Sen.
2. Bangla Bhasa tatwer Itihas -Dr. Krishnapada Goswami
3. Bangla Bhasa Parikrama - Pareshchandra Mazumder
4. Bangla Bhasar Adhunik tatwa-O-Itikatha-
Dr. Dwijendra Nath Basu
5. Bangla Bhasa - Parbaticharan Bhattacharjee.
6. Bangla Bhasar Itihas - Ananda Mohan Basu.

BENGALI-MAJOR

5th Paper.

Literary Theory and Criticism

Marks 100

1. Dhawani
2. Rasa
3. Sabdarthatatwa
4. Tragedy
5. Comedy
6. Mahakavya(Epic)
7. Rabindra Sahitya tatwa.

Ref. Books.

1. Kabya Jigyasa - Atul Gupta.
2. Kabya Mimangsa - Bishnupada Bhattacharjee
3. Sahitya Pather Bhumika - Subodh Chandra Sen Gupta.
4. Sahityer Swarup- Rabindra Nath Tagore.
5. Aristotle - Sadhan Bhattacharjee,
Bhavani Sanga.

BENGALI -MAJOR

Paper -VI

Full Marks - 100

1st Half - 50 marks.

1. Cultural patterns and History of Literature
Bangalir Itihas - Dr.Nihar Ranjan Roy.
2. Obscure religious cults of Bengal-Dr.Sashibhusan Das Gupta.
3. Cultural History of Bengal -Atul Sur.

IInd half - 50 marks.

1. Bangla Sahityer Itihas - 50 marks.

Charyya pada, Baru Chandidas.

Anubad Sahitya -Ramayana (Krittbas)

Mahabharata (Kabindra Parameswar, Kasiram Das)

Bhagvat (Matardhar Basu),Mangal Kabyer

(Bijoy Gupta, Narayan Deb, Ketakadas Khimananda),

Chandi Mangal (Dwiya Madhav, Mukundaram),

Dharmamangal(Rupram Chakraborty, Ghanaram

Chakraborty) Sibayan (Rameshwar Bhattacharjee)

Sri Chaitanyer Jiban-O-Jibane Sahitya

(Brindaban Das, Loochan Das, Jayananda,

Krishnadas Kabiraj) Vaisnabpadabali (Vidyapati)

Chandidas, Balaramdas, Jyanadas,

Gobindadas, Roy Sekhar).

Madhaya juga theke Adhunik juger uttaran

Parba, Kabigan, Baulgan, Lalan Fakir, Daulat Kazi,

Alaol, Sakta padavali (Ramprasad, Kamalakanta)

Bharat Chandra (Annada mangal)

Ref.Books.

1. Bangla Sahityer Sankhitta Itibritta - Dr.Ashit Kumar
Bandyopadhyaya.
2. Bangla Sahityer Itikatha -Dr. Bhudev Choudhury.
3. Puratan-O-Adhunik Bangla Sahityer Itihas -
Dr.Skhitra Gupta.

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BENGALI -MAJOR

Paper -VI

Full Marks - 100

BENGALI - MAJOR

PAPER -VII

FULL MARKS - 100

Epics, Ballads & Modern Poetry

FIRST HALF - 50

Epics & Ballads

1. Maimansingha Gitika-

a) Malua Mahua Pala b) Chandrabati Upakhyān.

2. Chandimangal Kavya - Mukundaram Chakraborty-

a) Kalketur Upakhyān.

3. Meghadvadh Kavya - Michael Madhusudhan Dutta

Chaturtha O. Nabam Sarga

2nd HALF - 50

Modern Poetry

1. Punascha - Rabindra Nath Tagore.

10 Selected pieces.

2. Adhunik Kavita Sankalan -Ed.by Budhadev Basu

(a) Champa. (b) Jaksher Nibedan (c) Dukhabadi.

(d) Banalata Sen (e) Saswati, (f) Sangati

(g) Ami Kavi Jata Kamarer (h) Bandir Bandana

(i) Sit Ratir Prarthana (j) Ghor Sawar.

3. Sanchita - Nazrul Islam

(a) Bidromi (b) Samyabadi (c) Fariyad (d) Amar Kaifiyat

(e) Daridrya.

BENGALI - MAJOR

PAPER - VIII

FULL MARKS - 100

Novel & Drama

1st HALF (FICTION) Novel

50 MARKS

1. Kapalkundata - Bankim Chandra Chattopadhyaya

2. Ghare Baire - Rabindra Nath Tagore.

3. Grhadaha - Sarat Chandra Chattopadhyaya.

2nd HALF

50 MARKS

1. Kapalkundata - Bankim Chandra Chattopadhyaya

2. Ghare Baire - Rabindra Nath Tagore

3. Grhadaha - Sarat Chandra Chattopadhyaya.

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BENGALI - MAJOR

Paper - VIII

2nd HALF

Drama - 50 marks.

1. Krshnakumari - Maechael Madhusudan Dutta
2. Prafulla - Giris Chandra Ghosh.
3. Raktakarabi - Rabindra Nath Tagore.

Ref.Books.

1. Bangla Sahityer Upanyaser Dhara - Dr. Srikumar Bandyopadhaya
2. Sarat Chandra - Subodh Sen Gupta.
3. Bankim Chandra - Subodh Sen Gupta.

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PROPOSAL TO REVISE THREE YEAR DEGREE COURSE (ELECTIVE)
IN MIZO AND PROPOSED SYLLABUS FOR BACHELOR OF ARTS HONOURS IN
MIZO SUBJECT.

In keeping with the distribution of marks and Syllabus pattern for the Three Year Degree Course to be introduced from 1993 session, the Board of undergraduate Studies in Mizo, in its meeting on November 25, 1992, at Aizawl, has revised the syllabus in Mizo to be offered as Elective and Major Indian Language (M.I.L).

The BUGS in Mizo has also proposed starting of Honours Course in Mizo at the B.A. level. The proposed Syllabus for the Courses to be followed in the Elective and B.A (Major), along with the two Papers in M.I.L (Mizo), are placed for consideration of the Academic Council for approval. The syllabus for the Courses are designed in keeping with the development in literary works in Mizos.

DISTRIBUTION OF PAPERS AND MARKS (Elective and Major)

PAPER I-POETRY AND DRAMA 100 (Poetry 60+ Drama 40)

PAPER II: PROSE AND FICTION 100 (Prose 60 + Fiction 40)

PAPER III : LITERARY TRENDS AND HISTORY OF MIZO

LITERATURE (40 + 60)

PAPER IV : LITERARY THEORY AND CRITICISM 100 (in English)

PAPER V : DRAMA 100

PAPER VI : POETRY 100

PAPER VII : NOVEL 100

PAPER VIII : ANTHOLOGY OF ENGLISH LITERATURE AND
LANGUAGE 100 (60 + 40)

B.A. Pass Course = PAPER I, II & III

B.A.(MAJOR) = PAPER I - VIII

PAPER I 100 Marks

A. Poetry = 60 marks

B. Drama = 40 marks

A. POETRY

1. Kum 1900 hmalam hlate (Songs before 1900)

i) Salulam Zai - Chang 5

ii) Chawngchen Zai - Chang 5

iii) Chai Hla - Chang 5

iv) Laltheri Zai - Chang 5

v) Saikuti Zai - Chang 5

vi) Hrangchhawni Zai - Chang 5

vii) Awithangpa Zai - Chang 5

2. Kum 1920- 1920 Chhung hlate (Songs in the period 1900-1920)
 - i) Tlang thim chhak lam kei ka en ang -Zosaphluia (D.E Jones)
 - ii) Thlalera ka vahvaih chhung hian - Liangkhaia
 - iii) Ka lungchhia hi man pek kha hriain- Zosapthara (E.Rowland)
3. Kum 1920-1940 Chhung hlate (between 1920-1940)
 - i) Pialrai ka ngai - Patea
 - ii) Lei lai puan ropui- C.Z.Huala
 - iii) Tlang a dang lung a leng - Saihnuna
4. Kum 1940-1965 Chhung hlate (between 1940-1965)
 - i) Ramthar Zai - Chang 5
 - ii) An hril hmar tlang hmingthang kan lenna (kaihlek hla)
 - iii) Hmangaihna - Vankhama
 - iv) Leng dun ila- Lalzuithanga
 - v) Vanhnuai Khuavel-
5. Kum 1965 hnulam hlate(After 1965)
 - i) Kan hun tawng zingah - Suakliana
 - ii) Ka pianna Zawlpawpui - Rokunga
 - iii) Thangtharte hnena thuchah- Biakliana
 - iv) Tho la, ding ta che - V.Thangzama

B. DRAMA/LEMCHAN

1. Sangi Inleng - Lalthangfala Sailo
2. Dr. Faustus - Christopher Marlowe (translated)

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PAPER II 100 marks

A. Prose- 60 marks

B. Fiction- 40 marks

A. PROSE/Thu

1. Thlirtu- Kaphleia
2. Zofaten kawng kan bove- Zikpui pa
3. Harsatna - J.Malsawma
4. Rihdil leh Mizoram -Siamkima Khawlhiring
5. Huaissen- Darchhawna
6. Khuai lui ral - Lalzuia Colney
7. Nun hlutna - C.Lalsiamthanga (to be revised)

B. FICTION/Thawnthu phuah

1. Sialton Official - C.Thuamluaia
2. Phira leh Ngurthanpari- Lalzuithanga
3. Pangpar Bawm (translated)- Rev.Rokhuma.

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100 Marks

A. Literary Trends = 40 Marks

B.History of Mizo Literature= 60 Marks

A. LITERARY TRENDS- Joint Authors

Dr. Laltluangliana Khianote
B. Lalthangliana
Dr. R. L. Thanmawia

B. HISTORY OF MIZO LITERATURE Joint Authors:
Darchuailova
Siamthanga
Dr. Laltluangliana Khiangte

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PAPER IV 100 Marks (ENGLISH)

LITERARY THEORY AND CRITICISM

- 1.The Poetics - Aristotle
2.An Introduction to the Study of
Literature - William Henry Hudson

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PAPER V 100 Marks

DRAMA

1. Lawm a kim- Liansailova (Comedy)
2. Lalnu Ropuiliiani-Laltluangliana Khiangte
(Historical Tragedy)
3. Macbeth (translated)- R. Lalrawna (tragedy)
4. Oedipus the REX (translated)- C. Lalsiam-
thanga (Tragedy)
5. Twelfth Night (translated)- R. Thangvunga
(Comedy)

PAPER VI 100 Marks

POETRY

- 1.Epic: i)Hlado- Chang 5
 ii)Bawhla - Chang 5
 iii) Taitesena - Lalkhawliana
 iv)
- 2.Ode: i) Virthlileng- Lalmama
 ii) Thal - Kaphlela
- 3.Elegy: i)Fam an chang ta- Ngurchhawna
 ii)Val leh Hrang an ral- R.L.Kamlala
 iii)Damlai pialral - R.L.Thanmawia
4. Ballad: i) Chhura leh Naa- Chhuana
 ii) Rairahtea- Hrawva
5. Lyric: i)Tlaizawng par- Vankhama iii)Chhawkhlel par-
 ii)Sikni Eng - Zikpuil pa H.Lalringa
6. Satire: i) Leng uchuaki - P.S.Chongthu
 ii)Aw vala, vala- Roliana Ralte
- 7.Narrative: i)Kan ram leh Hnam - J.Liankhuma
 ii)A tak chu khawiahnge- James Dokhuma

PAPER VII 100 Marks

FICTION

- 1.Hawilopari- Biakliana
- 2.Thlahrang- Lalzuithanga
- 3.Nunna kawngthuam pulah- Zikpuil pa
- 4.Thlahleinga Zan- James Dokhuma
- 5.Zawlpala Thlan tlang- Khawlkungi (Revised)

PAPER VIII 100 Marks (ENGLISH)

A.Poetry- 30 marks

B.Prose- 30 marks

C.Language-40 marks

A.POETRY:

- 1.Sonnet 60 Like as the Waves- William Shakespeare
- 2.The Exordium from Paradise lost Book III- John Milton
- 3.Prelude I - William Wordsworth
4. Ode to Autumn - John Keats
5. Shakespeare - Mathew Arnold
6. In Memorium - Lord Tennyson
7. The Second Coming- W.B.Yeats

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B. PROSE:

1. Of Studies- Francis Bacon
2. Happiness- Oliver Goldsmith
3. Miseries of the rich- George Bernard Shaw
4. Can a scientific society be stable- Bertrand Russell.
5. Gandhi Comes- Jawaharlal Nehru

C. LANGUAGE

1. An Outline History of the English Language (eleven Chapters)
- Frederick T. Wood

Further Reading:

1. The Growth and Structure of the English Language-
Otto Jespersen
2. Our Language- Simeon Potter

(N.B. The teaching of the Major papers will, preferably, require literary knowledge and qualifications for the teachers to be recruited to run the major courses may include M.A(English) with literature)

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MIZO (MAJOR INDIAN LANGUAGES)

PAPER I

A.Hla(Poetry)= 40 marks

B.Lemchan(Drama)= 25 marks

C.Thu (Prose)= 35 marks

A.Hla (Poetry)= 40

I PATHIAN FAKNA HLA(Devotional Songs)

1.Aw Lalpa chungnung ber kan fak hle a che- Thanga

2.Ka awm khawhar changin-Zasiama

3.Khawilam mi nge hmanah heng hi- Hrawva

4.Aw Isu, min kai ang che - Rokunga

II.Tunlai Hla (Modern)

1.Valhuaia- Sangliana

2.Sensiari- C.Lalkhawliana

3.Rimawi Ram(Lentupui chawivel..)- Vankhama

4.YMA Hla- V.Thangzama

III. Hlahril (Poem)

1.Dawi ang i dawm ang u- C.Chhuanvawra (Revised version)

2.Falak Rairah- J.Liankhuma

B.LEMCHAN THAWNTHU (Drama) =25

1.As You like it (Shakespeare)-P.L.Liandinga(Translator)

2.Darlalpuii- Lalchungnunga

C.THU (Prose)= 35

1.Chanchinbu kalhmang- R.L.Thanzawna (Revised version)

2.Sumdawna - Dr.H.Lallungmuana (Revised version)

3.Intodelh- Lallungmuana (Revised version)

4.Lehkathawn ziaak dan (Official, Business etc)

PAPER II

A.Thawnthu(Short Story= 25 marks

B.Thu(Prose) = 30 marks

C.Tawng (Language) = 45 marks

A. THAWNTHU TAWI (Short Story)= 25

1.Tumpang chal nge Saithangpuui- James Dokhuma

2.Thunder-bird (Title to be changed)- Vanneihtluanga

B.THU (Prose) = 30

1. Mizo Sakhua - Liangkhaia

2.Mizo Lalte leh an Khua leh tui- R.Vanlawma(Revised version)

3.Ral thah sawngbawl dan- K.Zawla

4.A ruh no no chuakah - Zikpuui pa

5.Rimawi Ram- A.Thanglura

cont-

C.TAWNG (Language)=45

- 1.Tawng Chungchang (Theory of language, general)
- Lalrindiki
- 2.Mizo tawng than danglam dan- Lalthangala Sailo
- 3.Sawifiahna tawngkau-chheh = James Dokhuma
- 4.Mizo tawng tihhausak dan tur- R.Lallianzuala
- 5.Mizo tawng kalhmang (theoretical aspect)
- Laltluangliana Khiangte

(PAPER I AND II WILL BE COMMON FOR B.A(General)/
B.Com(General). B.A(major) will offer PAPER II,
AND B.Com(Major) will have to offer PAPER I.)

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Annexure - L

A meeting of the Board of Under-Graduate Studies in Psychology was being held on 2nd and 3rd November, 1992 in the Committee Room of the Hon. Vice-Chancellor, NEHU, Shillong. The following members were present.

1. Dr. A.N. Jaiswal (in the Chair)
2. Dr. P.K. Vishwas - Member
3. Dr. R.N. Rai - -Do-
4. Mrs. Zokaitluangi - -Do-

Minutes of the BUGS(Psychology) Meeting held on 10th-11th July, 1990 was confirmed.

This Meeting of the BUGS(Psychology) has been called for developing, and constructing the course structure and content(syllabus) in compliance to the directive of the Academic Council of the NEHU vide resolution adopted in the fourtyfour meeting of Academic Council held on 7th and 8th August, 1992.

In view of the above, the Board discussed various dimensions of the course structure in Psychology for Under-Graduate Studies (B.A.) Psychology without major and B.A Psychology with Major) Psychology as an elective subject for B.A.(without Major) has the total allocation of Marks-300 (distributed 100 marks each across First Second and Third Year respectively). B.A.(Psychology) courses (with Major are allocated with 800 marks(in total distributed across Three years : 200 for the First year and 300 each for Second and Third year).

The members present discussed first the matter related to the B.A.(Psychology) course without major. The course structure for this course has been unanimously resolved to recommend as follows:

First Year: Course 101 : General Psychology	Full Marks -75
Course 102 : Practicals	Full Marks -25
Second Year: Course 201 : Developmental Psychology	Full Marks -75
Course 202: Practicals	Full Marks -25
Third Year : Course 301: Abnormal Psychology	Full Marks -75
Course 302: Practicals	Full Marks -25

As per the proposed structure matters related to the content of the various courses(Papers) were discussed unanimously. It was

Contd./.../-

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resolved to recommend to have the course content for B.A. (Psychology) Without Major as in Annexure-'I'.

After finalizing the B.A. (Psychology) Without Major the afternoon session of the first day meeting discussed the course structure for the B.A. (Psychology) With Major. It has been resolved to recommend the course structure for B.A. (Psychology) With Major as the followings :

First Year :	Course 101 : General Psychology	Full Marks -75
	Course 102 : Social Psychology	Full Marks -75
	Course 103 : Practicals	Full Marks -50
Second Year :	Course 201 : Developmental Psychology	Full Marks -75
	Course 202 : Psychological Statistic & Measurement	Full Marks-75
	Course 203 : System and Trends in	Full Marks-75
	Course 204 : Practicals	Full Marks-75
Third Year :	Course 301 : Abnormal Psychology	Full Marks -75
	Course 302 : Physiological Psychology	Full Marks -75
	Course 303(A) Educational Psychology	Full Marks-75
	Course 303(B) Organizational Psychology	Full Marks-75
	Course 304: Practicals	Full Marks-75

The meeting ended at 4 PM after adopting the resolution of the above.

On the 3rd of November, the members took keen interest in finalizing the interest of the courses for B.A. (Psychology) With Major. In this connection, in compliance to directive of the Academic Council, under reference, one course (Paper) has been kept common for both (B.A. Psychology Without Major as well as B.A. Psychology With Major). These Courses are:

1. Course 101 : General Psychology Full Marks - 75
2. Course 201 : Developmental Psychology Full Marks-75
3. Course 301 : Abnormal Psychology Full Marks-75

Contd/.../-

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Matters selected to the rest of the content were thoroughly discussed and examined and it was finally resolved to have the course content (Syllabus) for B.A. With Major as shown in Annexure-2.

On the proposal of some members of the Board matter related to Panel of Examiner was discussed. It was resolved to recommend a fresh Panel of Examiner for various courses in Psychology in addition to the existing Panel of Examiners.

The Meeting ended with a Vote of Thanks to the Chair.

Sd/-Zokaitluangi Sd/-R.N.Rai Sd/-P.K.Vishwas Sd/-A.N.Jaiswal

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ANNEXURE-'I'

SYLLABUS.

B.A. PSYCHOLOGY (WITHOUT MAJOR)

First Year : Course : 101 : Theory Paper : General Psychology - Full Marks-75

Course : 102 : Practicals Full Marks-25

Second Year : Course : 201 : Theory Paper : Developmental Psychology - Full Marks-75

Course : 202 : Practicals - Full Marks-25

Third Year : Course : 301 : Theory Paper : Abnormal Psychology - Full Marks-75

Course : 302 : Practicals Full Marks-25

Course : 101 GENERAL PSYCHOLOGY Full Marks-75

Unit -I : Basic Processes.

- (i) General Introduction,
Definition of Psychology
Methodological Approaches : Observational Method,
Experimental and Clinical Methods.
Field of Psychology.
- (ii) Attentional and Perceptual Processes.
Attention: Definition, characteristics and determinants.
Perception : Basic Perceptual Processes;
Detection, Discrimination and Identification;
Figure and Ground.
Perception of Forms, Space, Time and Perceptual Constancies.
Effects of Motivational and Personality variables on Perceptual Processes.
- (iii) Conditioning and Learning :
Definition : Kinds of Learning, Conditioning, Trial and Error,
Insightful, Imprinting and Verbal Learning.
Classical Conditioning, Nature of contiguity in extinction,
Spontaneous recovery and reconditioning.
Operant conditioning : Nature of schedules of reinforcement, Stimulus generalizations, discrimination, aversive conditioning.
- (iv) Memory and Forgetting :
Sensory storage : Empirical characteristic and types.

Contd./.../-

Short-Term (STM) storage : Empirical characteristics.

Long-term (LTM) storage : Nature and measurement; Episodic and semantic memories; Comparison of STM and LTM.

Theories of storage : Stimulus encoding theories : Levels of processing approach.

Forgetting : Causes, Retroactive and Proactive Inhibitions, Decay of Memory Trace.

Unit-II. Complex Processes and Applications.

(i) Verbal Learning and Mental Representation.

Methods and Materials.

Transformational and Organisational Processes (Mnemonic devices, chunking, serial position curve).

Transfer of training.

Representational Processes: Thinking, Theories of Thinking, kinds of thinking.

(ii) Problem Solving and Reasoning.

Problem Solving as a process, Basic characteristics, Methods and Stages.

Reasoning-Inductive and Deductive, Reasoning as internal representation, Decision making.

(iii) Motivation :

Basic concepts and approaches.

Biological and Social Motives. Theories of Motivation: Classical and Modern.

(iv) Personality and Intelligence :

Personality structure, types, traits and developmental theories.

Nature of Intelligence, theories of Intelligence.

Books:

Calfee, R.C. (1975). Human Experimental Psychology. New York: Holt, Rinehart & Winston.

Morgan, C.T. and King, H.A. (1975). Introduction to Psychology, 5th TMH Edition, Delhi.

Hilgard, E.R; Atkinson, R.C. and Atkinson, R.L. (1974). Introduction to Psychology, 5th Edition, Harcourt Brace Jovanovich.

Munn, N.L. Introduction to Psychology, 3rd Edition, Oxford & Amarind, 1970.

Crown E, and Herrentin, R.J.: Psychology, Methuen, London, 1975.

Floyd, L. Ruch: Psychology and Life D.B. Taraporevala & Company Ltd. Bombay, 1970.

Candland, D.K., & Moyer, R.S.: Psychology: The Experimental Approach, New York: McGraw Hill, 1970.

Kimble, G.A.; Garnezy, N. & Zigler, E. Principal of General Psychology, 1980.

Kothurkar, V.K. & Vanarase, S.D.: Experimental Psychology, New Delhi, Eastern, 1985.

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3

Duglas, K.Kendland : Psychology:An Experimental Approach,McGraw Hill
Book Company,New York,1968.

Ghorpade,M.B.:Essentials of Psychology.Himalaya Publishing House,1985.

Guifford,J.F.: The Nature of Human Intelligence,McGraw Hill,New York,1967.

Course :102

PRACTICALS

Full Marks-25

1. Reaction Time
2. Muller-Lyer Illusion
3. Retroactive Inhibition
4. Measurement of Intelligence
5. Span of Attention

COURSE :201

DEVELOPMENTAL PSYCHOLOGY

Unit -I

Full Marks-75

1. Introduction.
Concept and Principles of development.
Determinants of Development : Biological,Environmental and
Socio-cultural.
Theories of Child Development-Piaget,Frueid,Erickson.
2. Methods of Studying Behaviour Development,
Longitudinal and Cross-sectional Approaches
Naturalistic and Controlled Observation.
Case History Method.
Rating Method.
3. Stages of Development : Salient Characteristics.
Prenatal and Postnatal
Infancy
Childhood
Adolescence
Adulthood.

Unit-II

4. Dimension of Development:
Sensory Motor
Perceptual Motor
Cognitive Development
Language
Emotional
Social
Personality

5. Developmental Disabilities
Mental Retardation : Types and Cause
Learning Disabilities
Physically handicapped.
6. Management of Developmental Problem.

Books Recommended

1. Schell, R. E., and Hal, E. (1983). Developmental Psychology Today, Ransom House.
2. Yussen, S. R., and Santrock, J. W. (1979). Child Development, Wm C. Borwn.
3. Hurlock, E. B. (1964). Developmental Psychology. McGraw Hill.
4. Lerner, R. M. and Hultsen, D. F. (1983). Human Development: A Life span perspective. New York: McGraw Hill.
5. Mussen, P. H., Conger, J. J. and Kagan (1974). Child Development and Personality (4th Ed.). New York, Harper & Row.
6. Beard, R. M. (1958). An Outline of Piaget's Developmental psychology from Childhood to Adolescence, New York, Basic Books.
7. Baldwin, A. L. (1980). Theories of Child Development : John Wiley & Sons.
8. Bandura, A. (1977). Social Learning Theory. Englewood Cliffs, NJ: Prentice Hall.
9. Lewin, K. (1935). Dynamic Theory of Personality. New York: McGraw Hill.
10. Langer, J. (1961). Theories of Development. New York: Holt, Rinehart & Winston.
11. Sears, R. R.; Maccoby, E. E.; Levin, H. (1957). Patterns of Child Rearing. New York : Harper.
12. Hurlock, E. B. Child Development: McGraw Hill.
13. Hall (1990). Theories of Personality : Wiley Eastern Limited.

Reference Book:

Wolman, B. (1982). Handbook of Developmental Psychology.
New Jersey : Prentice Hall.

COURSE -202

PRACTICALS

Full Marks-25

1. ESPO/ESPRS
2. Perceptual Development
3. HSPQ
4. Social Maturity Scale
5. Emotional Maturity Scale.

Contd/..../-

COURSE ;301

ABNORMAL PSYCHOLOGYUnit-IFull Marks -75**A. ABNORMAL BEHAVIOUR**

Definition, Classification and Methods; Factors Contributing to Abnormal Behaviour : Genetic, Socio-Cultural and Psychological.

B. STRESS AND PROBLEMS OF ADJUSTMENT :

Sources of stress : Frustration and Conflicts Coping with stress : Strategies, Task-oriented reactions, Attack, Withdrawal and Compromise, Ego-defence mechanisms.

C. CHILDHOOD DISORDERS :

Habit disorders : Tics and Spasms Learning disorders : Speech, reading Personality disorders - Delinquency.

D. SYMPTOM DISORDERS :

Distinction between Neurosis, Psychosis and Psychophysiological disorders.

Symptoms of neurotic disorders : Anxiety-neurosis, depressive neurosis, phobic neurosis, obsessive-compulsive neurosis and hysterical neurosis (conversion and dissociative types).

Symptoms of Psychotic disorders : Schizophrenic, manic depressive-psychosis.

Symptoms of Psychophysiological disorders : Peptic disease.

Unit-II

Deviance and Pathology: Disorders of Behaviour; Methods:

Methods of Studying abnormal behaviour-Clinical-observation, interview and case history method. Administration of tests and experiments. Follow up.

Mental Retardation : Terminology, Levels and Clinical types, The causes : Genetic, Sociocultural, metabolic/nutritional, Traumatic and Psychogenic factors.

Diagnostic and Therapeutic Procedures: Psychological therapies, Psychoanalytic strategy, Client-centered therapy, Group therapy, Behaviour therapy, Play therapy.

Contd./..../-

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Books Recommended :

1. Coleman, J.C.: Abnormal Psychology and Modern Life. D.D.
Toraporevala Sons & Co. Bombay.
2. Kaplan, H.I. & Saddex, B.J. Comprehensive Text Book of Psychiatry.
Baltimore, London.
3. Eysenck, J. Handbook of Abnormal Psychology : A Sound Psychological
Approach, N.Y.: D Van Nostrand, 1978.
4. Costello, G.G. (Ed.); Symptoms of Psychopathology, N.Y.: John
Wiley & Son : 1978.
5. Milton, TM (Ed): Theories of Psychology and Personality :
Philadelphia : Sanders : 1973.
6. Ullman, Le Krasner, L : A Psychological Approach to Abnormal
Behaviour, N.Y.: Prentice Hall, 1969.
7. Adams, H.E. & Sutker, F.B. Comprehensive Handbook of Psychopathology,
N.Y.: Plenum Press, 1984.

COURSE : 302

PRACTICALS

Full Marks-25

1. Anxiety Scale
2. Personality Adjustment Inventory
3. Problem Check List (Mooney)
4. CAT/TAT
5. Marital Adjustment.

Contd/..../-

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Annexure - II

B.A. PSYCHOLOGY (WITH MAJOR)

FIRST YEAR :

- COURSE : 101 : THEORY PAPER : GENERAL PSYCHOLOGY
Full Marks - 75
- COURSE : 102 : THEORY PAPER : SOCIAL PSYCHOLOGY
Full Marks - 75
- COURSE : 103 : PRACTICALS (FIVE EXPERIMENTS)
Full Marks - 50

SECOND YEAR :

- COURSE : 201 : THEORY PAPER : DEVELOPMENT PSYCHOLOGY
Full Marks - 75
- COURSE : 202 : THEORY PAPER : PSYCHOLOGY STATISTIC
AND MEASUREMENT Full Marks - 75
- COURSE : 203 : THEORY PAPER : SYSTEM AND TRENDS IN
PSYCHOLOGY Full Marks - 75
- COURSE : 204 : PRACTICALS.

THIRD YEAR :

- COURSE : 301 : THEORY PAPER : ABNORMAL PSYCHOLOGY
Full Marks - 75
- COURSE : 302 : THEORY PAPER : PHYSIOLOGICAL PSYCHOLOGY
Full Marks - 75
- COURSE : 303 : (A) : THEORY PAPER : EDUCATIONAL PSYCHOLOGY
Full Marks - 75

Or,

- COURSE : 303(B): THEORY PAPER : ORGANIZATION
PSYCHOLOGY - Full Marks - 75
- COURSE : 304 : PRACTICALS ! Full Marks - 75

SYLLABUSB.A. PSYCHOLOGY (With Major)

FIRST YEAR : Course- 101 : THEORY PAPER : GENERAL PSYCHOLOGY

Course- 102 : THEORY PAPER : SOCIAL PSYCHOLOGY

Course -103 : PRACTICALS

COURSE : 101

GENERAL PSYCHOLOGY

Full Marks - 75.

Unit - I : Basic Processes

- (i) General Introduction.
Definition of Psychology.
Methodological Approaches : Observational Method,
Experimental and Clinical Methods.
Field of Psychology.
- (ii) Attentional and Perceptual Processes.
Attention : Definition, Characteristics and
determinants.
Perception : Basic Perceptual Processes.
Detection, discrimination and identification;
Figure and Ground.
Perception of Forms, Space, Time and Perceptual
Constancies.
Effects of Motivational and Personality variables
on Perceptual Processes.
- (iii) Conditioning and Learning :
Definition : Kinds of Learning, Conditioning,
Trial and Error, Insightful, Imprinting.
Classical Conditioning : Nature of Contiguity in
Extinction, Spontaneous recovery and reconditioning.
Operant conditioning : Nature of Schedules of reinforcement
stimulus generalizations, discrimination, aversive condition.
- (IV) Memory and Forgetting.
Sensory storage : Empirical Characteristic and types.
Short-Term (STM) storage : Empirical characteristics
Long-Term (LTM) storage . Nature and measurement
Episodic and somatic memories; comparison of STM and LTM.
Theories of storage : Stimulus encoding theories :
Levels of processing approach.
Forgetting : Causes. Retroactive and Proactive
inhibitions, Decay of memory trace.

UNIT - II Complex Processes and Applications.

- (i) Verbal Learning and Mental Representation. Methods and
Materials.

Transformational and Organisational Processes (Mnemonic devices, chunking, serial position curve)

Transfer of training.

Representational Processes : Thinking, Theories of thinking, kinds of thinking.

(ii) Problem Solving and Reasoning.

Problem Solving as a process, Basic characteristics
Methods and stages.

Reasoning - Inductive and Deductive, Reasoning as internal representation, Decision making.

(iii) Motivation -

Basic concepts and approaches.

Biological and Social Motives. Theories of Motivation :
Classical and Modern.

(iv) Personality and Intelligence -

Personality structure, types, traits and developmental theories.

Nature of Intelligence, theories of Intelligence.

Books :

Calfee, R.C. (1975). Human experimental psychology. New York :
Holt Rinehart & Winston.

Morgan, C.L. and King, R.A. (1975). Introduction to Psychology,
5th TMH Edition, Delhi.

Hilgard, E.R; Atkinson, R.C. and Atkinson, R.L. (1974). Introduction to
Psychology, 5th Edition, Harcourt Brace, Ivanovic.

Munn, N.L. Introduction to Psychology, 3rd Edition, Oxford & Amarind, 1975.

Brown E. and Harrentin, R.J.: Psychology, Methuen, London, 1975.

Floyed, L. Kuch : Psychology and Life, D.B. Taraporevala &
Company Ltd., Bombay, 1970.

Candland, D.K. & Moyer, R.S. : Psychology : The Experimental
approach. New York : McGraw Hill, 1978.

Kimble, G.A.; Garnezy, N. & Zigler, E. Principal of General Psychology, 1986.

Kothurkar, V.K. & Vanarase, S.D. : Experimental Psychology : New
Delhi : Wiley Eastern : 1985.

Duglas, K. Kendland : Psychology : An Experimental Approach, McGraw Hill
Book Company, New York, 1968.

Ghorpade, M.B.: Essentials of Psychology. Hinalaya Publishing House, 1985.

Guilford, J.P. The Nature of Human Intelligence, McGraw Hill
New York, 1967.

COURSE : 102

SOCIAL PSYCHOLOGY

Full Marks . 75.

UNIT - I

1. Nature of Social Psychology, Scope and definition of Social
Psychology. Subject matter of Social psychology, Its relationship
with other subject.

2. Methods of studying Social Behaviour :
Experimental Method, Observation, Survey and Field Studies.
3. Understanding of Self and Others :
Self-Perception; Perception of others.
4. Group structure and function :
Groups influences on Individual Behaviour; Group norms and conformity; Leadership Behaviour.

Unit - II

5. Social Attitudes :
Nature of attitude and formation; Attitude Measurement;
Attitude change.
6. Group Harmony and Conflict :
Basic concepts : Stereotypes, Prejudices; Cooperation and Competition, Inter-group conflict, Reducing group conflicts.
7. Enculturation and Social Behaviour.
Familiar antecedents, Social Parameters, Cultural influences.
8. Application of Social Psychology in the Indian Context.

BOOKS:-

1. Social psychology, understanding Human Interaction- Baron, R.A. and Byrne D Allyn and Bacon, INC, 1984.
2. Lindzey, G. (Ed.). Handbook of Social Psychology. Cambridge : Addison-Wesley, 1954.
3. Berkowitz, L. Advances in Experimental Social psychology. New York : Academic Press, 1978.
4. Fishbein M. Progress in social psychology. Hillsdale, NY : Erlbaum, 1980.
5. Paulus, P.B. The Psychology of Group Influence. Hillsdale, NY : Erlbaum, 1980.
6. Freedman D.G. Human Sociobiology : A Holistic Approach, New York : Free Press, 1979.
7. Altman, I. The Environment and Social Behaviour. Monterey, Calif : Books/Cole, 1975.
8. Lindgren, H.C.: An Introduction to Social Psychology. Wiley Eastern Limited, 1991.
9. Raven - Social Psychology : Wiley Eastern Limited, 1991.
10. Second and Backman : Social psychology, Tokyo : McGraw Hill International Edition, 1973.
11. Lindzey and Aronson : Handbook of Social Psychology. New Delhi : Oxford & IBM, 1968.
12. Kretch, Cruchfield and Ballachev : Individual in Society. Tokyo : McGraw Hill International Edition, 1962.
13. Berkowitz, H. A Survey of Social psychology, NY : Holt, Rinehart & Winston, 1980.
14. Sexvery, Bringham & Schelinker : A Contemporary Introduction to Social psychology, NY: Holt, Rinehart & Winston, 1980.

SECOND YEAR : COURSE 201 : THEORY PAPER : DEVELOPMENTAL

PSYCHOLOGY Full Marks - 75.

COURSE 202: THEORY PAPER : PSYCHOLOGICAL STATISTIC &
MEASUREMENT. Full Marks - 75.

COURSE 203 : SYSTEM AND TEND IN PSYCHOLOGY
Full Marks - 75

COURSE 204 : PRACTICALS.

COURSE 201 : DEVELOPMENTAL PSYCHOLOGY Full Marks - 75.

UNIT - I

1. Introduction.

Concept and Principles of Development.

Determinants of Development : Biological, Environmental
and Socio-cultural.

Theories of Child Development- Piaget, Freud, Erickson.

2. Methods of studying Behaviour Development.

Longitudinal and Cross-sectional Approaches.

Naturalistic and controlled observation.

Case History Method.

Rating Method.

3. Stages of Development : Salient Characteristics.

Prenatal and Postnatal

Infancy

Childhood

Adolescence

Adulthood.

UNIT- II.

4. Dimension of Development :

Sensory Motor

Perceptual Motor

Cognitive Development

Language

Emotional

Social

Personality.

5. Developmental Disabilities :

Mental retardation : Types and causes. Learning disabilities.

Physically handicapped.

6. Management of Developmental Problem :

Books Recommended :

1. Schell, R.E., and Hall, E. (1983). Developmental Psychology
Today, Random House.

2. Yussen, S.K., and Santrock, J.W. (1979). Child Development, Wm, C. Brown.
3. Hurlock, E.B. (1964). Developmental psychology, McGraw Hill
4. Lerner, R.M. and Hallgren, D.F. (1963). Human Development : A life span perspective. New York : McGraw Hill.
5. Mussen, P.H.; Conger J.J. and Kagan (1974). Child Development and Personality (4th Ed.) New York, Harper & Row.
6. Beard, R.M. (1958). An Outline of Piaget's Developmental psychology from childhood to Adolescence, New York, Basic Books.
7. Baldwin, A.L. (1980). Theories of Child Development. John Wiley & Sons.
8. Bandura, A. (1977). Social Learning Theory. Englewood Cliffs, N.J.: Prentice Hall.
9. Kewin, K. (1935). Dynamic theory of personality. New York, McGraw Hill.
10. Langer, J. (1961). Theories of Development. New York : Holt, Rinehart & Winston.
11. Sears, R.R.; Maccoby, E.E.; Levin, H. (1957). Patterns of Child Rearing. New York : Harper.
12. Hurlock, E.B. Child Development: McGraw Hill.
13. Hall (1990). Theories of Personality : Wiley Eastern Limited.

Reference Book:

Wolman, B. (1982). Handbook of Developmental psychology. New Jersey : Prentice Hall.

COURSE : 202 PSYCHOLOGICAL STATISTICS AND MEASUREMENT

Unit- I

Full Marks- 75

1. Importance of Statistic in Psychology.
2. The Frequency Distribution
 - Measures in General;
 - Drawing up a frequency distribution;
 - Graphic representations;
 - Cumulative distributions;
 - Percentiles and Percentiles ranks.
3. Measures of Central Tendency and Variability
 - Mean
 - Median;
 - Mode
 - Range
 - Average deviation;
 - Standard deviation and variance.

4. Probability and Distribution

The concept of probability;
 The Binomial Distribution;
 The Normal Distribution;
 Hypothesis testing and confidence intervals.

5. The T-test and Chi-square

The t-test for hypothesis about a single mean;
 Testing significance of difference between two means; chi-squares.

6. Correlation and Nonparametric Tests.

Product-moment correlations.
 Rank order correlation;
 Sign test, median test, and Mann-Whitney U Test.

UNIT - II

7. Introduction to Measurement.

Quantification and levels of Measurement;
 Scaling Techniques.

8. Construction of psychological Tests.

Preparation of Items;
 Types of Items;
 Item analysis and selection.

9. Test Reliability

Test-retest reliability;
 Alternate forms reliability;
 Split-half reliability.

10. Test Validity

Face and content validities,
 Predictive validity;
 Construct validity.

Books :

1. Downie and Heath : Basic Statistical Methods.
2. Edwards, A.I. : Statistical Analysis for Studies in Psychology and Education.
3. Guilford, J.P. : Fundamental Statistics in Psychology and Education : McGraw Hill, 1978.
4. Garrett, H.E. & Woodworth, R.S. : Statistics in Psychology and Education : Vakils, Fefer and Simons Ltd. 1970.
5. McNemar, Q. : Psychological Statistics 3rd Ed. : New York : John Wiley and Sons, 1962.
6. Nunnally : Psychometric Theory. : New Delhi : Tata McGraw Hill, 1978.
7. Freeman : Theory Practice of psychological testing, New Delhi : Oxford & IBH, 1965.
8. Anastasi, A. : Psychological Testing. Tokyo : Callier McMillan, International Edition, 1980.

9. Gullidese : Theory of Mental Test. NY: John Wiley, 1960.
 10. Cronback : Essentials of psychological Testing. Tokyo :
 Harper International Edition, 1970.

COURSE : 203 SYSTEMS AND TRENDS IN PSYCHOLOGY.

UNIT- I

Full Marks - 75.

1. Schools of psychology : A Historical View :
 Structuralism, Behaviorism, Functionalism, Gestalt, and Field
 psychology and psychoanalysis.
2. Introduction to neo-Behaviorism, Neo-Freudianism, and Humanistic
 trends in psychology.

UNIT-II

3. Contemporary trends : Collapse of Schools, cognitive revolution,
 Contribution of Piaget, Cross-cultural psychology.
4. Psychology in India : Philosophical tradition, Some related to
 mental status and mental health. Brief introduction to the
 emergence of modern psychology in India; Contemporary trends;
 Studies of Socializations, Social Change, Social disadvantage,
 Poverty and Rural Development.

Books :-

- Kuppuswami.B. (1985). Elements of ancient Indian psychology. New
 Delhi, Vikas.
 Paranjpa, A.C. (1984). Theoretical psychology. New York : Plenum Press.
 Sahakian. W.S. (1975). History and Systems of psychology. New York : Wiley.
 Sinha.D. (1986). Psychology in a Third World country. The Indian
 Experiences. New Delhi : Sage.
 Wertheimer.M. (1979). A brief History of psychology. New York : Holt
 Rinehart & Winston.
 Woodworth.R.S. and Sheehan.M.R. (1965). Contemporary Schools of
 psychology. New York & Wiley.

THIRD YEAR : COURSE 301 : THEORY PAPER : ABNORMAL PSYCHOLOGY

Full Marks - 75.

COURSE 302 : THEORY PAPER: PHYSIOLOGICAL

PSYCHOLOGY

Full Marks- 75.

COURSE 303 A: THEORY PAPER: EDUCATIONAL PSYCHOLOGY

Full Marks - 75.

Or

COURSE 303 B : THEORY PAPER: ORGANISATIONAL PSYCHOLOGY

Full Marks - 75.

COURSE 301

ABNORMAL PSYCHOLOGY

Full Marks - 75

Unit - I

A. ABNORMAL BEHAVIOUR

Definition, Classification and Method

Factors Contributing to abnormal behaviour: Genetic
 socio-cultural and Psychological.

B. STRESS AND PROBLEMS OF ADJUSTMENT :

Sources of stress : Frustration and Conflicts.
Coping with stress : Strategies, Task-Oriented reactions
Attack, Withdrawal and Compromise
Ego-defence mechanisms.

C. CHILDHOOD DISORDERS :

Habit disorders : Tics and spasms
Learning disorders : speech, reading
Personality disorders: Selingency.

D. SYMPTOM DISORDERS :

Distinction between Neuroses, psychoses and psychophysiological disorders.
Symptoms of neurotic disorders : Anxiety-neurosis
Depressive neurosis, Phobic neurosis, obsessive-compulsive neurosis and hysterical neurosis (Conversion and Dissociative types)
Symptoms of psychotic disorders : Schizophrenic, Manic depressive- psychosis.
Symptoms of psychophysiological Disorders :
Peptic disease.

UNIT - II

Deviance and Pathology : Disorders of Behaviour
Methods : Methods of studying abnormal behaviour-clinical observation, Interview and Case history Method. Administration of tests and experiments. Follow-up.
Mental Retardation Terminology, Levels and Clinical types
The Causes- Genetic, Sociocultural, metabolic/nutritional
Traumatic and psychogenic factors.
Diagnostic and Therapeutic procedures : Psychological Therapy, psychoanalytic strategy, Client-Centered Therapy, Group Therapy, Behaviour Therapy; Play Therapy.

Book Recommendation :

1. Coleman. J.C. : Abnormal psychology and Modern Life :
D.B.Toraporevala Sons & Co. Bombay.
2. Kaplan, H.I. & Sadock, B.J. Comprehensive Text Book of Psychiatry. Baltimore, London.
3. Eysenck, J. Handbook of Abnormal Psychology : A Sound psychological Approach, NY : D.Van Nostrand, 1978.
4. Costello, G.G. (Ed.) : Symptoms of Psychopathology .NY : John Wiley & Sons, 1978.
5. Milton T.H. (Ed) : Theories of psychology and personality.
Philadelphia : Saunders.
6. Ullman, L. Erasmers : A Psychological Approach to Abnormal Behaviour, NY : Prentice Hall, 1969.

7. Adams, H.E. & Sutker, P.B. Comprehensive Handbook of Psychopathology, NY : Plenum Press, 1984.

COURSE : 302 PSYCHOLOGICAL PSYCHOLOGY Full Marks- 75.

Unit - I

1. Cells and Nerve Cells.

Psychological psychology : Scope and definition. The Structure and Composition of Cells.

Nerve Cells : Its general components - the nerve cell body(also called the soma), the dendrite and the axon. The Synapse: Neurological Cells. Electrical Activity of the Nervous System. The Membrane potential, Action potential and synaptic potential. Excitatory-Inhibitory post synaptic potentials. Electroencephalogram.

2. Organisation of the Nervous System.

Central and Peripheral Nervous System.

The Central Nervous System. The Spinal Cord. The Brain.

The Peripheral Nervous System. Afferent and Efferent Nerves; Spinal and Cranial nerves. Somatic and autonomic divisions of the peripheral Nervous System.

3. Hormone and Behavior :

The endocrine glands. Autonomic and endocrine correlates of emotions. Endocrine influence on personality.

4. Sensory Processes

Structure and functioning of the visual system, the auditory system.

UNIT- II

5. Drives, Motives and Behaviour

The adaptive nature of drives and motives, Biological theories of drives and motives (1) Local theories, (2) Central Theories. and (3) General Theories. Induction and measurement of drives.

6. Sleep and Arousal

Characteristics of the sleep-arousal continuum.

Neural mechanisms of sleep and wakefulness.

7. Learning and Memory Storage :

Brain Mechanism & Learning. Neural correlates of Memory.

Books :-

1. Groves, D.M., and Schlesinger, K. (1979). Introduction to Biological psychology (2nd Ed. Wm. E. Brown Company Publishers, Dubuque, Iowa.
2. Miller, E. (1972). Clinical Neuropsychology. Penguin Books.
- 3- Williams, R.H. (1968). Text Book of Endocrinology. W.B. San Company, London.
4. Thompson, R.F. : Foundations of Physiological psychology. NY: Harfer and Row Publication, 1967.
- Morgan : Physiological Psychology, Bombay : Tata McGraw Hill, 1970.

6. Crossman, S.T. : A Text Book of Physiological Psychology. NY: Wiley John & Sons Inc. 1969.
7. Freeman, G.I., : Physiological Psychology. NY.: Wen Mortrand, 1948
8. Miller : Physiological Psychology.

COURSE : 303 (A) EDUCATIONAL PSYCHOLOGY

Unit-I

Full Marks - 75.

1. Nature and Scope of Educational Psychology : Goals of Education, Education and Educational Psychology, Objectives and Methods of Educational Psychology.
2. Stages of Development, their characteristics and Educational Significance: Growth and Development, Principle and Stages of Development, their educational significance.
3. Teaching - Learning Process :
Principles of Learning, factors in learning, Class-room climate and School Environment, Instructional Technology: Programmed Instruction and media.
4. Intelligence
Nature of Intelligence, Models of Intelligence, Relationship with Scholastic Achievement.

Unit -II

1. Creativity:
Nature, Types of Creativity, promoting creativity and problem solving.
2. Entering Behaviour : Learning acts, Learning abilities and Learning styles.
3. Motivation: Drives and needs, Personality factors and Motivation.
4. Measurement and Evaluation : Characteristics and use of standardized tests in Education.

Books:

1. Cronbach, L.R.: Educational Psychology (3rd ed.), New York: Harcourt Brace Jovanovich, 1997.
2. Lefrancis, G.A.: Psychology for teaching (3rd ed.) California: Wadsworth Publishing Company, 1979.
3. Lindgren, H.C.: Educational Psychology in the class-room (5th ed.). New York; Wiley & Son, 1976.
4. Dececeo & Crawford : Psychology of Learning, New Delhi: Prentice Hall of India, 1974.

Contd/.../-

5. Travers: Fundamental of Educational Psychology, NY: International Text Book Co. 1970.
6. Esso: Psychological Foundation of Education, NY : Holt, Rine & Wilson.
7. Thorndike, E: Measurement in Psychology and Education.
8. Boggie Morris: Learning theory of teacher, NY; Harper and Row, 1976.
9. Klausniere : Learning and Human Abilities.

COURSE : 303 (B) ORGANIZATIONAL PSYCHOLOGY

Unit-I

Full Marks -75

1. Organizational Structure :

Basic structure, factors in structure differences, types of structure.

2. Organizational Socialization:

Concept of Organizational Culture, Socialization in Organizational, Factors in Socialization.

3. Job Design :

Concept of job design, scientific management, job analysis, job enlargement, job enrichment, job-rotation.

4. Job Satisfaction :

Concept of job satisfaction, Attitude and Job Satisfaction, Dimensions of Job Satisfaction, Theories of Job Satisfaction Measurement of Job Satisfaction.

5. Organizational Development(OD):

Change and OD, Organizational Development, Objectives, Basic Approaches to Organizational Development.

Unit-II

1. Organizational Behaviour :

Concept of Organizational Behaviour, Steps of Organizational Behaviour Model, Behavioural Self-Management.

2. Motivation :

Nature of Motivation, Classification of Motives, Theories of Motivation, Motivation in Organizational setup.

3. Conflict :

Nature of Conflict, Intra-individual conflict, Interpersonal conflict, Intergroup Behaviour and Conflict, Organizational conflict.

Contd./.../-

Communications

Communication Process, Barriers to effective
Communication, Non-Verbal communications.

Books:

- Robins, S.B.: Organizational Behaviour : New Delhi, Prentice Hall, 1985.
- McCoruck, E.H. and Elgen, D : Industrial Psychology, New Delhi: Prentice Hall, 1985.
- Luthans, F.: Organizational Behaviour : New York, McGraw Hill, 1985.
- Davis, K.: Human Behaviour at Work, Organizational Behaviour, New Delhi, Tata McGraw Hill, 1981.
- Miles, R.E.: Theories of Management; Implications for Organisational Behaviour and Development, New York: McGraw Hill Book Company, 1975.
- Ghosh, P.K. and Ghorpade, M.B.: Industrial Psychology: Himalaya Publishing House : Bombay, 1980.

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SYLLABUS

TECHNOLOGY(PRACTICALS)(WITH MAJOR)

FIRST YEAR : COURSE : 103 PRACTICALS : Full Marks-50

1. Reaction Time
2. Muller-Lyer Illusion
3. Retroactive Inhibition
4. Measurement of Intelligence
5. Span of Attention
6. Attitude Measurement
7. Sociometry
8. Cooperation and Competition/Stereotypes.

SECOND YEAR : COURSE : 204 PRACTICALS : Full Marks -75

1. ESPQ/ESPRS
2. Cross-sectional-Longitudinal Methods
3. HSPQ
4. Social Maturity Scale
5. Emotional Maturity Scale
6. Reliability
7. Correlation
8. Transfer of Training

THIRD YEAR : COURSE : 304 PRACTICALS : Full Marks-75

1. Anxiety Scale
2. Personality Adjustment Inventory
3. Problem Check List(Mooney)
4. CAT/TAT
5. Marital Adjustment
6. Aptitude Test
7. Mental Fatigue
8. Job Satisfaction Scale/Fingerdexterity Test.

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Annexure -M

B.A., B.COM. THREE YEARS DEGREE COURSE
SYLLABUS IN HINDI (M.I.L)

There will be TWO papers, one of which will be taken in the second year and the second paper in the third year. Each paper will be of three hours duration and shall carry 100 marks.

PAPER I

Distribution of Marks

Poetry (medieval & Modern)	1. Explanation :
Ekanki (One act Play)	1. piece from Medieval Poetry 10 marks
	1. piece from Modern Poetry 10 marks
History of Hindi Literature	2. Descriptive & objective Qs 25 marks from Poetry
Essay writing	3. Descriptive & Objective Qs. 20 marks from Ekanki
	4. Descriptive & Objective Qs. from History of Hindi Literature 20 marks
	5. Essay Writing 15 marks

TEXT BOOKS :

1. Hindi Kavya ke Pratinidhi Hastakshar : Ed. Dr. Shridhar Singh Gangasaran & Grandsons C.K.37/44B Bansphatak VARANSI-221001.

Selected poems of the following poets only;

1. Kabirdas 2. Surdas 3. Tulsidas 4. Bihari 5. Jaishankar Prasad
6. Ramdhari Singh Dinkar 7. Muktibodh

SELECTION OF POEMS WILL BE MADE LATER

2. Ekanki Sankalan : Ed. Virendra Kumar Mishra

Vani Prakashan, Kamla Nagar, Delhi-7

Only the following plays are to be studied :

1. Reed Ki Haddi 2. Mammi Thakurani
3. Hindi Sahitya Ka Sankshipt Itihas : Acharya Nand Dulare

Vajpayee Sathi Prakashan, Sagar

Elementary Knowledge of the following Kals only is expected:

1. Bhakti Kal 2. Adhunik Kal

Reference Books :

1. Hindi Sahitya Ek Parichay : Dr. Tribhuvan Singh (Hindi Pracharak Varansi)
2. Hindi Sahitya Ka Sankshipt Itihas : Babu Gulab Rai.
3. Hindi Ekanki-Udbhav Aur Vikas-Ramchandra Mahendra.

Contd./.../-

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HINDI(M.I.L)

PAPER II PROSE, FICTION AND GRAMMER

Distribution of Marks

1. Explanations : 2 pieces from Nibandh(Prose) 20 marks
2. Descriptive and Objective questions from Prose 20 marks
3. Descriptive and objective questions from Novel 20 marks
4. Descriptive and objective questions from story 20 marks
5. Grammar

TEXT BOOKS

1. Adhunik Gadya : Dr. Vijay Shankar Mall, Vidya Mandir, C.K. 10/64
Barmanal, Varansi-221001

(SELECTION OF PIECES TO BE MADE LATER)

2. Tyagpatra : Jainendra Kumar, Purvoday Prakashan, Delhi
3. Hindi Kahani Ke Alok Stambh: Dr. Rambabu Sharma, Vani Prakashan,
61 F Kamala nagar, Delhi-110007.

(SELECTION OF STORIES TO BE MADE LATER)

GRAMMER : It will consist of two parts :

- (a) Applied general grammar and
- (b) Alankar

(a) Applied grammar will consist of tests in syntax and idiom e.g. synthesis in sentence construction, formation of sentence in Hindi language correctly embodying given words or forms. knowledge of grammatical terms will not be required.

(b) Alankar : Only the following Alankars are to be studied:

1. Upma 2. Roopak 3. Aupras 4. Yamak 5. Utpreksha.

Reference Books :

1. Hindi Ka Gadya Sahitya : Dr. Ramchandra Tiwari
2. Adhunik Hindi Vyakaran Aur Rachna : Dr. Vasudevanand Prasad
Bharti Bhavan, Patna
3. Samanya Hindi : Dr. Vijay Pal Singh, Hindi Pracharak Sansthan, P.B. 106
Peeshachmochan, Varansi-221001.
4. Vyavharik Hindi : Dr. Mahendra Mittal, Sebar Sansthan, Delhi-7
5. Practical Hindi : Girjanan Ganju, Vani Prakashan, Kamalanagar, Delhi-7

Contd./.../-

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B.A. THREE YEAR DEGREE COURSE
SYLLABUS IN HINDI (ELECTIVE)

There will be THREE papers of three hours duration and 100 marks.
First paper will be taken in the first year, second paper in the second year and the third paper in the third year.

PAPER I : POETRY (Medieval & Modern)

Distribution of Marks

1. Explanation : 1 piece from Medieval Poetry
2. pieces from Modern Poetry 30 marks
2. Textual and critical questions on the
prescribed texts and poets (both descriptive
and objective) 70 marks

TEXT BOOKS :

1. Tulsi Kavya : Ed. Dr. Baldev Prasad Mishra, National Publishing House,
23, Darya Ganj, Delhi - 2.

Selected portion : Uttarkand of Ramcharit manas and 1 to 15 Padas from
Vijay Patrika

2. Ektara : Ed. Dr. Bapphen Singh, National Publishing House, 23 Darya Gaj
Delhi-2.

(SELECTION OF POEMS TO BE MADE LATER)

Reference Books :

1. Tulsi : Ram Bahori Shukla
2. Tulsi Rasayan : Ed. Dr. Bhagirath Mishra (introduction only)
3. Nayee Kavita - Swaroop Aur Samasyayen : Dr. Jugdish Gupta
4. Naya Hindi Kavya : Dr. S.K. Mishra.

Contd./.../-

HINDI (ELECTIVE)

PAPER II : ESSAY AND DRAMA

Distribution of Marks

1. Explanation : 2 pieces from Essay and 1 piece from drama 30 marks
2. Textual and critical questions on prescribed pieces 70 marks
(these will include descriptive and objective questions)

TEXT BOOKS :

1. Hindi Nibandh : Ed. Dr. Shoo Prasad Singh, Hindi Pracharak Sansthan, Varansi

(SELECTION OF PIECES TO BE MADE LATER)

2. Sindoor Ki Holi : Laxmi Narayan Mishra, Bharati Bhandar, Allahabad

Reference Books:

1. Hindi Gadya Ki Shailiyan : Dr. Jagannath Prasad Sharma
2. Hindi Natak : Dr. Nagendra (National Publishing House, Delhi)

PAPER III: Novel and Short Story

Distribution of marks

1. Explanation: 2 pieces from short stories and 1 piece from the Novel 30 marks
2. Textual and critical questions on the prescribed texts 70 marks
(these will include descriptive and objective questions)

TEXT BOOKS :

1. Mrignayani: Vrindavan Lal Verma
2. Chitra Lekha : Bhagwaticharan Verma
3. Hindi Kahaniyan : Ed. Dr. Shri Krishna Lal, Sahitya Bhavan, Allahabad
Only the following stories are to be studied :
(i) Burhi Kaki (ii) Puraskar (iii) Mithaiwala (iv) Roj (v) Kamkaj

Reference Books :

1. Hindi Upanyas : Dr. Bhagirath Mishra, Rajkamal Prakashan, New Delhi
2. Hindi Upanyas-Ek Nayee Drishti : Indranath Madan, Rajkamal Prakashan
3. Hindi Kahani Ke antarang: Dr. Ramdras Mishra
4. Kahani-Swaroop aur samvedna : Ranjendra Yadav

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THREE YEAR DEGREE COURSE SYLLABUS IN HINDI
WITH MAJOR

There will be Eight papers. Paper I and II will be taken in the 1st year, III, IV and V in the Second year and VI, VII and VIII in the third year. Each paper will be of 100 marks and three hours duration

B.A. (1st Year)

Paper I : OLD POETRY

Text Books :

1. Vidyapati Ed. Monoharlal Gaud, Vidya Mandir C.K. 10/64 Brahamahal Varansi - 221001.

Selected Portion : 1 to 33 padas to be read)

2. Ramcharit Manas - Tulsidas, Geeta Press Gorakhpur

Selected portion : Only kevat and Chitrakeet Prasangas of Ayodhyakand only.

3. Bhramargeet Sar - Surdas, Ed. Ramchandrar Shukla, Sahitya Seva Sadan, Varanasi.

Selected Portion : from 175 to 200 Padas to be read)

4. Riti Kavya Sangrah : Ed. Dr. V.P. Singh, Lok Bharati Prakashan, Allahabad

Selected portion : Only Kehavdas, Binari and Ghananand are to be read)

Reference Books:

1. Vidyapati - Dr. Sheo Prasad Singh
2. Manas Ka Kathashilp - Dr. S.D. Singh
3. Reeti Kavya - Dr. Jagdish Gupta.

PAPER II : History of Hindi Literature

Reference Books :

1. Hindi Sahitya Ka Itihas : Ram Chandra Shukla
2. Adhunik Hindi Sahitya Ki Pravratitayan - Dr. Namvar Singh
3. Hindi Sahitya Ka Itihas - Dr. Nagendra

B.A. (2nd Year)

Paper III : Indian Poetics, Western Criticism and Literary Forms

Distribution of Marks

1. Indian Poetics 60 marks
2. Western Criticism 20 marks
3. Study of Literary forms 20 marks.

Prescribed topics : (i) Different Schools of Indian Poetics and its development upto modern period, definition of poetry, functions of poetry, Kavya Hetu, Shabd Shakti, Rasa, Its kinds and Rasa Bishpatti, Sadharnikaran, Kavya Guna, and Desh, Riti and Major Alankars.

- (ii) Western Criticism : Major western critics and General idea of their theories(Aristotle,Croce and T.S.Elliet)major literary tendencies(Art for Arts sake,Romanticism and realism) and short history of western criticism.
- (iii) Study of literary forms : definition and elements of poetry,novel,short story, Essay,Drama,Sketch,Memoris,Travelogue,Biography,

HINDI WITH MAJOR

Paper III contd.

Reference Books :

1. Kavya Ke Roop - Gulap Rai
2. Kavya Darpan - Ram Dahin Mishar
3. Alankar Vimarsh - Dr. K.N.Prasad
4. Bhartiya tatha Paschatiya Kavya Shashtra Ke Siddhanta-Dr.Satyadeo Choudhury.
5. Paschatiya Kavya Shashtra ki Parampara-Dr.Savitri Sinha
6. Sahityalochan - Dr. Shyamsundar Das.
7. Alanker Muktavali - Pro;Devendra Nath Sarma

PAPER IV MODERN POETRY

TEXT BOOKS

1. Kamayani : Jaishankar Prasad ,Bharati Bhandar,Allahabad
(Selected portion : Chinta and Shraddha Sargas only)
- 2.Uddhava Satak : J.D.Bhatnagar (Indian Press,Prayag)
Selected portion : 43 to 105 Kavitta only)
3. Ram Ki Shakti pooja : Surya kanta Tripathi Nirale
4. Asmita :Ed,Dr,J.P.Srivastava,Chawk,Varanasi,Vishwanidyalay Prakashan
(Selections to be made later)

Reference Books :

1. Adhunik Hindi Sahitya : Prof. Nand Dulare Vajpayee
2. Kamayani Vimarsh : Bhagirath Dixit
3. Nayee Kavita : Swaroop Aur Samasayen : Dr. Jagdish Gupta
4. Adhunik Hindi Kavya : Dr. Sukumar Misra
5. Naya Hindi kavya : Dr. S.K.Mishra

PAPER V : DRAMA AND ONE ACT PLAY

Distribution of marks

Drama	70 marks
One Act Play	30 marks

TEXT BOOKS :

1. Skandgupta : Jai Shankar Prasad (Bharati Bhandar,Allahabad)
2. Mukti Ka Rahsya : LaxmiNarayan Mishra
3. Adhe Adhure : Mohab Rakesh
4. More Shreshtha Ekantri : Vishnu Prabhakar (National Publishing House)
(Selection to be made later)

Reference Books :

1. Hindi Natak : Dr.Magendra (National Publishing House)
2. Hindi Ekantri - Udbhav Aur Vikas : Ramchandra Mahendra
3. Prasad Ke Natken Ka Shstriya Adhyayan : Jagannath Sharma
4. Prasad Ke Natken ka Aitihasek Avam Sanskritik Vivechan : J.C.Joshi
5. Hindi Ekantri 'Shilp Vidhan Vikas : Siddhanta Kumar.

B.A. Hindi with Major B.A. (3rd Year)

PAPER VI : PROSE AND FICTION

Distribution of Marks : Prose : 40
Fiction : 60

Text Books :

1. Hindi Nibandh : Ed. Dr. Shree Prasad Singh (Hindi Pracharak Sansthan, Varanasi)
(SELECTION OF PIECES TO BE MADE LATER)
2. Kutaj : Hazari Prasad Dwivedi (Naivedya Niketan, Kavindrapuri, Varanasi - 5)
Only the following pieces are to be studied :
1. Kutaj 2. Vaishali 3. Deedaru 4. Manav Sharma 5. Deepawali.
3. Divya : Yashpal
4. Hindi Pratidinhi Kahaniyan : Ed. Dr. Bachhan Singh (Anurag Prakashan, Varanasi)
(SELECTION OF STORIES TO BE MADE LATER.)

Reference Books :

1. Hindi Gadya Ki Shailiyan : Dr. Jagannath Prasad Sharma
 2. Hindi Upanyas-Prayog ke Charan : Dr. Rajmal Bora
 3. Kahani Swaroop Aur Samvedna : Rajendra Yadev
 4. Acharya Hazari Prasad Dwivedi : B. Satyanarayanan
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PAPER VII : Introduction to general Linguistics and History of Hindi Language and Devnagri Lipi.

Distribution of Marks : General Linguistics - 60
Hindi Language - 30
Devnagri Lipi - 10

Prescribed Areas of study :

- A. Introduction to general linguistics
 - i. Linguistics - definition, linguistics & language
 - ii. Kinds of Linguistics.
 - iii. Linguistics and other disciplines (-Sociology, history etc)
 - iv. Main Schools of Linguistics.
- B. General Linguistics & Historical Linguistics :
 - i. Theories of the origin of languages
 - ii. Theories of the development of languages.
 - iii. Structure of language (phonology, morphology, syntax and semantics)
- C. Origin and development of Hindi and other modern Indian languages with special reference to the classification of their families.
 - i. Dialects of Hindi language and its development
 - ii. Short Hindi Grammar (Specially Ipsarg, Pratyaya, Karak and Sarvanam)
 - iii. Hindi Shwani, Pad and Vakya.
- D. Nagri Script :
 - i. Origin and development of Nagri script
 - ii. Other Indian scripts - their History.

Reference Books :

1. Bhasha Vigyan Ki Bhumiya : Prof Devendra Nath Sharma
2. Bhasha Vigyan : Dr. Bholanath Tiwari
3. Hindi Bhasha Aur Lipi ka Eitahhasik Vikas : Satyanarain Tripathi
4. Hindi Aur Uski Vividh Boliyan : Dr. D.C. Jain

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B.A. Hindi with Major

PAPER VIII : SPECIAL PAPER + AUTHORS

A student can offer any one of the following authors with their particular context.

A. TULSIDAS :

Distribution of Marks : Explanations : 40
Critical Qs : 60

Explanations from : (i) Ramcharit Manas - Balkand only.

(ii) Geetawali : from 192 to the end only.

Reference Books :

1. Goswami Tulsidas : Ram Chandra Shukla
2. Tulsidas Aur unka Yug : Rajpati Dixit
3. Tulsidas ki karyitri Pratibha : Shridhar Singh
4. Hindi Pad Parampara Aur Tulsidas : Vachandev kumar
5. Tulsī : Udai Bhanu Singh
6. Goswami Tulsidas : Shyamsunderdas.

B. Natak Kar Prasad.

Distribution of marks : Explanation : 40
Critical Qs : 60

Explanations from Chandragupta only.

All other dramas for non detailed study. Only critical questions will be asked from them.

Reference Books :

1. Prasad Aur Unke Natak : Dr. Keshri Kumar
2. Prasad Ke Natak Ka Shastriya Adhyayan : Dr. Jagannath Prasad Sharma
3. Prasad Ke Natak : P.L.Gupta
4. Prasad Ke Itihasik Natak : Dr. Jugdish Chandra Joshi.

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Annexure - N

B.A. (PASS)

Paper - I : Political Theory

1. State - The normative the descriptive concept of the State, theories of origin of State, the idea of the nation state, the liberal and the marxist views of the State.
2. Justice - The Philosophical, the natural, the legal and the Marxist theories of justice - corrective and distributive justice Raw's theory of justice.
3. Sovereignty - Meaning of Sovereignty, characteristics of sovereignty kinds of sovereignty - Nominal and Real, Legal and Political de jure and de facto, popular sovereignty, Austine's theory of sovereignty, Marxism and Pluralism.
4. Law - Meaning, Sources, Kinds, theories of origin and Nature of law, Law and Liberty, Law and Morality. International Law - its meaning and sources, problem and codification of international law, international law and municipal law.
5. Government - Meaning of Government, Organisation of Government - Separation of powers - Executive, Legislature and Judiciary - Forms of Government - Aristotle's classification of Government Modern classification of government - Monarchy, Aristocracy Dictatorship, Democracy - Western Liberal democracy, Communist democracy and the Third World variants.
6. Rights - Meaning, Theories and Kinds.
7. Liberty - Meaning, Theories and Kinds.
8. Equality - Meaning, Theories and Kinds.
9. Political Obligation - Meaning, Theories and Grounds of resistance.
10. Revolution - Meaning, Marxist and Functionalist Theories.

Books :-

1. Watkins F.M., The State as a concept of Political Science (Harper, New York, 1934)
2. Hinsley F.H., Sovereignty (Cambridge Univ. Press 1986, N.Y.)
3. Banker F., Principles of Social and Political Theory (OUP, 1952)
4. Stewart R.M. (ed), Reading in Social & Political Philosophy (OUP, 1986)
5. Ben, S.I. & Peters R.S., Social Principles and Democratic State (Allen & Unwin 1964), Ch. 4, 5, 6, 7, 10, 12 & 15.
6. Gauba O.P., An Introduction to Political Theory (New Delhi, 1981)
7. Johari J.C., Principles of Modern Political Science (New Delhi, 1989)
8. Arendt H., On Revolution (Penguin, 1973)
9. Blackburn R., Revolution and Class Struggle (N.Y., 1977)
10. Chang S.H., Marxist Theory of the State (N.Y., 1985)
11. Miliband R., State in Capitalist Society (London, 1973)
12. Colclough, P., Revolution (Macmillan, 1970, Bombay)
13. C.D. Thompson, Real World of Democracy (OUP, 1970)

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B.A.(Pass)

Paper - II : Major Political System

This paper requires an understanding of the Political Systems of the U.K., U.S.A., China and U.S.S.R (Upto 1988). The Course may be divided into the following topics :-

1. Ideological basis
2. Main characteristics of the Constitutions
3. Forms of Government
4. Process of Mobilization - Parties, Pressure Groups etc.
5. Electoral Process
6. Executive Authorities
7. Legislatures and Legislative Processes
8. Judicial Processes
9. Rights of Citizens
10. Bureaucracy

Suggested Readings :

1. Roy Macridis & Robert E. Ward, eds., Modern Political System : Europe (Englewood Cliffs, New Jersey: Prentice Hall 1968)
2. M.J.C. Wile, Politics in the United States (London, Penquine 1970)
3. S. Banerjee, The Chinese Government and Politics (Calcutta, K.P. Bagchi, 1980)
4. S.K. Chaube, The New Constitution of USSR (Calcutta, P. Bagchi, 1980)
5. John Alexander Armstrong, Ideology, Politics and Government of Soviet Union (New York, Praeger, 1978)
6. J.C. Johari, Comparative Politics (New Delhi, Sterling, 1976)
7. Richard Rose, Politics in England (Boston, Little Brown, 1975)
8. Johan PL Machintosh, The Government and Politics of Britain (London, Hutchinson University Library, 1977)
9. R.M. Punnett, Government and Politics in Britain (London, St. Paul, 1970)
10. M.J.C. Wile, Politics in the United States (London, Penquine, 1977)
11. Caludics O. Johnson, Government in the United States (New Delhi, Thomas Growel, 1970)
12. Robert Dahl, Democracy in the United States : Promises and Performance (Chicago, Rand McNally College Publishing Co., 1967)
13. L. Grigeryan and Y. Delgapoler, Fundamental's of Soviet State State Law (Moscow, Progress Publishers, 1971)
14. L.G. Churchward, Contemporary Soviet Government (New York, Routledge & Kegan, 1978)
15. Leonard Schapiro, The Government and Politics in USSR (London, Allen Lane, 1978)
16. D.J. Walker, Government and Politics of Communist China (London, Mathuen, 1970)

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contd...paper II - Major Political System

17. Jan Prybylla, Political Economy of Communist China
(Seratan, Intex, 1970)
18. Johan Wilson Bowis, Leadership in Communist China
(New York, Cornell University Press, 1963)
19. Irving Lonis Horowitz, Three Worlds of Development
(New York, Oxford University Press, 1972)-Chs.III,
pp.63-71 & 204-241
20. Roy C. Macridise and B.E. Brown, (eds), Comparative Politics
:Notes and Readings(Homewood, Dorsey Press, 1970)
Part XVII, Chap.54, pp.539-544.
21. Karl Jaspers, "The End of Colonialism", in Harry Eckstein
and David E. Apter, Comparative Politics(New York, Free Press,
1963), Part VIII, pp.601-616
22. Lucian W. Pye, "Non-Western Political Process" in Ibid.
pp.657-665, Ch.I and III

References :-

1. Gabriel A. Almond(ed), Comparative Politics Today : A World View (Boston, Little Brown, 1974)
 2. John H. Kautsky, Political Change in Underdeveloped Countries
(New York, John Wiley & Sons, 1962)
 3. John H. Kautsky, The Fundamental Law of the USSR(Text), 1977).
 4. John H. Kautsky, The Constitution of the People's Republic of China (Text), 1978)
 5. John H. Kautsky, Political Consequences of Modernisation
(New York, John Wiley & Sons, 1971)
 6. Jerman Finer, Theory and Practice of Modern Government
(London, Methuen, 1963)
 7. Robert Dahl, Pluralist Democracy in the United States
(Calcutta, Scientific Book Agency, 1967)
 8. Mitchell, Constitutional Law(London, Edinburg, W. Green & Sons,
1970)
 9. R. Milliband, The State in Capitalist Society
(London, Quarter Books, 1973)
 10. Chalmers Johnson(ed), Change in Communist System
(Standford, University Press, 1970)
 11. Macpherson C. B., Democratic Theory
(Oxford, Clarendon Press, 1973)
 12. C. Wright Mills, Power Elite (New York, John Wiley & Sons).
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B.A. (Honours), Compulsory

Paper I : Introduction to World Politics

(Students will have to attempt atleast two questions from each part).

PART - I

1. International Politics as a field of study and its scope
2. Components of national capability and impact of technology thereon.
3. Control of inter-State relations; Balance of power; Collective Security; International Law - its sources, sanctions and limitations.
4. Neo-Colonialism
5. International Organisation : Failure of the League of Nations; Nations; U.N. (Its main organs; its achievements and failure)
6. Regional Organisations and Integrations (E.E.C. & A.S.E.A.N)
7. U.N. and Human Rights.

PART-II

1. Versailles Treaty
2. Impact of Bolshevik revolution and the World Economic Depression of 1929 on International Politics.
3. Rise of Fascism : Hitler's foreign policy; Mussolini's attack on Ethiopia; Sino-Japanese relations during inter-war years.
4. Western appeasement of Fascist powers; Munich Pact, Soviet-German non-aggression Pact of 1939.
5. Causes of Second World War
6. Rise of Cold war.

Suggested Readings :-

1. Pierre-Marie Martin, Introduction to International Relations (New Delhi, Sterling Press, 1986)
2. Teresa Hayter, Aid As Imperialism (Harmondsworth, Penguin, 1974)
3. John White, The Politics of Foreign Aid (London, Bodley, 1974)
4. Howard Tolley, Jr., The UN Commission on Human Rights (Boulder, West View, 1987)
5. Ernest Mandel, The Meaning of the Second World War (Verso, 1987)
6. J.W. Burton, International Relations : A General Theory (Bombay, Allen & Unwin, 1971)
7. E.H. Carr, Twenty Years of Crisis (London, Macmillan)
8. E.H. Carr, International Relations : Between Two World Wars (London, Macmillan)
9. Jack Warson, Success in Twentieth Century World Politics (London, John Murray, 1974)
10. Charles P. Schleincher, International Relations (New Delhi, Prentice Hall, 1963)

contd...page 2/-

contd...paper I (BA Hons): Introduction to world Politics.

11. Rodee, Anderson, Christol, Gree, Introduction to Political Science, (New Delhi, Tata McGraw Hill, 1977, Ch.19-21)
 12. Rajami Palm Dutt, World Politics (1913-36)
 13. Frederick Schuman, International Politics (New York, 1969)
 14. Hans Morgenthau, Politics amongst Nation (Calcutta, 1966)
 15. Mahendra Kumar, Theoretical Aspects of International Relations
(Agra, Shivrul Agarwal, 1975)
 16. J.A. Nai, A Text Book of International Relations
(Calcutta, Macmillan, 1978)
 17. Klauss Knorr, The Power of Nations
(New York, Basic Books, 1975)
 18. F.N. Schuman, International Politics
(New York, 1976)
 19. Peter, Calbocoressi, World Politics since 1945
(Orient Longman, 1988)
 20. Devendra Kaushik, Soviet Political System
(Progress Publishers, Moscow, 1983)
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B.A.(Honours) Compulsory

Paper II : Advance Political Theory

The following topics will be discussed at the level of concepts.

1. Nation : Characteristics of Nations, difference between nations and nationalities, State and Nations.
2. Power : Scope of power, Power and Influence, Elements national power.
3. Authority : Authority and Power, Types of Authority, State and Authority, Liberal and Marxist Approaches.
4. Legitimacy : Sources, types - numinous and civil legitimacy.
5. Imperialism: Imperialism and Nationalism, Imperialism and Revolution.
6. Capitalism : Laissez-faire; Capitalism, Liberty and Democracy, Capitalism and Pluralism.
7. Neo-Colonialism : Specifics of Neocolonialism, Neo-colonialism and its relation to early socialism and state power.
8. Socialism : Varieties - social democracy and communism
9. Political Integration: Levels of integration, Integration in National and International Politics.
10. Democracy : Modern Variants - Western Liberal, Communist and Third World varieties.

Books:-

1. S.P.Verma, Modern Political Theory (Vikash, 1984)
2. Joseph A Schumpeter, Capitalism, Socialism and Democracy (Harper, 1950)
3. Max Weber, Max weber on Law in Economy and Society (Havard, 1954)
4. A.Gray, The Socialist Tradition : Moses to Lenin (Longmans, 1946)
5. Ray and Bhattacharya, Political Theory Ideas and Institutions (Calcutta world Press, 1968)
6. Car Fredrich, Authority (Cambridge, 1958)
7. R.Dahl, Modern Political Analysis (Eagle Wood Clifs, 1976)
8. Ashirratham, Political Theory (Upper India, 1984)
9. S.B.Daview, Towards a Marxist Theory of Nationalism (MR, 1978)
10. Shankar Ghosh, Socialism Nationalism and Democracy in India
11. George Lichtein, Imperialism (Praeger, 1971)
12. C.B.Macpherson, Real World of Democracy (OUP, 1974)
13. Geovani Sartory, Democratic Theory (OUP, 1974)
14. J.C.Johari, Contemporary Political Theory (Sterling, 1988)
15. George Lichtheim, Imperialism (Penquine, 1977)
16. Felix Greene, The Enemy (Vintage, New York, 1969)

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B.A.(Honours)

Paper IV : State Politics (Meghalaya or Mizoram or Nagaland)

PART - I

In part One the theoretical aspects of State Politics will be studied.

1. Socio-Economic & Historical factors of State Politics.
2. Union-State Relationship in State Politics
3. Working of State Governments.
4. Party Politics in the States
5. Politics of Sub-State Movements
6. Electoral Politics

PART- II

In part two a study of State Politics in any One of the following :-

Meghalaya, Mizoram ,. Nagaland.

MEGHALAYA :

1. Traditional Political Institutions in Khasi, Jaintia and Garo Hills and the effects of British annexation.
2. Hill State Movement; Creation of the Autonomous State of Meghalaya and full fledged Statehood.
3. Electoral Politics in Meghalaya
4. Regional Political Parties in Meghalaya
5. District Council - Constitutional Structures, Finances and Working; State-District Council relationship.

Reading List :-

1. H.Bareh, The History and Culture of the Khasi People (Revised Edition) Shillong, 1987
2. H.Bareh, Khasi Democracy, Shillong, 1964
3. H.Bareh, Meghalaya, Shillong, 1974
4. Kamaleswar Sinha, Meghalaya : Triumph of the Tribal Genius (Delhi Publication Division (ISSD), 1970)
5. P.R.T.Gurdon, The Khasis (Cosmo Publishers (Reprint) 1975)
6. S.K.Chattopadhyaya (ed), Tribal Institutions of Meghalaya (Spectrum Publications, Gauhati, 1985)
7. V.V.Rao; N.Hazarika & B.Pakem (Eds), A Century of Government and Politics in North East India (1874-1983), Vol.II, Meghalaya S.Chand & Co., Delhi, 1984).
8. V.V.Rao, A Century of Tribal Politics in North East India (1874-1974), (S.Chand & Co., Delhi, 1976)
9. B.Datta Ray (Ed), Electoral Politics in Meghalaya, Shillong, 1978)
10. P.S.Datta (Ed), Electoral Politics in North East India (Omsons Publication, 1986).
11. Milton Sangma, History and Culture of the Garos (Book Today, Delhi, 1981).

contd...paper IV : State Politics(B.A.Hons)

12. Playfair, The Garos (United Publisher, Gauhati, 1975)
13. B.L.Hanzaria, Sixth Schedule to the Constitution of India : A Study (Gauhati, 1983)
14. P.C.Kar, British Annexation of Garo Hills (Nababharat Publishers, Calcutta, 1970)
15. J.B.Bhattacharjee, Garos and the English (1765-1874) (Radiant, New Delhi, 1973)
16. A.J.M.Mills, Report of the Administration of Khasi and Jaintia Hills, 1853, NEHU Publications.
17. S.K.Chaube, Hill Politics in North-East India (Orient Longman, Calcutta, 1974)
18. Jangsan Sangma, Law of Administration of Justice in Meghalaya (Iura, 1973)
19. S.K.Chaube, Electoral Politics in North East India (Madras University, 1985)
20. D.R.Syiemlieh, British Administration in Meghalaya : Policy & Pattern (Heritage Publishers, New Delhi, 1989)
21. Udayon Mishra, North East India Quest for Identity, Ch.I (Omsons Publication, New Delhi, 1988)
22. Udayon Mishra, Nation Building Development and Communication in N.E.India (Purbanchal Prakash, Gauhati, 1991)

MIZORAM :

1. Traditional political institutions and the effects of British annexation; Inner Line Regulation.
2. Insurgency Problem in Mizoram
3. Creation of the Union Territory of Mizoram, the MNF Accord and the creation of the State of Mizoram.
4. Electoral Politics in Mizoram
5. Regional Political Parties in Mizoram
6. District Council in Mizoram Constitutional Structure, Finances and working; State District Council relationship.

Reading List :-

1. L.B.Thanga, The Mizos (United Publishers, Gauhati, 1978)
2. V.V.Rao, N.Hazarika & H.Phansanga (Eds), A Century of Tribal Politics in N.E.India, Vol.III, Mizoram
3. V.V.Rao, A Century of Tribal Politics in N.E.India (1874-1974) (S.Chand & Co., Delhi, 1976)
4. S.K.Chaube, Hill Politics in N.E.India (Orient Longman, Calcutta, 1974)
5. A.G.MacCall, Lushai-Chrysalis (Firma KLM, 1949)
6. Lt.Col.Shakespeare, Lushai-Kuki Clan (Part I & II) (Research Institute, Aizawl, 1975)
7. B.B.Goswami, Mizo Unrest : A Study of Politicisation of Culture (Aelekh Publishers, Jaipur 1979)

5:2:1(221)

3

Paper IV(B.A.Hons) contd-----

8. Suhas Chatterjee, Mizoram Under the British Rule
(Mittal Publications Delhi, 1985)
9. N.Chatterjee, The Lushai Chief and his Administration
(Tribal Research Institute, Aizawl, 1975)
10. N.F. Parry, Lushai Custom : A Monograph on Lushai Customs and Ceremonies (Firma KLM (Reprint), 1976)
11. J.D. Baveja, The Land Where the Bamboo Flowers
(Publication Board of Gauhati, 1970)
12. Robert Reid, The Lushai Hills, Firma KLM, Pvt, Ltd (on behalf of Tribal Institute, Aizawl (Reprint) 1978)
13. P.S. Datta(ed), Electoral Politics in North East India
(Omsons Publications, 1986)
14. R.N. Prasad, Government and Politics in Mizoram
(New Delhi, Northern Book Centre, 1987)
15. Udayon Mishra, North East India Quest for Identity, Ch.I
(Omsons Publication, New Delhi, 1988)
16. Udayon Mishra, Nation Building Development and Communication in N.E. India (Purbanchal Prakashan, Gauhati 1991)

NAGALAND :

1. Traditional Political Institutions and the effects of British Administration; Inner Line Regulation
2. Creation of Naga Hills and Tuensang Area, Interim Body (Advisory Council) Creation of the State of Nagaland
3. Insurgency problem in Nagaland
4. Electoral Politics in Nagaland
5. Regional Political Parties in Nagaland
6. Local Self-Government in Nagaland.

Reading List :-

1. V.V. Rao, A Century of Tribal Politics in North East India (1874-1974) (S. Chand & Co., Delhi, 1976)
2. M. Horam, Naga Policy (B.R. Publishing Corp., Delhi, 1975)
3. M. Horam, Social and Cultural Life of Nagas, The Tongkhul Nagas
(B.R. Publishing Corp., Delhi, 1977)
4. M. Horam, Naga Insurgency : The Last Thirty Years
(Cosmo Publications, New Delhi, 1988)
5. Asaso Youno, The Rising Nagas : A Historical and Political Study
(Vivek, Delhi, 1974)
6. Verrier Elwin, The Nagas in the 19th Century (OUP, 1969)
7. P.N. Luthra, Nagaland: From a District to a State, DIPR, Arunachal Pradesh, Shillong, 1974
8. J.H. Hutton, The Ancient Nagas (London, OUP, 1969)
9. J.H. Hutton, The Soga Nagas (London, OUP, 1967)
10. J.P. Mills, The Ache Nagas (Bombay, OUP, 1973)
11. H. Bareh (Ed), Nagaland District Gazetteer, Kohima, Calcutta, Govt. of Nagaland, 1970
12. S.K. Chaube, Hill Politics in N.E. India (Orient Longman, Calcutta 1974)
13. C. Von Furer Haimendorf, The Konyak Nagas, Hatt, Rinchart & Winston 1969)
14. M. Aram, Peace in Nagaland (1964-72), New Delhi, Heinemann Publications, 1974
15. Udayon Mishra, North East India Quest for Identity (Ch.I)
(Omsons Publication, New Delhi, 1983)
16. Udayon Mishra, Nation Building Development and Communication in N.E. India (Purbanchal Prakashan, Gauhati 1991)

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B.A.(Hons) Optional

Paper V : Colonialism and Nationalism in India

- I Impact of Colonialism on Indian Society, Economy and Polity.
- II Colonialism and Nationalism : A Theoretical Analysis
- III Ideology of Socio-political Reform in 19th Century India:
a) Introduction
b) Raja Ram Mohan Roy
c) M.G.Ranade
- IV Nationalist Movement: The Moderate Phase-(1885-1905)
a) Moderates and their programme, political strategy, methods of Political action and social base - Study with particular reference to G.K.Gokhale, Dadabhai Naoraji
- V Nationalist Movement : The Extremist and Terrorist Phase-(1905-1920) Extremists/Terrorists and their policies, programmes, political strategy, methods of political action and social base- Study with particular reference to B.G.Tilak, Aurobindo and Bhagat Singh.
- VI Nationalist Movement : The Gandhian Era
a) Political strategy
b) Programmes of action and methods
c) Social Base and class character of the movement during this era
d) M.K.Gandhi contribution to Indian Nationalism
- VII Religious and Secular Nationalism
a) Syed Ahmed Khan
b) M.A.Jinnah
c) Swami Vivekananda
d) A.K.Azad
e) M.K.Gandhi and Jawaharlal Nehru
- VIII Perspectives on Tribal Movements with special reference to North East India
- IX The Socialist Phase ; with particular reference to -
a) M.N.Roy
b) Jawaharlal Nehru
c) Jaiprakash Narain and Vinoba Bhave
- X Nationalism : The Contemporary Phase : Problems of National integration and Unity in the context of regionalism, communalism and fundamentalism.

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contd....Paper V (B.A.Hons)

Reading List --

A.R.Desai, Social Background of Indian Nationalism
(Bombay, Popular Prakashan, 1975)

Bipan Chandra, Rise and Growth of Economic Nationalism in India
(New Delhi, Peoples Publishing House, 1956)

Bipan Chandra, Modern India (New Delhi, NCERT, 1971)

Bipan Chandra, Amles Tripathi and Barun De, Freedom Struggle
(New Delhi, National Book Trust, 1972)

G.Adhikari, Marx on India (New Delhi, Peoples Publishing House, 1969)

J.Bandhopadhyaya, Social and Political Thought of Gandhi
(Bombay, Allied Publishers, 1969)

Kiron Mukherjee, India's struggle for Freedom (Bombay, Manakatala, 1966)

Lichtheim, G., Imperialism (London, Penquin 1971)

L.P.Singh, The Left Wing in India (Muzaffarpur, New Publishers, 1965)

Marx and Engles, On Colonialism (Moscow, Progress Publishers 1969)

R.C.Majumdar, History of the Freedom Movement in India
(Calcutta, Firma, KLM, 1962)

R.P.Dutt, India Today (Calcutta, Manisha, 1870)

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B.A.(Hons)

Paper VI : Political Sociology

1. Nature definition, and scope of Political Sociology, Political Sociology and Sociology of Politics : Critical assessment of the role of Political Sociology as a formal subject.
2. Social stratification : Social conflict and legitimacy
3. Influence and Power
4. Authority
5. Political Socialisation : Political Culture
6. Political participation and Political parties
7. Pressure Groups
8. Bureaucracy
9. Elites : An outline of the elite theories of MOSCA, MICHAELS, PARETO, BURNHAM, C.WRIGHT MILLS, and Pluralist criticism thereof.
10. Marxist Critique of Liberal Political Sociology

SUGGESTED READING:

1. Amal K.M.Khopadhyaya, Political Sociology : An Introductory Analysis (Calcutta, K.P.Bagchi & Co ,1977)
2. T.Bottomore, Political Sociology (London, Hutchinson, 1979)
3. I.L.Herowitz, Foundation of Political Sociology(New York, Longmans, 1972)
4. Michael Rush and Philip Attheff, An Introductory to Political Sociology (London, Nelson, 1971)
5. Lewis A.Coser, Political Sociology(New York, Harper & Row, 1967)
6. Robin Blackburn, Ideology in Social Sciences: Readings in Critical Social Theory (Fontana, Collins, 1975)
7. S.Sartori, "From Sociology of Politics to Political Sociology" in S.M.Lipset, ed, Political and Social Science(New York, 1969) page 92-99.
8. Robin Blackburn "A Brief Guide to Burgeois Ideology" in Alexander Cockburn & Robin Blackburn, eds, Student Power (London, Penquine, 1969) pp.163-213.
9. L.S.Rathore, Political Sociology
10. S.M.Lipset, Political Man
11. S.M.Lipset, Politics & Social Science
12. Ali Ashraf and L.N.Sharma, Political Sociology
University Press, Hyderabad, 1983)

Journals -

1. British Journal of Political Science
 2. American Political Science Review
-

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B.A.(Honours)

Paper VII - The United Nations

Contents :

1. Origin of the United Nations, its Charter and Membership.
2. The Principal Organs of the UN
 - i. The General Assembly
 - ii. The Security Council
 - iii. The Economic and Social Council
 - iv. The Trusteeship Council
 - v. The Secretariat
 - vi. The International Court of Justice.
3. Specialised Agencies under the UN
4. Pacific Settlement of International Disputes.
5. UN and Human Rights
6. Collective Security under the UN
7. UN and world Peace.

Suggested Readings :

1. Niranjana Bhuiya, United Nations : Problems and Prospects (Calcutta, K.P. Bagchi and Co., 1980)
2. Stephen S. Goodspeed, The Nature and Function of International Organisation (New York, 1967)
3. A. Leroy Bennett, International Organisation (New Jersey, Prentice Hall, 1930)
4. James Barress, ed., The UN : Past, Present and Future (New York, Free Press, 1972)
5. N. Nicholas, The United Nations as a political Institution (London, Oxford University Press, 1967)
6. S.D. Bailey, The General Assembly of the United Nations (New York, Frederick Praeger, 1964)
7. Robert W. Gregg and Michael Barku, (eds) The United Nations : Systems and its Functions (New Delhi: Affiliated East Press, 1970)
8. Goodrick Hambre Simons, The Charter of the United Nations (New York, Columbia University Press, 1969)
9. Iris Claude Jr., Swords in Ploughshares (New York, Random House 1964)
10. C.V. NaraSimhan, The UN : An Inside View (Vikas Publishing House Pvt. Ltd., 1938)
11. Evan Luard, The UN : How it works and what it does (Macmillan Press Ltd., 1982)

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B.A. Honours (Compulsory)

Paper VIII : Public Administration

Course Contents-

1. Introduction - Meaning, scope and significance of Public Administration; Private and Public Administration; Politics and Public Administration; Evolution of Public Administration as a field of study. Development Administration.
2. Theories of Administration:- Scientific management, Bureaucratic management; Classical Theory; Human Relations Theory; Behavioural Approach, Systems Approach.
3. Principles of Administration: Hierarchy Unity of Command, Span of control; Authority and Responsibility, Delegation, Decentralisation and coordination.
4. Structure of Organisation:- Formal and Informal, Bases of Organisation; Integrated (Departmental) versus Unintegrated Organisation; Line and staff agencies, Chief executive; Independent Regulatory Commissions; Public corporations.
5. Field Administration: Importance of field agencies; Patterns of Headquarters-field relationships; Methods of Headquarters Control; Centralisation field coordination.
6. Personnel Administration : Civil Service in Developed and Developing Countries; Recruitment- Methods of Recruitment and agencies, Training; Promotion, Service conditions; Discipline and Morale; Collective bargaining and joint consultative machinery; Neutrality versus Commitment; Civil Service and Political Executive.
7. Control over Administration: Legislative, Executive and Judicial Professional Ethics.
8. Citizen and Administration: Ombudsman; Lokpal and Lokayukta; Public Relations
9. Administrative Law : Growth of Administrative Law; Delegated Legislation and Administrative Adjudication; Safeguards.
10. Financial Administration : Concept of Budget; Formulation and Execution of Budget; Budget as a tool of administration; Accounts and Audit.

Suggested Readings :-

1. A. Avasthi and Maheshwari, Public Administration (Agra, Lakshmi Narayan, Agarwal, 1983)
2. M.P. Sharma and B.L. Sharma, Public Administration in Theory and Practice (Allahabad, Kitab Mahal, 1987) 17th Edition.
3. Vishnoo Bhagwan and Vidya Bhushan, A Text Book of Public Administration (New Delhi, S. Chand, 1981)
4. F.M. Marx (ed), Elements of Public Administration (New Delhi, Prentice Hall, 1968)

contd---Paper VIII(B.A.Hons); Pub.Admn.

5. Mohit Bhattacharya, Public Administration
(Calcutta, World Press, 1981)
6. B.G. Peters, The Politics of Bureaucracy(London, Longman, 1984)
7. Ivan L. Richardson and S. Baldwin, Public Administration :
Government in Action(Columbus, Ohio, A. Bell & Howell Co., 1976)
8. Nicholar Henry, Public Administration and Public Affairs
(Englewood Cliffs, N.J. Prentice Hall, 1975)
9. Howard E. McCurdy, Public Administration : A Synthesis
(California, Cunnings Publishing Company, 1975)
10. John M.P. Fiffner & Robert Presthus, Public Administration
(New York, Ronald Press Company, 1967)
11. Herbert A. Simon, James D. Thompson, et.al., Public Adminis-
tration (New York, Knoff, 1950)
12. F.A. Nigro, Modern Public Administration
(New York, Macmillan, 1984)
13. Mohit Bhattacharya, Bureaucracy and Development
(Uppal Publishing house, New Delhi, 1979)
14. V.A. Pai Panandiker & S.S. Khsirsagar, bureaucracy and
Development Administration(Centre for Policy Research
New Delhi, 1978)
15. G.F. Gant, Development Administration (wisconsin Press, 1982)

Journals :-

1. Indian Journal of Public Administration
(Special Issue, July-September, 1990
Vol. XXXVI.)
2. Administrative Change

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B.A.(Hons) : Optional

Paper IX : Government and Politics in North East India

1. Regional Profile and Importance of North-East India
2. Formation of Modern Assam - A brief study of -
 - a) Assam under the Governor-General of India(1826-54); Lieutenant Governor of Bengal(1854-74); Chief Commissioner of Assam(1874-1905, 1912-21), Lieutenant-Governor of East Bengal and Assam (1905-12); Governor of Assam since 1921.
 - b) State of Indian Union since 1950 - Separatist movements- Nagaland Transitional Provision Regulation 1957 and State of the Indian Union since 1963 - Assam Reorganisation (Meghalaya) Act, 1969 and North-Eastern Areas Reorganisation Act, 1971.
 - c) Arunachal Pradesh and Mizoram as Union Territories (1972-85) and States of the Indian Union since 1985.
3. Princely States and Tribal Areas - A brief study of -
 - a) Khasi States since 1947
 - b) Manipur and Tripura as Princely State(Before 1949); Part C States(1950-56); Union Territories(1956-72); States of the Indian Union since 1972.
 - c) Tribal Areas under Act VI of 1835; Garo Hills Act XXII of 1869; Bengal Eastern Frontier Regulation 1880; Chin Hills Regulation 1806; Government of India Acts 1919 and 1935; and Constitution of India since 1950 - Fifth and Sixth Schedules to the Indian Constitution and the Manipur Hills Areas District Council Act, 1971.
4. Development of Assam(and Eastern Bengal)Legislative Council (1906-1946, and Assam Legislative Assembly (1937-1972)
5. Formation of Governments Under Dyarchy and Provincial Autonomy
6. Main regional political parties
7. Administration of justice since 1950
8. Women in Politics
9. North-Eastern Council
10. Panchayati Raj.

Suggested Readings :-

1. Bareth, H., Meghalaya, (NEINFS, Shillong), 1974.
2. Choube, S.K., Hill Politics in N.E. India (Orient Longman, Calcutta
3. Guha, A., Planter-Raj to Swaraj, (People's Publishing¹⁹⁷³ House, New Delhi, Reprint, 1988)
4. Rao, V.V. et.al., A century of Government and Politics in North-East India, Vol. I, Assam, 1870-1980 (S.Chand and Co., New Delhi, 1983).
5. Rao, V.V. et.al., op.cit, Vol.2, Meghalaya, 1874-1983 (S.Chand & Co., New Delhi, 1983)
6. Rao, V.V. et.al., op.cit, Vol.3, Mizoram, (S.Chand & Co., New Delhi, 1987)

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B.A.(Hons) : Optional

Paper X : Human Rights

Suggested Course Contents -

1. The Definition and Scope of Human Rights.
2. Universal Declaration of Human Rights
3. Covenant of Human Rights.
4. Group Rights - Rights of women, Children, minorities
5. Collective and Individual Rights.
6. Varieties of exploitation-Economic, Political, Social.
7. Contribution of Agencies for the protection of Human-Rights- I.C.J., Amnesty International.
8. Human Rights and Racial Equality
9. Promotion and protection of Human Rights at the National level.
10. Promotion and protection of Human Rights at the International level.

Suggested Readings :-

1. Buerghenthal, Thomas(ed), International Human Rights (Allied, Bombay, 1979)
2. Carey, J., UN Protection of Civil and Political Rights (New York, 1970)
3. Chakravorty, R., Human Rights and the United Nations, (Progressive Publishers, Calcutta, 1958)
4. Dominguez, J., et.al, Enhancing Global Human Rights (1930)
5. Iyer, V.R.K., Human Rights and the Law (FedPal Lane House, Indore, 1934)
6. Kashyap, S.C., Human Rights and Parliament (Metropolitan, New Delhi 1978)
7. Lauterpacht, H., International Law and Human Rights (London, Reprinted, 1968)
8. Luard, E., (ed), The International Protection to Human Rights (New York, 1967)
9. Meron, Theodore, Human Rights in International Law (Oxford, Clarendon Press, 1984) 2 vols.
10. Ramcharan, B.G. (ed), Human Rights (The Hague, 1979)
11. Robertson, A.H., Human Rights in National and International Law (Manchester, 1968)
12. Robertson, A.H., Human Rights in the world (Manchester, 1972)
13. Schwells, E., Human Rights and the International Community (Chicago, 1964)
14. Sieghart, Paul, The International Law of Human Rights (Oxford, Clarendon Press, 1983)
15. Sohn, L., and Buerghenthal, F., International Protection of Human Rights (1973)
16. United Nations, UN Action in the field of Human Rights (New York, 1930)
17. Vallat, F., (ed), An Introduction to the study of Human Rights (London, 1972)
18. Vasak, K., The Information Dimension of human Rights (UNESCO, 1979)

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B.A. (Honours)

Paper - XII : Contemporary Western Ideas.

1. Nature and scope of Contemporary Political Thought
2. Mao
3. Gramsci
4. Santiago Carrillo
5. Marcuse
6. John Rawls & C.B. Macpherson
7. C.W. Mills
8. Michael Oakshott
9. Robert A. Dahl
10. David Easton.

Readings :

1. Gould A. Thursby - Contemporary Political Thought : Issues in Scope, Value and Directions (New York, 1969).
2. Eugene J. Meehan - Contemporary Political Thought : A Critical Study (Flamewood, Illinois, the Dorsey Press, 1967).
3. O.M. Bakshi - The Crisis of Political Theory (Oxford University Press, Delhi, 1987).
4. J.C. Johari - Contemporary Political Theory (Sterling Publishers, New Delhi, 1988).
5. K. Graham - Contemporary Political Philosophy
6. Andrew Hacker - Political Theory, Philosophy and Ideology (New York, 1969).
7. Stuart Schram - The Political Thought of Mao Tse Tung (Harmondsworth, 1969).
8. Santiago Carrillo - Eurocommissions and the State (London, 1977).
9. F. Claudin - Eurocommissions and Socialism (London, 1978).
10. Maurice Ceranston - Six Essays in New Left
11. John Rawls - A Theory of Justice (London, Oxford University Press, 1976).
12. Charles J. King & J.A. Nagiluray - Political and Social Philosophy.
13. C.B. Macpherson - Real World of Democracy.
14. Michael Oakshott - Rationalism in Politics and other essays (London, 1967).
15. Randhir Singh - Reason, Resolutions and Political Theory Peoples' Publishing House, New Delhi, 1967).
16. Robert A. Dahl - A Preface to Democratic Political Theory (Chicago: University Chicago Press, 1965).
17. David Easton - Political System (New York, 1963).
18. A.K. Basrah - Systems Analysis in Political Science.
19. Thomas A. Spragens - Jr. - The Dilemma of Contemporary Political Theory New York - Dunken, 1973).
20. L. Kolakowski - Main Currents of Marxism (Oxford, 1978).

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B.A. (HONOURS) : OPTIONAL

Paper XI - Course Content

Paper XI - Ancient and Modern Indian Political Ideas

Suggested Course Contents:-

PART - I

1. Name, History and sources of the Science of Polity.
2. Concept of State and Government in Ancient India; contributions of Manu and Kautilya.
3. Political Institutions in Ancient India : Kingship, Republics, Sabha and Samiti.
4. State and Citizen in Ancient India.
5. M.N. Roy
6. Jaiprakash Narain.

PART - II

1. Gandhian Concept of State-Hind Swaraj.
2. Gandhian Concept of Non-Violence.
3. Gandhian economics : Trusteeship, Industrializations and Cottage Industries.
4. Jawaharlal Nehru on Democratic Socialism.
5. Nehru and Non-alignment.

Suggested Readings:-

1. Altekar, A.S., State and Government in Ancient India (MBD Banaras, 1949).
2. Bandhopadhyaya, J.B., India's Foreign Policy.
3. Bhandarkar, Some Aspects of Ancient Hindu Polity (Delhi, 1950).
4. Bordurant, Joan., Conquest of Violence (OUP, Bombay, 1959).
5. Fisher, Louis., The Life of Gandhi (BVP, Bombay, 1955).
6. Ghoshal, U.N., A History of Indian Political Ideas (OUP, Bombay, 1959).
7. Ghoshal, U.N., Studies in Indian History and Culture (Orient Longman, Bombay).
8. Jayaswal, K.P., Hindu Polity (3rd Edition, Bangalore 1955).
9. Karunakaran, K.P., India and the World.
10. Majumdar, R.C., Ancient India (MBD Banaras, 1979).
11. Nanda, B.N., Nehru and Socialism.
12. Nehru, Jawaharlal., Discovery of India.
13. Pant, S., History of Political Thought (Prakashan Kendra, Lucknow, 1983).
14. Pillai, R.C., Nehru and his critics.
15. Prasad, Beni., Theory of Gouti Ancient India (Allahabad, 1928).
16. Rajan, M.S., Studies in India's Foreign Policy.
17. Spratt, P., Gandhism (Huxley Press, Madras 1939).
18. Tendulkar, D.G., Mahatma Vol. I - IV, (The PDMIS, Calcutta, 1947).
19. Thapar, Romila., Ancient India.
20. V.P. Verma - Modern Indian Political Thought (Lakshmi Narain Agarwal, Agra, 1990).

21. Ernest Mandel - From Stalinism to Eurocommunism (London, 1978).
22. Urban (ed.) - Eurocommunism (London, 1978).
23. David Molellan - Marxism After Marx (The Macmillan Press Ltd., London, 1979)
24. A. Gramsci - The Modern Prince and other visitings (Edited L. Masks, London, 1957).
25. A. Gramsci - Selections from the Prism Notebooks (Ed. Floare and C. Nowell Smith, London, 1971).
26. Perry Anderson - The Antinomies of Antonio Gramsci, New Left Review, 100, 1976-77
27. Arthur Cohen - The Communism of Mao Tse Tung (Chicago, 1964).
28. Marcuse - One Dimensional Man : Studies in the Ideology of Advanced Industrial Society (Boston, 1964).
29. Marcuse - Reason and Revolutions : Hegel and the rise of Social Theory (London, 1964).
30. Marcuse - Studies in Critical Philosophy (London, 1972).
31. Alasdair MacIn Tyre - Marcuse (London, 1970).
32. Robert W. Marks - The Meaning of Marcuse (New York, 1970).
33. C.W. Mills, The Power Elite (OUP, New York, 1973).

B.A. (HONOURS)

Paper XIII - Geo-Politics

Objective of the Course : To introduce the Geo-political interpretation (meaning) to the concept of Power and concept of State. This is to be done at different scales (Local, Regional, National and Global identifying people, territory and ideology).

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Course Content :

- Unit I : Nature, Scope and Significance of Geo-politics; Political Geography and Geo-politics with emphasis on Geo-politics as the study of political geography from a national point of view.
- Unit II : Concepts and theories in Political Geography - Concepts of the State (Liberal & Marxian); Elements of Power - Capital Cities, Nationalism & Ideology.
- Unit III : Development of Political Aspects in Relation to Geographical Environment - Location, Size and Shape.
- Unit IV : Development of Political Aspects in Relation to Geographical Environment - Study of the land and Water Masses in Relation to their political significance (Relief, Inland Water Bodies, Coasts and Maritime Development and also Seas and Oceans).
- Unit V : Relation of Geo-political Environment - Ethnic, Linguistic and Religious.
- Unit VI : Global Strategic views - Geopolitical Theories of Mackinder, Spykman, De Seversky and Hofstadter.
- Unit VII : Geopolitical study of Economic Elements - Natural resources, Food and Power, Minerals and Industry, trade and investment, and transportation.
- Unit VIII : The State as a politico-territorial phenomenon - the changing value of location, size and shape in the political geography of States; Organisation of government over the national territory - Unitary and Federal; Boundaries and Frontiers - Function and classification of international boundaries; World Government - The United Nations.
- Unit IX : International tensions - identification of tension areas and factors contributing to tensions in different areas with special

reference to West Asia and the Indian Ocean Region;
Regionalism in International relations.

Unit X : Geo-political study of India - application of Geo-political model, relevance of geopolitical model and geopolitics and Nuclear age.

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Suggested Readings :

1. Dikshit, R.D. : Political Geography : A Contemporary Perspective, Tata McGraw-Hill Publishing Co., New Delhi, 1982.
2. Valkenburg, S.V. & Stotz, C.L. : Elements of Political Geography, Prentice-Hall of India, New Delhi, 1963.
3. Prescott, J.R.V. : Political Geography, Methuen & Co., London, 1972.
4. Taylor, Peter : Political Geography, Longman, London, 1985.
5. Short, J.R. : An Introduction to Political Geography, Routledge & Kegan Paul, London, 1982.
6. Cyorgy, A. : Geopolitics (University of California - Berkeley).
7. Moodie, A.E. : Geography Behind Politics
8. Hans Weigen : Principles of Political Geography, Appleton-Century Crofts.
9. Muir, R. : Modern Political Geography, Macmillan, London, 1981.
10. De Blij, Harm, J. : Systematic Political Geography, John Wiley & Sons Inc., New York, Latest Edition.
11. Taylor, Peter and House, John : Political Geography : Recent Advances and Future Directions, Barnes and Noble Books, Totowa, N.J., 1984.
12. Cox, K.R. : Conflict Power and Politics in the City : A Geographical View, 1973
13. Cohen, S.B. : Geography and Politics of World Divided, U.P., London, 1973.
14. Sukwal, B.L. : Political Geography of India.

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B.A. (Hons) - N.E.H.U.

Paper XIV : Politics of South Asia

This course is designed to provide a framework for making a comparative study of Political Systems and governmental structures and Politics in South Asia. It is also intended to study the structural and functional aspects of these systems, while examining their characteristics and differences. Furthermore, an attempt would be made in the direction of studying the different attributes that have been generally associated with political development and inter-state relations of these countries and prospects for regional co-operation.

- I South Asia - A general Survey-Colonial Heritage; Strategic Importance.
- II Growth of Nationalism in South Asia and role of ruling elites.
- III Governmental Structures; Political Processes and political Development.
- IV Political Infrastructure - Parties and Pressure Groups .
- V Religion and Politics in South Asia
- VI Role of language, Caste and Ethnicity
- VII South Asian Regional Cooperation
- VIII Problems of economic development
- IX India and her Neighbours
- X South Asia - Retrospect and Prospect.

READINGS

Almond Gabriel A. and Coleman J.S., Politics of Developing Areas
(Princeton, PUP, 1960)

Almond, Gabriel A. and Powell, G. Bingham Jr., Comparative Politics: A Developmental Approach (New Delhi, Amerind Publishing Co. 1975)

Amin Samin, Imperialism and Unequal Development (Sussex, Harvester, 1977)

Bahadur, Kalim ed., South Asia in Transition: Conflicts and Tensions,
New Delhi : Patriot Publishers, 1966)

Blackburn R, Explosion in a Subcontinent-India, Pakistan, Bangladesh and Ceylon (Harmensworth, 1975)

Brocher, M. The New States of South Asia: A Political Analysis (London, 1963)

Chandra Bipan, Nationalism and Colonialism in India (New Delhi, 1979)

Franda, Marcus and Brass, Paul R., Radical Politics in South Asia (Cambridge, 1973)

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- Gough Kathleen and Sharma H. ed., Imperialism and Revolution in South Asia
(New York, MRP, 1978)
- Israel, Milton, ed., National Unity; The South Asian Experience
(New Delhi Promilla, 1983).
- Johnson, B.L.C., Development in South Asia, (New York, 1983)
- Low D.A. ed., Studies in Modern South Asian History (London, 1978)
- Mathur, P.C. ed., Government and Politics in South Asia (A Book of Readings)
Vol.I : The Domestic Scene, (Jaipur: Printwell Publishers,
1985)
- Muni, S.D., Arms Build Up and Development Linkages in The Third World,
(New Delhi, Heritage, 1983).
- Myrdal Gunnar, Asian Drama: An Enquiry Into the Poverty of Nations Vols. I
and II (Massachusetts, 1968)
- Nayar, Kuldip, Distant Neighbours: A Tale of the Sub-Continent, (New Delhi,
Vikas, 1972)
- Park ed., South Asian Political Systems (New York Ithaca, 1976)
- Phadnis, Urmila, Muni, S.D. and Bahadur Kalim eds., Domestic Conflicts
Conflicts in South Asia: Vol I: Political Dimensions, (New Delhi, South
Asian Publishers, 1986).
- Ramakant, Regionalism in South Asia (Jaipur, 1983)
- Robinson, E.A.G., Economic Development in South Asia (London, 1970).

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THREE YEAR DEGREE COURSE

Examination Pattern for Physics-General

Note: The S.I. Units to be used throughout. In theory papers 20% marks shall be for objective type multiple choice questions and 20% for small problem oriented questions. The remaining long answer part of the paper will contain long answer type questions (45%) and numerical problems (15%)

First Year

Paper I : 3 hours examination : 10 Marks

	Lectures
Group A - Mechanics & Properties of Matter ...	50
Group B - Heat & Thermodynamics ...	40
Group C - Fourier Series and Transform ...	10
Acoustics ...	25
Special Theory of Relativity ...	15
Total	<u>140 Lectures</u>

In the long answer part of the theory paper six questions (two from each group) to be asked and four questions (at least one from each group) to be answered.

Second Year

Paper II : 3 hours examination : 80 Marks

	Lectures
Group A - Optics ...	70
Group B - Electricity & Magnetism ...	50
Electronics ...	20
Total	<u>140 Lectures</u>

Six questions (three from each group) to be asked and four questions (two from each group) to be answered in the long answer part of the theory paper.

Paper III : Practical : 6 hours examination : 120 Marks

Two experiments to be performed (one from each group)

Third Year

Paper IV : 3 hours examination : 100 Marks

Lectures

Group A	-	Atomic & Nuclear Physics	...	80
Group B	-	Quantum Mechanics	...	30
		Solid State Physics	...	30
Total				140 Lectures

Six questions (three from each group giving equal weightages to Quantum Mechanics and Solid State Physics) to be asked and four questions (two from each group) to be answered in the long answer part of the theory paper.

Paper I : Physics General : 100 Marks

Mechanics & Properties of matter (50), Heat & Thermodynamics (40), Fourier Series (10), Acoustics (25), Special Theory of Relativity (15), Mechanics (30)

Laws of motion, motion in an uniform field, components of velocity and acceleration, velocity and acceleration in different co-ordinate systems-moving frame and rotating frame. Centripetal acceleration due to rotation, Coriolis force with examples (5)

Motion under a central force, deduction of Kepler's laws, gravitational potential and fields due to spherical body. Gauss's laws and Poisson's equation for gravitational field. (6)

System of particles, centre of mass and its equation of motion, conservation of linear and angular momenta, elastic and inelastic collisions. (6)

Rigid body motion, rotational motion, moment of inertia-theorems of parallel and perpendicular axes, moments of inertia of rect-

angular lamina, disc, cylindrical and spherical bodies (Hollow and solid), Euler's equation. (6)

Oscillations : Differential equation simple harmonic motion and its solution, examples of simple harmonic motion. Bar pendulum and its time period, Kater's pendulum - Bessel's modified time period, torsional pendulum. spring and mass system, Oscillation of two masses connected by a spring. (7)

Properties of matter : (20)

Elasticity : Small deformations, interrelations of elastic constants, bending of beams, cantilever and beams supported at both ends, torsional rigidity (7)

Kinematics of moving fluids, equation of continuity, Euler's equation, Bernoulli's theorem, viscosity, Poiseuille's equation, Raynold's number, deduction of stoke's law. (8)

Books Recommended:

1. R. Sengupta and H. Chatterjee : A treatise on General properties of matter (New Central Book Agency)
2. D.S. Mathur : Elements of properties of matter (S. Chand & Co.)

Further reading:

1. ^{F.H. and V.H.L.} Newman/Searle : Properties of Matter (Orient Longman)
2. Theoretical physics - Vol.1. K.C. Kar (Das Gupta and Co.)

Heat and Thermodynamics : (4)

Kinetic theory of gases : a review, Kinetic energy interpretation of temperature, root mean square (RMS) velocity, Brownian motion, estimates of Avogadro's number, equipartition of energy (deduction not necessary), specific heats of gases, deduction of $C_p - C_v = R$ experimental determination of specific heats at constant pressure and constant volume (5)

Real gas : real gas as different from an ideal gas, van der Waals' gas, equation of state, P-V curves based on this and its difference with the experimental curves, the critical constants, gas and vapour (8)

Thermal conductivity and diffusivity, rectilinear flow of heat (one dimensional), Ingenhausz's experiment. (3)

Thermodynamics : First law of thermodynamics, Mechanical equivalent of heat J, Callender & Barnes' experiment. Isothermal and adiabatic changes and their corresponding works done, ratio of specific heats of gases and its determination by Clement & Desormes' method. (5)

The latent heat equations and their applications. (2)

Liquefaction of gases-Boyle temperature and inversion temperature, principles of cascade and regenerative cooling, liquefaction of air and hydrogen

Theory of Joule Thomson effect, temperature of inversion (9)

Second law of thermodynamics : reversible and irreversible processes. Carnot cycle, Carnot theorem, practical cycles used in internal combustion engines. Kelvin's thermodynamic scale, entropy and its change in reversible and irreversible processes, entropy of perfect gas. (8)

Books Recommended:

1. Text book of Heat : J.A. Rajan (S. Chand & Co. Ltd.)
latest edition.

Further reading:

1. College Physics - Vol.II : ^{D.V.} Sinha and ^{J.C.} Das Sharma (Modern Book Agency Calcutta, latest edition)
2. Heat and Thermodynamics : Brijlal and N. Subhramanyam (S. Chand & Co. Ltd.), latest edition)
3. Text book on Heat : P.K. Chakraborty (Hindustan Publishing concern, latest edition)

and
Fourier series transform: (10)

Definition, evaluation of coefficients, cosine and sine series, complex form of Fourier series, properties of Fourier series, applications of Fourier series in (i) square wave (ii) full wave rectifier. Sine and cosine transform - applications in evaluation of integrals (10)

Books recommended:

1. Fourier series and Boundary problem
- R.V. Churchill (Mc.Graw Hill Co. latest edition)

Acoustics : (30)

Waves : Waves, speed of transverse waves in string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves, waves over a liquid surface, group and phase velocities. (4)

Superposition of waves: linear homogenous equations, and the superposition principle, nonlinear superposition and consequences. (3)

Standing waves: Standing waves as normal modes of sounding systems, harmonics and quality of sound, examples, Chladni figures, production and detection of ultrasonic waves and applications. (4)

Noise & music: The human ear and its responses, limits of human audibility, intensity and loudness, units, musical scale, noise pollution, its implication and remedy. (3)

Free and forced vibrations, condition of maximum amplitude, resonance and condition of resonance, sharpness of resonance (5)

General form of equation of vibrations: plucked string, Young's law, vibration of struck string, vibration of bowed string, laws of bowed string. (5)

Auditorium accoustics: reverberation, Sabine's law, theory of reverberation, energy density in an enclosure, absorption of energy, growth and decay of energy, time of reverberation, live and dead rooms, reverberation time of a dead room, measurement of absorption coefficients. (6)

Books Recommended:

Special Theory of Relativity: (15)

Reference frames, inertial frame, Galilean invariance and conservation laws, Michelson - Morley experiment, search for ether. (5)

Postulates of special theory of relativity, Lorentz transformations, length contraction, time dilation, velocity addition theorem, acceleration, invariance of the velocity of light,

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-8-

relativistic formula for aberration, variation of mass with velocity, Relativity of simultaneity, mass energy equivalence, Particle with zero rest mass. (10)

Books recommended:

Paper II . Physics General : 80 Marks

Optics (70), Electricity & Magnetism (50), Electronics (20)

OPTICS

GEOMETRICAL OPTICS: (14)

Thick lens : Cardinal points, image formed by thick lens; concave & convex, relation between the distances of cardinal points, object & image distance from principal planes, cardinal points of Ramsden and Huygens' eyepieces, location of cardinal points by nodal slides. (5)

Aberrations . Methods of minimising monochromatic aberrations, aplanatic points & surfaces, Abbe's homogeneous immersion microscope objective, calculation of axial and lateral chromatic error, condition of achromatic combination of two lenses in contact & separated (calculation), achromatic combination of prisms. (6)

Comparison of luminous intensities of two sources by Photo voltaic photometer, determination of velocity of light by Kerr-cell method (3)

PHYSICAL OPTICS: (56)

Fermat's principle and lens formula from wave theory (2)

Conditions of interference by analytical treatment, classification of different methods for the production of interference fringes, Fresnel's biprism-formation of fringes, theory, wavelength determination, angle of biprism, thickness of thin film. Achromatic fringes, production of fringes by Lloyd's mirror, change of phase by reflection, Colour of thin film, reflected and transmitted light, fringes of equal width and equal inclination (Haidenger fringes). Theory of Newton's rings and experimental determination of wavelength and refractive index. (10)

Jamin's and Rayleigh interferometre : Construction, determination of refractive index of a gas and thickness of thin film. (2)

Michelson's interferometer : Construction, formation of fringes, determination of wavelength and small differences of wavelength, standardisation of metre. (3)

Fabry-Perot interferometer: Construction, production of fringes, angular width, linear width, angular dispersion, spectral range, resolving power. Lummer and Gehrcke plate interferometer: construction, separation of maxima, dispersion, spectral range, resolving power, comparison of Fabry-Perot and Lummer plate. (4)

Diffraction: Fresnel's half-period zones, areas, displacement, phase; Zone plate-its similarity with convex lens. Fresnel diffraction: Straight edge, circular aperture, obstacle, rectangular aperture. Fraunhofer diffraction: single slit, double slit, N parallel slits, theory of plane diffraction grating, dispersive power, resolving power; rectangular aperture, circular aperture, resolving power of telescope & microscope, outline of phase contrast microscope. Concave grating: construction and theory, Rowland mounting. (12)

Polarisation: Different methods of production of polarised light, Brewster's law, optic-axis, double diffraction, Nicol prism-construction, uses. Polaroid, Uniaxial crystals, propagation of

plane wave in uniaxial crystal; Quarter wave plate and its use to produce and detect elliptically and circularly polarised light. Babinet compensator-its action and applications. (8)

Biot's laws, Fresnel's explanation of the rotation of the plane of polarisation and its verification. Laurent's Polarimeter-construction, half shade plate, strength of solution. wave surfaces in bi-axial crystals and origin of internal and external conical refractions. (4)

Faraday effect, Verdet's constant and its determination, difference from natural rotation. Spectroscopy: Ultraviolet and infrared spectroscopy, Constant deviation spectrograph. (2)

Raman effect, study of Raman effect in liquid, Raman shift, Stokes and anti-stokes lines, Smekal quantum explanation of Raman effect. (2)

Scattering of light, normal and anomalous dispersions, theory of dispersion, absorption, experimental demonstration of anomalous dispersion in sodium. (3)

Laser: Purity of spectrum, spontaneous & induced emission, population inversion, principle of laser, He-Ne Laser, properties of laser (monochromaticity, directionality), applications of lasers. (4)

Books recommended:

1. A Text book of Light (for advanced degree students)-K.G. Majumdar (Modern Book Agency Pvt. Ltd. latest edition)
2. Optics-A.K. Ghatak (Mc Graw Hill, latest edition)

Further reading:

1. A text book of Optics-Brijlal and N. Subramanyam (Nira Prabhawan, latest edition)
2. A Text book of light-D.N. Vasudev (Atma Ram & Sons, latest ed.)
3. Geometrical and Physical Optics-P.K. Chakraborty (New Central Book Agency, latest edition)
4. Optics and Atomic Physics-D.P. Khandelwal (Himalaya Publishing House, latest edition)

Electricity & Magnetism (50)

Electrostatics (30)

Electric field: Coulomb's law expressed in vector form, calculations of $\vec{E}$ for simple distributions of charges at rest (line, surface & volume). Dipole and quadrupole fields.

Work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Electric potential ϕ , $\vec{E} = -\nabla\phi$, torque on a dipole in a uniform field and its energy, flux of the electric field, Gauss' law and its application for finding $\vec{E}$ for symmetric charge distributions, field at the surface of a conductor, screening of electric field by a conductor, capacitors, electrostatic field energy, force per unit area of a conductor in an electric field, conducting sphere in a uniform electric field, point charge in front of a grounded plane infinite conductor.

Dielectrics, parallel plate capacitor with a dielectric constant, polarisation and polarisation vector, displacement vector $\vec{D}$, boundary conditions satisfied by $\vec{E}$ and $\vec{D}$ at the interface between two homogenous dielectrics, illustration through an example.

Electric current (Steady and Alternating) (10)

Steady current, current density $\vec{J}$, varying currents and equation of continuity, rise and decay of current in LR and CR circuits, decay constants, transients in LCR circuits, AC circuits, complex numbers and their uses in solving problems in AC circuits, complex impedance and reactance, series and parallel resonance, Q factor, power consumed in an AC circuit, power factor, Y and Δ -networks and transmission of electric power.

Magnetostatics (10)

Force on a moving charge, Lorentz force equation and definition of $\vec{B}$, force on a straight conductor carrying current in

uniform magnetic field, force on a current loop, magnetic moment, angular momentum and gyromagnetic ratio.

Biot and Savart's law, calculation of $\vec{H}$ in single geometrical situations, Ampere's law, $\vec{\nabla} \cdot \vec{B} = 0$, $\vec{\nabla} \times \vec{B} = \mu_0 \vec{J}$, field due to a magnetic dipole, magnetisation current, magnetisation vector, $\vec{H}$ field, magnetic permeability (linear cases), interpretation of a bar magnet as a surface distribution of solenoidal current.

Varying fields (10)

Electromagnetic induction, Faraday's law, electromagnetic force,

$\mathcal{E} = \oint \vec{E} \cdot d\vec{l}$, integral and differential forms of Faraday's law, mutual and self inductance, transformers, energy in a static magnetic field. Maxwell's displacement current, Maxwell's equations, electromagnetic field energy density.

Books recommended:

1. Electricity & Magnetism-D.C. Tayal (Himalaya Pub. House, 1991)
2. Electricity & Magnetism-Brijlal and N. Subramanyam (C Ratan Prakashan Mandir, latest edition)

Further reading:

1. Electricity & Magnetism-R.C. Lakhapal (Kalyani Publishers, 1992)
2. Berkeley Physics Course Vol 2-Electricity and Magnetism, Ed.. E.M. Purcell (Mc Graw Hill, latest edition)
3. Electricity and Magnetism-A.D. Mahajan and P.M. Rangwala (Tata McGraw Hill, latest edition)

Electronics : 20

Diode as a circuit element, load line concept, ripple factor, Zener diode, voltage stabilization, Transistor characteristics in CB, CE, and CC modes, graphical analysis of CE configuration. (10)

Small signal transistor amplifier: General principles of operation, classification, distortion, RC coupled amplifier, gain & frequency response, input and output impedance, multistage amplifier, transformer coupled amplifiers. (10)

Books Recommended:

1. Basic Electronics-D.C. Tayal (Himalaya Publishing House 1991)
2. Electronics Fundamentals & Applications - J.P. Ryder
(III Edition Prentice-Hall of India)

PAPER III : B.Sc. Physics : General : Marks 120

GROUP - A

1. Determine the acceleration due to gravity g by Bar/Kater's pendulum
2. Determine the Moment of Inertia of a body using a torsional pendulum
3. Determine the modulus of rigidity of the material (cylindrical rod shape) by the statical method.
4. Determine the young's module of a wire by Searle's method.
5. Determine the coefficients of viscosity of water by capillary tube method.
6. Determination of surface tension of liquid by Jaegar's method
7. Determine the focal length of two convex lenses and their combination by the displacement method.
8. Determination of magnifying power of a telescope.
9. Determination of refractive index of material of a prism at different wavelengths by spectrometer.
10. Determine the radius of curvature of a convex lens by Newton's rings method.
11. Determine the number of lines per unit length of the grating using spectrometer.
12. Determine the refractive index of a liquid/solid travelling microscope.
13. Determine the coefficient of linear expansion of rod by optical lever method
14. Determine the specific heat of a liquid by the method of cooling

15. Determine the thermal conductivity of a metallic rod by Searle's method
16. Determine the pressure coefficient using constant volume thermometer
17. Determine the coefficient of apparent expansion of a liquid by weight thermometer method.

GROUP 'B

1. Determine the Horizontal component H and the magnetic moment M of a bar magnet with the help of Deflection & Vibration magnetometer.
2. Adjust the Dip circle and determine the angle of Dip at a place.
3. Determine the resistance per unit length of a wire by Carey Foster's method.
4. Calibration of an ammeter and a voltmeter using Potentiometer.
5. Determine the resistance of a lamp at room temperature and when incandescent.
6. Determine resistance of a galvanometer by post office box.
7. Determine the self inductance of a coil by Rayleigh's method using wheatstone bridge.
8. Determine the figure of merit of a mirror galvanometer.
9. Determine the high resistance by the method of leakage.
10. Determine the current and voltage in a given network and hence verify Kirchhoff's laws.
11. Determine the reduction factor of a tangent galvanometer with a copper voltmeter and hence determine the value of H .
12. Determine the value of J , the mechanical equivalent of heat, using Joule's electrical calorimeter.
13. Plot the $V_a - I_a$ characteristics of a diode valve and determine the internal resistance.

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14. Plot the characteristics of a triode valve and hence find its amplification factor.
15. Verify inverse square law in magnetism
16. Draw the characteristics curves of a semiconductor diode.

Books Recommended.

1. A Text book of Practical Physics-K.G. Majumdar (Modern Book Agency, Calcutta, latest edition)

Further reading:

1. A Text book of Practical Physics-C.R. Gupta (Book Syndicate, latest edition)
2. B.Sc. Practical Physics-H. Singh (S. Chand & Co. Ltd. latest edition)
3. A Text book of Practical Physics-Indu Prakash & Ramkrishna (Kitab Mahal, latest edition)
4. A Text book of Practical Physics-S.K. Ghosh (New Central Book Agency, latest edition)

PAPER IV: Physics General : 100 Marks
Atomic and Nuclear Physics - (80)

Atom, Ions, Ionisation current, excitation and ionisation potential, measurement of ionisation current, mobility of ions; determination of e/m of the electron by Thomson's method, determination of electronic charge by Millikan's oil-drop method, determination of mass of the electron, Avogadro number, mass of the hydrogen atom; Principle of Cathode ray oscilloscope (8)

Positive rays. Properties, positive ray analysis - Thomson's parabola method, isotopes, isobars; Aston's mass spectrograph, Bainbridge mass spectrograph, (5)

Atomic structure: Bohr's theory of H-like atoms, Pauli's principle, quantum number for atomic orbitals and degeneracy (4)

X rays, absorption of X-rays, diffraction of X-rays, Laue's experiment, Bragg's Law and Bragg X-ray spectrometer. X-ray spectra, continuous spectra and its explanation (Duane-Hunt law), Characteristic X-ray spectra, Origin of Characteristics spectra,

energy level diagram, Moseley's law, and its importance. Compton scattering, deduction of change in wavelength, experimental verification (13)

Photoelectric effect: Einstein's photoelectric equations and explanation of photo-electric effect, determination of h by Millikan's method. Photoelectric cells and their uses, Photo multiplier tube. (7)

Natural Radioactivity: Law of disintegration, decay constant, halflife, mean life, (deduction). Basic ideas of α , β - and γ -decays- energetics with examples. Passage of gamma rays through matter. Uses of radioactivity. (6)

Particle accelerators: electrostatic accelerators, linear accelerators, cyclotron. (3)

Particle detectors: Ionisation chamber and cloud chamber, GM counter. (4)

Artificial transmutation: Artificial transmutation, scheme of nuclear reactions, Nuclear reaction energy, discovery of neutron, properties of neutron, determination of mass of neutron, classification of neutrons according to their kinetic energy. (5)

Nuclear fission: Discovery, energy released in fission, secondary neutrons and their importance, multiplication factor, chain reaction, concept of critical size. Uranium-graphite nuclear reactor (8)

Nuclear fusion: origin of stellar energy, calculation of fusion energy. Nuclear structure: Nuclear constituents, nuclear composition, idea of meson theory, basic ideas of nuclear models, calculation of binding energy. (7)

Cosmic rays and elementary particles: Intensity of cosmic rays on earth surface, latitude effect, east-west effect, altitude effect, primary and secondary cosmic rays, origin of cosmic rays. Discovery of positron, muons and pion, their general properties. Brief qualitative study of other elementary particles

and their properties. Ideas of leptons, baryons and mesons, concept of anti-particles. Universal conservation laws-statements and their application to production and decay of mesons and baryons (few cases) (13)

Books Recommended:

1. Introduction to Modern Physics-H.S. Mani and G.K. Mehta (Affiliated East-west Press Pvt. Ltd. 1938)

Further reading:

1. Modern Physics-R. Murugesan(S. Chand & Co. Ltd., latest ed.)
2. Modern Physics-J.B. Rajam (S. Chand & Co. Ltd. latest edition)
3. Fundamentals of Modern Physics-B.V. Luggal and C.L. Chhabra (Shobanlal Nagin Chand & Co., latest edition)
4. Modern Physics-N.K. Sehgal, K.L. Chopra and D.L. Sehgal (Sultan Chand & Co. Ltd, latest edition)
5. Concepts of Modern Physics - S.L. Gupta and S. Gupta (Dhanpat Rai & Sons, latest edition)

Quantum Mechanics: (20)

Origin of the quantum mechanics, failure of classical physics to explain the phenomenon of black body radiation, photoelectric effect and Compton effect. Ritz combination principle, Planck's radiation law, wave particle duality, De Broglie's concept of matter waves and de Broglie relation. Simple deduction of de-Broglie wavelength, properties of matter waves, verification by G.P. Thomson's experiment, wave velocity, group velocity (8)

Heisenberg's uncertainty principle and its explanation.

Determination of the position of a particle by microscope, diffraction by single slit, explanation of non-existence of electrons in the nucleus using uncertainty principle, binding energy of an electron in atom, radius of Bohr's first orbit, complementarity principle.

Concept of electron microscope. (8)

Schrodinger time dependent and time independent wave equation, (one dimension), physical interpretation of wave function,

particle in a box. (4)

Books recommended:

1. Quantum Mechanics - A.K. Ghatak and S. Lokanathan (The Macmillan Co. of India Ltd., latest revised edition)

Further reading:

1. Concept of Modern Physics-S.L. Gupta and S. Gupta (Dhanpat Rai & Co. Delhi, latest edition)
2. Quantum Mechanics, Statistical Mechanics and Solid State Physics-D. Chattopadhyay and P.C. Rakshit (S. Chand & Co. Ltd., latest edition)
3. Introduction to Modern Physics-H.S. Mani and G.K. Mehta (Affiliated East-West Press Pvt. Ltd. 1988)

Solid State Physics.

Crystal Structure: Periodicity of crystals, unit cells, Miller indices, and representation of planes, Symmetry considerations Symmetry groups, space groups, different types of crystal structure, classification of crystals based on nature of forces, analysis of crystal structure of Na Cl and K Cl from Bragg's law.

Bravais lattices, structure of diamond, coordinate number, packing fraction, liquid crystals. Elementary theory of Lane spots, reciprocal lattice, rotation crystal method, Debye-Scherrer method, electron and neutron diffraction method. (11)

Lattice vibrations: Dynamics of a one dimensional monoatomic linear chain and chain of two types of atoms.

Optical and acoustic modes and concept of Brillion zones.

Phase velocity and group velocity. (5)

Thermal properties: Specific heat of solids, temperature variation of specific heat, Einstein's and Debey's theories (3)

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18(b)

Free electron theory: Concept of free electrons, Drude's theory, energy levels in free electron theory, concept of Fermi level (3)

Band theory: Origin of forbidden gaps, valance band, conduction band and forbidden band; conductors, semi-conductors and insulators, intrinsic and extrinsic and extrinsic semiconductors (qualitative discussion only) (5)

Magnetism: qualitative discussion of para, ferro and diamagnetic materials, concept of superconductivity (3)

Books Recommended:

1. Quantum Mechanics, Statistical Mechanics and Solid State Physics-D. Chattopadhyay and P.C. Rakshit (S. Chand & Co. Ltd. latest edition)
2. Introduction to Solid State Physics-C.Kittel (Wiley Eastern Ltd. 1992)

Further reading:

1. Solid State Physics - B.S. Saxena, R.C. Gupta and P.N. Saxena (Pragati Prakashan, latest edition)
2. Concept of Modern Physics-S.L. Gupta and S. Gupta (Dhanpat Rai & Sons, latest edition)

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Examination Pattern for Physics-Major

Note: The S.I Units to be used throughout

First Year

Paper I. 3 hours examination : 80 Marks

	Lectures
Group A - Mechanics & Properties of Matter ...	50
Group B - Heat & Thermodynamics ...	40
Group C - Fourier Series and Transform ...	10
Acoustics ...	25
Special Theory of Relativity ...	15
Total	140 Lectures

Nine questions (three from each group) to be asked and five questions (not more than two from each group) to be answered.

Paper II. 3 hours examination : 80 Marks

	Lectures
Group A - Thermal Physics ...	70
Group B - Methods of Mathematical Physics I ...	70

Eight questions (four from each group) to be asked and five questions (not more ^{than} three from each group) to be answered.

Paper III: Practical: 3 hours examination : 40 Marks

One experiment to be performed.

Second Year

Paper IV: 3 hours examination : 80 Marks

	Lectures
Group A - Optics ...	70
Group B - Electricity & Magnetism ...	50
Electronics I ...	20
Total	140 Lectures

Eight questions (four from each group) to be asked and five questions (not more than three from each group) to be answered.

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20 -

Paper V: 3 hours examination : 80 Marks

	Lectures
Group A - Statistical Mechanics	... 25
Group B - Electromagnetism	... 65
Group C - Electronics II	... 50
Total	140 Lectures

Eight questions (two from group A and three each from group B and C) to be asked and five questions (one from group A and two each from groups B and C) to be answered.

Paper VI: Practical : 6 hours examination : 70 Marks

Two experiments (one from each group) to be performed.

Paper VII: Practical: 6 hours examination : 70 Marks

One experiment to be performed.

Third Year

<u>Paper VIII:</u>	3 hours examination	: 80 Marks	Lectures
Group A - Atomic & Nuclear Physics	---	80	
Group B - Quantum Mechanics I	---	30	
Group C - Solid State Physics I	---	30	
Total		140	Lectures

Nine questions (five from group A and two each from groups B and C) to be asked and five questions (three from group A and one each from groups B and C) to be answered.

Paper IX: 3 hours examination : 80 Marks

	Lectures
Group A - Solid State Physics II	... 35
Group B - Classical Mechanics	... 25
Quantum Mechanics II	... 30
Group C - Methods of Mathematical Physics II	... 50
Total	140 Lectures

Eight questions (two from group A, three from group B (giving equal weightages to CM and QM II) and three from group C) and five questions (one from group A, two each from groups B and C) to be answered.

Paper X: 3 hours examination : 80 Marks

	Lectures
Group A - Atomic & Molecular Physics ...	60
Group B - Nuclear & Particle Physics ...	80
Total	<u>140</u> Lecs.

Nine questions (four from group A and five from group B) to be asked and five questions (two from group A and three from group B) to be answered.

Paper XI. Practical : 6 hours examination : 60 Marks

One experiment to be performed.

Paper I : Physics Major : 80 Marks

Mechanics & Properties of matter (50), Heat & Thermodynamics (40), Fourier series and transform (10), Acoustics (25), Special Theory of Relativity (15)

Mechanics : (30)

Laws of motion, motion in an uniform field, components of velocity and acceleration, velocity and acceleration in different co-ordinate systems-moving frame and rotating frame. Centripetal acceleration due to rotation, Coriolis force with examples. (5)

Motion under a central force, deduction of Kepler's laws, gravitational potential and field due to a spherical body. Gauss's law and Poisson's equation for gravitational field. (6)

System of particles, centre of mass and its equation of motion, conservation of linear and angular momenta, elastic and inelastic collisions. (6)

Rigid body motion, rotational motion, moment of inertia-theorems of parallel and perpendicular axes, moments of inertia of rectangular lamina, disc, cylindrical and spherical bodies (Hollow and solid), Euler's equation. (6)

Oscillations: Differential equation of simple harmonic motion (SHM) and its solution, examples of SHM. Bar pendulum and its time period, Kater's pendulum-Bessel's modified time period, torsional pendulum, spring and mass system, Oscillation of two masses connected by a spring. (7)

Properties of matter: (20)

Elasticity. Small deformations, interrelations of elastic constants, bending of beams, Cantilever and beams supported at both ends, torsional rigidity. (7)

Kinematics of moving fluids, equation of continuity, Euler's equation, Bernoulli's theorem, Viscosity, Poiseuille's equation, Reynold's number, deduction of Stoke's law. (8)

Molecular interpretation of Surface tension, Pressure on curved liquid surface, excess pressure in spherical drops and bubbles, capillary rise of liquids. (5)

Books Recommended.

1. A treatise on General properties of matter - R. Sengupta and H. Chatterjee (New General Book Agency, Calcutta, 1992)
2. Elements of Properties of Matter - D.S. Mathur (S. Chand & Co., 1992)

Further Reading.

1. General Properties of Matter - Newman and Searles (Orient Longmans, latest edition)
2. Theoretical Physics - Vol I - K.C. Kar (Das Gupta & Co. Calcutta, latest edition)

Heat and Thermodynamics (40)

Kinetic Theory of gases: a review. Kinetic energy, interpretation of temperature, RMS velocity, Brownian motion, estimates of Avogadro number, equipartition of energy (deduction not necessary), ratio specific heats of molecules of gases, specific heats of gases, $c_p - c_v = R$, experimental determination of specific heats at constant pressure and constant volume. (5)

Real gas: real gas as different from an ideal gas, Van der Waals gas, equation of state, P-V curves based on this and its difference with the experimental curves, the critical constants, gas and vapour. (8)

Thermal conductivity and diffusivity, rectilinear flow of heat (one dimensional), Ingenhausz's experiment. (3)

Thermodynamics: First law of thermodynamics, mechanical equivalent of heat J, Callender & Barnes' experiment. Isothermal and adiabatic changes and their corresponding works done, ratio of specific heats of gases and its determination by Clement & Desormes' method. (5)

The latent heat equations and their applications. (2)

Liquefaction of gases, Boyle temperature and inversion temperature, principles of cascade and regenerative cooling, liquefaction of air and hydrogen.

Theory of Joule Thomson effect, temperature of inversion (9)

Second law of thermodynamics: reversible and irreversible processes. Carnot cycle, Carnot theorem, practical cycles used in internal combustion engines. Kelvin's thermodynamic scale, entropy and its change in reversible and irreversible processes, entropy of perfect gas. (6)

Books recommended:

1. Text book of heat - J.B. Rajam (S. Chand & Co., latest edition).

Further reading:

1. Heat and thermodynamics - Brijlal and ^NSubramanyam (S. Chand & Co. latest edition)
2. Text book of heat - P.K. Chakraborty (Hindustan Publishing Concern, latest edition)
3. College Physics - Vol-II - ^{D.B.}Sinha and ^{J.C.}Das Sharma (Modern Book Agency Calcutta, latest edition).

Fourier Series and Transform : (10)

Definition, evaluation of coefficients, cosine and sine series, complex form of Fourier series, properties of Fourier series, applications of Fourier series in (i) square wave (ii) full wave rectifier. Sine and cosine transform - applications in evaluation of integrals.

Books recommended:

1. Fourier series and Boundary problem - R.V. Churchill (P. Graw Hill Co. latest edn.)

Acoustics : (30)

waves : waves, speed of transverse waves in string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves, waves over a liquid surface, group and phase velocities (4)

Superposition of waves: linear homogenous equations, and the superposition principle, nonlinear superposition and consequences. (3)

Standing waves: Standing waves as normal modes of sounding systems, harmonics and quality of sound, examples, Chladni figures, production and detection of ultrasonic waves and applications (4)

Noise & music : The human ear and its responses, limits of human audibility, intensity and loudness, units, musical scale, noise pollution, its implication and remedy. (3)

Free and forced vibrations, condition of maximum amplitude, resonance and condition of resonance, sharpness of resonance. (5)

General form of equation of vibrations: plucked string, Young's law, vibration of struck string, vibration of bowed string, laws of bowed string. (5).

Auditorium acoustics: reverberation, Sabine's law, theory of reverberation, energy density in an enclosure, absorption of energy, growth of energy, decay of energy, time of reverberation, live and dead rooms, reverberation time of a dead room, measurement of absorption coefficients. (6)

Books recommended.

1. A text book of sound - M. Ghosh (S. Chand & Co. Ltd. 1992)

Further reading.

1. Text book of sound - A. Wood (G. Bell and Sons Ltd. latest edition)
2. Waves and Oscillations - Brijlal and^{N.} Subramanyam (Vikas Publishing House Ltd. latest edition)
3. A text book on waves and acoustics - P.K. Chakraborty and S.B. Choudhury (New Central Book Agency, latest edition)

Special Theory of Relativity: (15)

Reference frames, inertial frame, Galilean invariance and conservation laws, Michelson-Morley experiment, search for ether. (5)

Postulates of special theory of relativity, Lorentz transformations, length contraction, time dilation, velocity addition theorem, acceleration, invariance of the velocity of light, relativistic formula for aberration, variation of mass with velocity. Relativity of simultaneity, mass energy equivalence. Particle with zero rest mass. (10)

Books recommended:

1. Introduction to Special Relativity - Robert Resnick (Wiley Eastern Limited, 1990)

Further reading:

1. Theory of Relativity - M. Ray (S. Chand & Co. latest edition)

Paper II: Physics Major : 80 Marks

Thermal Physics (70) Methods of Mathematical Physics I (70)

Kinetic theory of matter: (20)

Evidences of kinetic theory of matter, Brownian motion, Einstein's theory of translational Brownian motion, Verification by Perrin and determination of Avogadro's number, law of equipartition of energy-deduction of the law by the method of moments, ratio of specific heats of monoatomic, diatomic, and triatomic gases. (8)

Deduction of Maxwell-Boltzmann law of distribution of velocity of molecules, experimental verification by Stern, deduction of velocity (average), r.m.s. velocity, most probable velocity and energy distribution law. Mean free path, deduction of the expression, collision, probability, law of distribution of free path, experimental verification by Born's experiment. (8)

Non equilibrium of gases, Transport phenomenon in gases, Viscosity, Thermal conductivity, Diffusion (elementary deduction) their dependence on pressure & temperature. (4)

Thermodynamics: (50):

Zeroth law of thermodynamics and concept of temperature, brief review of 1st & 2nd law of thermodynamics, thermodynamical variables, thermodynamical system and thermodynamical equilibrium. Concept of path function, and single valued function, Third law of thermodynamics, impossibility of attaining the absolute zero. (6)

Thermodynamical energy functions - internal energy functions, enthalpy, Helmholtz function, Gibb's function, Study and conclusions from above function, tendency of thermodynamical systems towards equilibrium. (8)

Thermodynamical relations. Derivation of Maxwell's relations (four), from thermodynamical energy functions. Applications-variation of intrinsic energy with volume, T.ds equation, difference of C_p and C_v (all thermodynamical relations), to deduce $(C_p - C_v)$ relations for perfect and real gas, variation of C_v with volume and C_p with pressure. Ratio of isothermal and elastic moduli, ratio of adiabatic to isobaric coefficient of expansion and the ratio of adiabatic to isochoric pressure coefficient, application to Joule-Thomson cooling and adiabatic cooling in a general system. Clausius-Clapeyron latent heat equation and deduction from thermodynamical relations. (25)

Equilibrium of a heterogeneous system, Gibb's phase rule, its deduction, and application to monocomponent, di-component systems, tripple point. (4)

Black body radiation, deduction of energy, Planck's distribution law in the system of black body radiation, Stefan's law and its deduction. (5)

Saha's theory of ionisation and its application (2)

Books recommended:

1. A treatise on heat - M.N. Saha and B.N. Srivastava (The Indian Press Pvt. Ltd. latest edition)
2. Advanced text book of heat - P.K. Chakraborty (Modern Book Agency latest edition)
3. Fundamentals of heat - D.S. Mathur (S. Chand. & Co. latest edition)

Further reading:

1. Heat & thermodynamics - M.W. Zemansky (Student edition - McGraw Hill Kogakusha Ltd.)

Methods of Mathematical Physics 1 (70)

Vectors: Review of dot and cross products, vector triple product, gradient of scalar field and its geometrical interpretations, divergence and curl of vector field; line, surface and volume integrals, flux of vector field, Gauss' divergence theorem, Green's theorem, Stokes theorem. (10)

Curvilinear co-ordinates. Transformation of co-ordinates, Orthogonal curvilinear co-ordinates, unit vectors in curvilinear co-ordinates, gradient, divergence and curl, cylindrical and spherical polar co-ordinates.. (5)

Matrices. A review of matrix addition and multiplications (2)

Transpose and conjugate transpose of a matrix, Adjoint and inverse of a matrix

Transpose and inverse of product of two matrices. (5)

Special matrices: singular matrices, symmetric and skew symmetric matrices,

Hermitian and skew-Hermitian matrices, orthogonal and unitary matrices (5)

Application of matrices: Rotation of co-ordinates axes, solution of linear algebraic equation by matrix methods (5)

Rank of matrix (2)

Characteristic equation, eigen values, eigen vectors, calculation of eigen-values and eigen vectors of (2×2) matrices, properties of eigen-values & eigen vectors of Hermitian & unitary matrices, Trace of a matrix, diagonalisation of real symmetric (2×2) matrix with examples. (6)

Tensor analysis: Concept of tensor with examples, transformation of co-ordinates, summation convention, contravariant and covariant tensors, kronecker delta, tensor of higher ranks, mixed

tensor, symmetric and skew-symmetric tensors, invariant tensor, rank of tensor, epsilon tensor, moment of inertia tensor, stress tensor, strain tensor, polarizability tensor (10)

Beta and Gamma functions: Definition of gamma function, evaluation of $\Gamma(1/2)$, recursion formula, beta function, different forms of beta functions, relation between beta and gamma functions; Evaluation of definite integrals of the types:

$$\int_{-\infty}^{+\infty} e^{-ax^2+bx} dx; \int_0^{\infty} \frac{x^3 dx}{e^x-1}; \int_0^{\infty} x^2 e^{-ax^2} dx \quad (8)$$

Statistics and probability: Fundamental theorem of probability (without proof), distribution function, Poisson distribution & Gaussian distribution function, Binomial distribution, Normal distribution, calculation of average value in Gaussian distribution and calculation of errors. (12)

Books recommended:

1. Mathematical Physics - B.D. Gupta (Vikash Publishing House latest edition)
2. Mathematical Methods of Physics - Mathews & Walker: (W.A. Benjamin, INC, latest edition)
3. Vector Analysis & An Introduction to Tensor Analysis - M.R. Spiegel (McGraw Hill Book Co. latest edition)
4. Mathematical Physics - R.K. Gupta & H.C. Sharma (Minakshi Prakashan latest edition)
5. Mathematical Physics - B.S. Rajput (Pragati Prakashan, 1991-92)

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30

Paper III: Physics Major : 40 Marks

1. Determination of acceleration due to gravity g by Bar/Kater's pendulum.
2. Determination Moment of Inertia of a body using a Torsional pendulum.
3. Determination of modulus of rigidity of the material (cylindrical rod shape) by the statical method.
4. Determination of coefficient of viscosity of water by capillary tube method.
5. Determination of the Young's modulus of a wire by Searle's method
6. Determination of surface tension of a liquid ^{by} Jager's method
7. Determination of Young's modulus Y by the method of flexure.
8. Verification of Stoke's law of Viscosity and hence determination of Coefficient of viscosity.
9. Determination of magnifying power of a telescope.
10. Determination of radius of curvature of a convex lens by Newton's ring method.
11. Determination of refractive index of material of a prism at different wavelengths by spectrometer.
12. Determination of number of lines of a grating using spectrometer.
13. Comparison of illuminating powers of two different sources by Lummer Brodhun Photometer.

Books Recommended:

1. A text book of Practical Physics - K.G. Majumdar (Modern Book Agency, Calcutta, latest edition).

Further reading:

1. A text book of Practical Physics-C.R. Gupta (Book Syndicate P.L.)
2. B.Sc. Practical Physics-H. Singh (S. Chand & Co. Ltd. latest edition)
3. A text book of Practical Physics - Indu Prakash & Ramakrishna (Kitab Mahal, latest edition)
4. A text book of Practical Physics-S.K. Ghosh (New Central Book Agency, latest edition).

Paper IV: Physics Major : 80 Marks

OPTICS (70), Electricity & Magnetism (50), Electronics (20)

GEOMETRICAL OPTICS: (13)

Thick lens: Cardinal points, image formed by thick lens: concave & convex, relation between the distances of cardinal points, object & image distance from principal planes, Cardinal points of Ramsden and Huygens' eyepieces, location of cardinal points by nodal slides (5)

Aberrations: Methods of minimising monochromatic aberrations, aplanatic points & surfaces, Abbe's homogeneous immersion microscope objective, calculation of axial and lateral chromatic error, condition of achromatic combination of two lenses in contact & separated (calculation), Achromatic combination of prism. (6)

Comparison of luminous intensities of two sources by Photo-voltaic photometer, determination of velocity of light by Kerr cell method. (2)

PHYSICAL OPTICS: (67)

Fermat's principle and lens formula from wave theory (2)

Conditions of interference by analytical treatment, classification of different methods for the production of interference fringes, Fresnel's biprism-formation of fringes, theory, wavelength determination, angle of biprism, thickness of thin film. Achromatic fringes, production of fringes by Lloyd's mirror, Change of phase by reflection, Colour of thin film, reflected and transmitted light, fringes of equal width and equal inclination (Haidenger fringes). Theory of Newton's rings and experimental determination of wavelength and refractive index. (10)

Jamin's and Rayleigh interferometers: Construction, determination of refractive index of a gas and thickness of thin film. (3)

Michelson's interferometer: Construction, formation of fringes, determination of wavelength, and small differences of wavelength, standardisation of metre. (3)

Fabry-Perot interferometer: Construction, production of fringes, angular width, linear width, angular dispersion, spectral range, resolving power. Lummer and Gahrcke plate interferometer:

Construction, separation of maxima, dispersion, spectral range resolving power, comparison of Fabry-Perot and Lummer plate (4)

Diffraction: Fresnel's half-period zones, areas, displacement, phase; Zone plate-its similarity with convex lens, Fresnel diffraction: Straight edge, circular aperture, obstacle, rectangular aperture.

Fraunhofer diffraction: Single slit, double slit, N parallel slits, theory of plane diffraction grating, spectra, dispersive power, resolving power, rectangular aperture, circular aperture, resolving power of telescope & microscope, Outline of phase contrast microscope.

Concave grating: construction and theory, Rowland mounting (12)

Polarisation: Different methods of production of polarised light, Brewster's law,

elliptically and circularly polarised light, optic axis, double diffraction, Nicol prism-construction, uses; Polaroid, Uniaxial crystals, propagation of plane wave in uniaxial crystal; Quarter wave plate and its use to produce and detect elliptically and circularly polarised light.

Babinet's compensator-principle and applications. (8)

Biot's laws, Fresnel's explanation of the rotation of the plane of polarisation and its verification. Laurent's Polarimeter-construction, half shade plate, strength of solution. Wave surfaces in bi-axial crystals and origin of internal and external conical refractions. (4)

Faraday effect, Verdet's constant & its determination, difference from natural rotation: Ultraviolet and infrared spectroscopy, Constant deviation spectrograph. (2)

Raman effect, study of Raman effect in liquid, Raman shift, Stokes and Anti-Stokes lines, Smekal quantum explanation of Raman effect (2)

Scattering of light, Normal and anomalous dispersions, theory of dispersion, absorption, experimental demonstration of anomalous dispersion in sodium. (3)

Laser: Purity of spectrum, spontaneous and induced emission, population inversion, principle of laser, He-Ne laser, Properties of laser (monochromaticity and Directionality). (4)

Books recommended:

1. A text book of light (for advanced degree students):
K.G. Mazumdar, (Modern Book Agency Pvt. Ltd., latest edition)
2. Optics : A.K. Ghatak (Mc. Graw Hill, latest edition)

Further reading:

1. A text book of optics: Brijlal, N. Subrahmanyam (Niraj Prakashan, latest edition)
2. A text book of light: D.N. Vasudev (Atma Ram & Sons latest edition)
3. Geometrical and Physical Optics: P.K. Chakraborty
(New Central Book Agency, latest edition)
4. Optics and Atomic Physics: D.P. Khandelwall (Himalaya Publishing House, latest edition)

Electricity & Magnetism (50)

Electrostatics (20)

Electric field: Coulomb's law expressed in vector form: calculations of $\vec{E}$ for simple distributions of charges at rest (line surface & volume), dipole and quadrupole fields.

Work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Electric potential, ϕ , $E = -\vec{\nabla}\phi$, torque on a dipole in a uniform field and its energy, flux of the electric field, Gauss' law and its application for finding $\vec{E}$ for symmetric charge distributions, field at the surface of a conductor, screening of Electric field by a conductor, capacitors, electrostatic field energy, force per unit area of a conductor in an electric field, conducting sphere in a uniform electric field, point charge in front of a grounded plane infinite conductor.

Dielectrics, parallel plate capacitor with a dielectric constant, polarisation and polarisation vector, displacement vector $\vec{D}$, boundary conditions satisfied by $\vec{E}$ and $\vec{D}$ at the interface between two homogenous dielectrics, illustration through an example.

Electric current (Steady and Alternating) (10)

Steady current, current density $\vec{J}$, varying currents and equation of continuity, rise and decay of current in LR and CR circuits, decay constants, transients in LCR circuits, AC circuits, complex numbers and their uses in solving problems in AC circuits, (complex) impedance and reactance, series and parallel resonance, Q factor, power consumed in an AC circuit, power factor, Y and Δ -networks and transmission of electric power.

Magnetostatics (10)

Force on a moving charge, Lorentz force equation and definition of $\vec{B}$, force on a straight conductor carrying current in uniform magnetic field, force on a current loop, magnetic displacement, angular momentum and gyromagnetic ratio.

Biot and Savart's law, calculation of $\vec{H}$ in single geometrical situations; Ampere's law, $\vec{\nabla} \cdot \vec{B} = 0$, $\vec{\nabla} \times \vec{B} = \mu_0 \vec{J}$, field due to a magnetic dipole, magnetisation current, magnetisation vector, $\vec{H}$ field, magnetic permeability (linear cases), interpretation of

a bar magnet as a surface distribution of solenoidal current.

• Varying fields (10)

Electromagnetic induction, Faraday's law, electromotive force, $\mathcal{E} = \oint \vec{E} \cdot d\vec{r}$, integral and differential forms of Faraday's law, mutual and self inductance, transformers, energy in a static magnetic field, Maxwell's displacement current, Maxwell's equations, electromagnetic field energy density.

Books recommended.

1. Electricity & Magnetism - R.C. Tayal (Himalaya Publishing House, 1991)
2. Electricity & Magnetism - Brijlal and ^NSubhramanyam (Ratan Prakashan Mandir, latest edition)

Further reading.

1. Electricity & Magnetism - R.C. Lakharpal (Kalyani Publishers, 1992)
2. Berkeley Physics Course Vol.2 - Electricity and Magnetism, Ed. E.M. Purcell (McGraw Hill, latest edition)
3. Electricity and Magnetism - A.S. Mahajan and M.A. Rangwala (Tata McGraw-Hill, latest edition)

Electronics I: (20)

Diode as a circuit element, load line concept, ripple factor, Zener diode, voltage stabilization,

Transistor characteristics in CB, CE, CC modes, graphical analysis of CE configuration. (10)

Small signal amplifier: General principles of operation, classification, distortion, RC coupled amplifier, gain-frequency response, input and output impedance, multistage amplifier, transformer coupled amplifiers. (10)

Books recommended:

1. D.C. Tayal: Basic Electronics: Himalaya Publishing House.
2. J.D. Ryder: Electronics Fundamentals & Applications: II Edition (Prentice-Hall of India)

Paper V: Physics Major : 80 Marks

Statistical Mechanics (25), Electromagnetism (65), Electronics (50)

Statistical Mechanics: (25)

Phase space, The concept of probability, Mutually exclusive events with simple examples, Independent events, Binomial distribution of probabilities, Stirling's formula, Random variables and their characteristics. (5)

Distribution function, Ensembles: Micro canonical, canonical, grand canonical. Microstates and Macrostates, Postulates of equal a priori probability, distribution function and conservation theorem, Liouville's theorem, Equation of continuity in electromagnetism, Statistical equilibrium and assumptions. (5)

Phase space cells and quantum states, explanation of the specification that one quantum state corresponds to one phase space cell. Condition of equilibrium, thermal, mechanical and particle equilibrium. (5)

Maxwell's Boltzmann statistics, Bose-Einstein Statistics, Fermi-Dirac Statistics. Application of MB Statistics to total internal energy and specific heat at constant volume of an ideal gas, application of BE statistics to black body radiation and deduction of Planck's law. Fermi-Dirac statistics and deduction of Fermi-energy. (10)

Books recommended:

1. Statistical Mechanics - A.N. Konar (The Dacca Student Library CAL, latest edition)

Further reading:

1. Introduction to Statistical Mechanics: B.B. Laud (Wiley Eastern Ltd. 1988)
2. Statistical Mechanics - F. Reif (McGraw-Hill, 1988)
3. Statistical Mechanics - K. Huang (Wiley Eastern, 1988)

Electromagnetism (65)

Potential: Potential energy of a system of charges, pair of charges, line charge, sheet charge, spherical shell of charge. Field equation for $\vec{E}$ in vacuum, Energy associated with an $\vec{E}$ -field. Differential form of Gauss' law, Poisson's equation, Laplace's equation, uniqueness theorem. (10)

Electric field around conductors, induced charges, field and potential inside a conductor, field near the surface of a conductor by the method of images. (6)

Electric field in matter: Atomic and molecular dipoles, induced dipoles, polarizability tensor, electronic and molecular contributions. Electric field caused by polarised matter, $\vec{E}$ and $\vec{D}$ fields, permittivity, dielectric constant, capacitor filled with a dielectric, field equation in presence of dielectric. The field of a polarised sphere, dielectric sphere in a uniform field. Energy in dielectric system, Polarizability and susceptibility, frequency dependence of polarizability, Clausius-Mossotti equation and its molecular interpretation. (8)

Magnetic field in matter: Torque on a current loop in $\vec{B}$ -field, magnetic dipole moment, magnetic dipole in atoms and molecules, gyromagnetic ratio, Magnetising current, magnetisation vector, permeability and susceptibility. Field equations for $\vec{E}$, $\vec{D}$, $\vec{B}$, $\vec{H}$. (6)

Books Recommended:

1. Electromagnetics: B.B. Laud (Wiley Eastern Ltd. 1988)
2. Electricity & Magnetism: D Chattopadhyaya & P.C. Rakshit (New Central Book Agency, 1992)

Further reading:

1. Electricity & Magnetism: E.M. Purcell (Berkeley Physics Course Vol.2, McGraw Hill, latest edition)
2. Electricity & Magnetism: D.C. Tayal (Himalaya Publishing House, 1991)

Electric current & Circuits:

Current density, nonsteady currents, and equation of continuity (2)

Transient current: Integrating and differentiating circuits (3)

Skin effect for resistance at high frequencies, complex impedance, reactance. Impedances of LCR series and parallel circuits, Q

factor, power dissipation and power factor, AC bridges,

Anderson & Owens. (4)

Three phase electric power supply, Delta and star connections, current regulations. (2)

Electromagnetism:

Faraday's law in integral and differential forms, displacement current, modified Ampere's law, Maxwell's equations for the time dependent electromagnetic field, in vacuum and in dielectric medium. (8)

Magnetic vector potential ($\vec{A}$) and scalar potential (ϕ)

Poisson's equation for $\vec{A}$ in terms of current density, solution for line & surface currents, Coulombs & Lorentz gauge transformations, Lorentz law in terms of potential. (4)

Plane wave solution for Maxwell's equations, orthogonality of $\vec{E}$, $\vec{B}$ and propagation vector. Poynting vector, Energy and momentum propagation, reflection and transmission at dielectric boundaries; E-M waves in conductors, reflection at and transmission through a conducting surface. (8)

Modification of Coulomb's law to include velocity and acceleration dependent terms in electric field, Radiation from an oscillating dipole and its polarisation, concept of retarded potentials. (4)

Books Recommended.

1. Electromagnetics: B.B. Laud (Willy Eastern Ltd. 1988)
2. Electricity and Magnetism: L. Chattopadhyay and P.C. Rakshit
(New Central Book Agency, 1992)
3. Classical Electrodynamics: S.I. Gupta, S.P. Singh, V. Kumar
(Pragati Prakashan, 1992)

Further Reading:

1. Classical Electrodynamics: J.D. Jackson (Willy Eastern Ltd)
2. Electricity and Magnetism: E.M. Purcell (Berkeley Physics
Course Vol 2) (McGraw Hill Book Co.)

Electronics II (50)

Circuit-analysis:

Multiloop Networks and their analysis by loop method, Phasors & phasors diagram, use of complex numbers in phasors. Two & four terminal networks, Z , Y and H parameters and their interrelations, T and π networks and their equivalence, Superposition, Thevenin's and Norton's theorems. (8)

Semiconductors diodes, BJT, FET.

PN junction diode, I-V characteristics, Schottky model, application in half and full wave rectifier, efficiency & ripple factors bridge rectifier, Series inductance & shunt capacitance filters, L-section and π -section filters; clip^bpers and limiters. Zener diode and its application. (8)

NPN & PNP structures, active and saturation region, hybrid parameters, Two port analysis of transistor, loadline concept. (4)

Classification of FET's, construction of JFET, drain characteristics of JFET, its binary operating regions, pinch off voltage. Idea of metal-oxide semiconductor transistor. (4)

Amplifiers:

Transistor as an amplifier with CB, CE, CC configurations using h-parameters. Frequency response of R-C coupled amplifier, band width, flat band equivalent circuits with & without input & output loading, Voltage and current gains. Principle of operational amplifier, differential amplifiers, differential gain, CMRR (8)

Oscillators

Positive feed back, Barkhausen criterion, RC oscillators, Weinbridge, Phaseshift, Colpitt's and Hartley Oscillators (8)

Digital circuits: Binary system, Boolean algebra, Truth tables, AND, OR, NAND, NOR gates, TTL and ECL families, RS and JK-flip-flops, simple memory systems (no circuits) (10)

Books Recommended:

1. Hand Book of Electronics-S.I. Gupta and V. Kumar (Pragati Prakashan, 1992)
2. Digital and Analogue Technique: G.N. Narrest, V.M. Gokhale and R.G. Kale (Kitab Mahal, Allahabad, latest edition)

Further reading:

1. Solid State Electronics Device^s: B.G. Streetman (Prentice-Hall of India, 1986)
2. Electronics for Scientists & Engineers: G.K. Mehta and (Prentice Hall^{of India} latest edition)

Paper VI Practical: Physics Major: Marks 70

GROUP A

1. Determine the Horizontal component H and magnetic moment of a magnet with the help of a deflection and vibration magnetometers.
2. Adjust the dip circle and determine the angle of Dip at a place.
3. Verify the inverse square law in magnetism.
4. Determine the frequency of a tuning fork by Melde's experiment.
5. Determination of mass per unit length of
6. Determination of coefficient of linear expansion of a rod by optical lever method.
7. Determine the specific heat of a liquid by the method of cooling.
8. Determine the thermal conductivity of a metallic rod by the Searle's method.
9. Determine the pressure coefficient using the constant volume thermometer.
10. Determine the coefficient of apparent expansion of a liquid by weight thermometer or specific gravity bottle.

11. Study of static characteristics of a transistor in CE/CB configuration.
12. Plot the characteristics of a triode valve and hence find the amplification factor.

GROUP B

1. Determination of resistance per unit length by Carey Foster's bridge.
2. Calibration of an ammeter and voltmeter using potentiometer.
3. Determination of resistance of a lamp at room temperature and when incandescent.
4. Comparison of two low resistances using meterbridge.
5. Determination of the resistance of a galvanometer by post office box.
6. Determination of self inductance by Rayleigh's method using Wheatstone's bridge.
7. Determination of figure of merit of a mirror galvanometer.
8. Determination of high resistance by the method of leakage.
9. Determination of current and voltage in a given network and verification of Kirchhoff's laws.
10. Determination of reduction factor of a tangent galvanometer with a copper voltameter and hence determination of the value of H.
11. Determination of current in an external circuit with the help of a potentiometer.
12. Determination of low resistance by potentiometer.

Books Recommended:

1. A text book of Practical Physics-Indu Prakash & Ramkrishna (Kitab Mahal, latest edition)
2. A text book of Practical Physics-K.G. Majumdar (Modern Book Agency, Calcutta, latest edition)

Further reading:

1. A text book of Practical Physics -C.R. Gupta (Book Syndicate Pvt. Ltd., latest edition)
2. B.Sc Practical Physics -H. Singh (S. Chand & Co. Pvt. Ltd. latest edition)
3. A text book of Practical Physics-S.K. Ghosh (New Central Book Agency, latest edition)

Paper VII: Practical: Physics Major : Marks 70

1. Determine the elastic constants of glass by Cornu's method
2. Determine the coefficient of viscosity of a liquid by rotating viscometer.
3. Determine the wavelength of sodium D lines using Biprism
4. Determine the wavelength of monochromatic light with Michelson's interferometer
5. Measure the width of a single slit from the study of its Fraunhofer diffraction
6. Determine the specific rotation of a solution by polarimeter
7. Determine the thermal conductivity of a bad conductor by Lees method
8. Determine the Mechanical equivalent of heat by Callender and Barnes' method
9. Determine the Stefan's Constant
10. Determine the velocity of ultrasonic waves in liquids
11. Determine the value of e/m of electron (any method)
12. Determine the work function and Planck's constant by photocell
13. Draw the plateau of a GM counter and carry out the statistical analysis of the data
14. Study Hall effect and determine the Hall coefficient and Hall voltage.

Books Recommended:

1. Advanced practical Physics-B.L. Worsnop & H.T. Flint (Methuen & Co. Ltd.)

2. A text book on practical Physics: For Advanced Degree Students - K.G. Majumdar (Modern Book Agency Ltd.)

Further reading:

1. A hand book of Advanced practical Physics 'C.R. Gupta
(Book Syndicate Pvt. Ltd. latest edition)
2. Practical Physics-K.K. Dey & B.N. Dutta(Kalyani Publishers, latest edition)
3. Advanced Practical Physics-S.P. Singh (Pragati Prakashan, latest edition)
4. A text book of Advanced practical Physics-S.K. Ghosh
(New Central Book Agency)

PAPER VIII: Physics Major: 80 Marks

Atomic and Nuclear Physics (80), Quantum Mechanics I (30),
Solid State Physics I (30)

Atomic and Nuclear Physics : (80)

Atom, Ions, Ionisation current, excitation and ionisation potential measurement of ionisation current, mobility of ions; determination of e/m of the electron by Thomson's method, determination of electronic charge by Millikan's oil-drop method, determination of mass of the electron, Avogadro number, mass of the hydrogen atom; Principle of Cathode ray oscilloscope (8)

Positive rays: Properties, positive ray analysis, (Thomson's parabola method), isotopes, isobars; Aston's mass spectrograph, Bainbridge mass spectrograph. (5)

Atomic structure: Bohr's theory of H-like atoms, Pauli's principle, quantum numbers for atomic orbitals and degeneracy (3)

X rays, absorption of X-rays, diffraction of X-rays, Laue's experiment, Bragg's Law and Bragg X-ray spectrometer

X-ray spectra, continuous spectra and its explanation (Duane-Hunt law), Characteristic X-ray spectra, Origin of Characteristics spectra, energy level diagram, Moseley's law, and its importance (12)

Photoelectric effect. Einstein's photoelectric equation and explanation of photo-electric effect, determination of h by Milikan's method. Photoelectric cells and their uses,

Photo multiplier tube (7)

Natural Radioactivity: Law of disintegration, decay constant, halflife, mean life, (deduction). Basic ideas of α and β -decay and γ -decay-energetics with examples. Passage of gamma rays through matter. Uses of radioactivity. (6)

Particle accelerators: Electrostatic accelerators linear accelerators, cyclotron (4)

Particle detectors: Ionisation chamber and cloud chamber

G.M. counter (4)

Artificial transmutation: Artificial transmutation, scheme of nuclear reactions, nuclear reaction energy, discovery of neutron, properties of neutron, determination of mass of neutron, classification of neutrons according to their kinetic energy. (5)

Nuclear fission: Discovery, energy released in fission secondary neutrons and their importance, multiplication factor, chain reaction, concept of critical size, Uranium-graphite nuclear reactor. (8)

Nuclear fusion: Origin of stellar energy, calculation of fusion energy. Nuclear structure: Nuclear constituents, nuclear composition, idea of meson theory, basic ideas of nuclear models, calculation of binding energy (5)

Cosmic rays and elementary particles: Intensity of cosmic rays on earth surface, latitude effect, east-west effect, altitude effect, primary and secondary cosmic rays, origin of cosmic rays. Discovery of positron, muon and pion, their general properties. Brief qualitative study of other elementary particles

and their properties. Ideas of leptons, baryons and mesons, concept of anti-particles. Universal conservation laws-statements and their application to production and decay of mesons and baryons (few cases). (12)

Books recommended.

1. Introduction to Modern Physics-H.S. Mani and G.K. Mehta
(Affiliated East-West Press Pvt. Ltd. 1988)

Further reading:

1. Modern Physics-R. Murugesan (S. Chand and Co. latest edition)
2. Modern Physics-J.B. Rajam (S. Chand and Co. Ltd. latest edition)
3. Fundamental of Modern Physics (Schobanlal Nagin Chand & Co. latest edition)
4. Modern Physics-N.K. Sehgal, K.L. Chopra and D.L. Sehgal
(Sultan Chand & Co. latest edition)
5. Concepts of Modern Physics - S.L. Gupta and S. Gupta
(Dhanpat Rai & Son, latest edition)

Quantum Mechanics I (30)

Origin of the quantum mechanics, failure of classical physics to explain the phenomenon of black body radiation, photo-electric and compton effect, Ritz combination principle, Planck's radiation law, wave particle duality, De Broglie's concept of matter waves and de Broglie's relation, simple deduction of de-Broglie wavelength, properties of matter waves, verification by G.P. Thomson's experiment, wave velocity, group velocity. (12)

Heisenberg's Uncertainty principle, and its explanation, determination of the position of a particle by microscope, diffraction by single slit, applications to non-existence of electrons in the nucleus, binding energy of an electron in atom, radius of Bohr's orbit, complementarity principle;

Concept of electron microscope

(12)

Thermal properties. Specific heat of solids, temperature variation of specific heat, Einstein's and Debye's theories. (3)

Free electron theory. Concept of free electrons, Drude's theory, energy levels in free electron theory, concept of Fermi level(3)

Band theory. Origin of forbidden gaps, valance band, conduction band and forbidden band; conductors, semiconductors and insulators, intrinsic and extrinsic semiconductors (qualitative discussion only).

Magnetism: Qualitative discussion of para, ferro and diamagnetic materials, concept of superconductivity. (3)

Books recommended:

1. Quantum Mechanics, Statistical Mechanics and Solid State Physics: D. Chattopadhyay and P.C. Rakshit (S. Chand & Co. Ltd, 1992)
2. Introduction to Solid State Physics C. Kittel (Wiley Eastern Ltd. 1992)

Further reading.

1. Solid State Physics: B.S. Sexena, R.C. Gupta and P.N. Sexena (Pragati Prakashan)
2. Concept of Modern Physics: S.L. Gupta and S. Gupta (Dhanapat Rai & Son)

Schrodinger time dependent time independent wave equation,
(one dimension), physical interpretation of wave function,
particle in a box

(6)

Books recommended

1. Quantum Mechanics-A.K. Ghatak and S. Lokanathan (The
Mecmillan Co. of India Ltd. latest revised edition)

Further reading:

1. Concept of Modern Physics - S.L. Gupta & S. Gupta
(Dhanpati Rai & Co. Delhi, latest edition)
2. Quantum Mechanics, Statistical Mechanics and Solid State
Physics - D. Chattapadhyay & P.C. Rakshit (S. Chand & Co.)
3. Introduction to Modern Physics -H.S. Mani and G.K. Mehta
(Affiliated East-West Press Pvt. Ltd. 1988)

Solid State Physics I : (30)

Crystal Structure: Periodicity of crystals, unit cells Miller
indices and representation of planes, Symmetry considerations,
Symmetry groups, space groups, different types of crystal struc-
ture, classification of crystals bases on nature of forces, ana-
lysis of crystal structure of Na Cl and K Cl from Bragg's law.
Bravais lattices, Structure of diamond, Co-ordinate number,
packing fraction, liquid crystals.

Elementary theory of Laue spots, Reciprocal lattice, Rotation
crystal method, Debye-Scherrer method, Electron and neutron diff-
raction method.

(12)

Lattice vibrations: Dynamics of one dimensional monoatomic linear
chain and chain of two types of atoms. Optical and acoustic modes,
and concept of Brillion zones. Phase velocity and group
velocity.

(6)

Physics Major: Max Marks. 80

Paper I: Solid State Physics II (35), Classical Mechanics (25),
Quantum Mechanics II (30), Methods of Mathematical
Physics II (50)

Crystal binding, Lattice vibrations and Conduction in metal:
Types of binding in solid, Ionic binding, covalent binding metallic binding, molecular (Van der waal) binding, binding energy, hydrogen bond (3)

Sommerfeld's theory of conduction in metals, Fermi-Dirac distribution, thermal properties of free electron gas. Calculation of specific heat & Thermal conductivity, Wiedemann-Franz law, band theory. Electrons in periodic potential and origin of energy gap. Difference between insulators, Semiconductors & conductors in terms of energy gap. (8)

Semiconductors and Semiconductor devices:

Electrons and holes: details of Fermi level, temperature dependence of electron and hole concentration, doping, electrical conductivity of semiconductors, Hall effect, Hall coefficient, measurement of Hall coefficient and Hall voltage, cyclotron resonance. (5)

PN junction, majority and minority carriers, rectifying action of P-N junction diode. (3)

Magnetism:

Langevin's theory of diamagnetism, Weiss theory of paramagnetism, paramagnetic susceptibility, Curie-Weiss law, Weiss theory of ferromagnetism, experimental verification. Ferromagnetic domains, antiferromagnetism, and ferromagnetism. Paramagnetism of free electrons (10)

Superconductivity:

Zero resistivity, transition temperature, critical magnetic field, Meissner effect. The intermediate state, thermodynamic effect, latent heat, specific heat and thermal conductivity of superconductors. Type I & Type II superconductors. Ideas about high temperature superconductors.

Books recommended:

1. Introduction to Solid State Physics: C. Kittel (Wiley Eastern Ltd. 1992)
2. Quantum Mechanics-Statistical Mechanics and Solid State Physics (S. Chand & Co. Ltd. 1992)

Further reading:

1. Solid State Physics-Saxena, Gupta and Saxena (Fragati Prakashan)
2. Solid State Physics-J.S. Blackmore (Cambridge University Press 11th edition)
3. Solid State Electronic Devices-B.G. Streetman 11th Ed. (Prentice Hall India. 1986)
4. Solid State Physics -R.N. Levy (Academic Press, latest edition).

Quantum Mechanics II(30)

Experimental evidence of matter waves, Davision & Garmer's experiment. Proof of uncertainty principle and its applications, time energy relation. Postulates of quantum mechanics, operators, observables and measurements. (4)

Physical meaning of ψ , ψ^2 and normalisation, Schrödinger equation as an operator equation. (2)

Average values, expectation values in quantum mechanics, Simple one dimensional problems, potential well, infinite and shallow, potential step. Eigen values, eigenfunctions of ground and excited states, probability density and its variations with excitation, orthogonality of wave functions. (5)

Applications to one dimensional Simple harmonic oscillator, Step potential, penetration through rectangular barrier, transmission & reflection coefficients, quantum mechanical tunnelling. (4)

Angular momentum operator in cartesian coordinates, representation in polar co-ordinates, evaluation of their eigen functions their degeneracy. Schrodinger equation for hydrogen atom in polar co-ordinates - separation into radial & angular variables, Spherical harmonics. (6)

Pauli's Spin operators and their matrix representation eigen values & eigen functions of spin operators, Pauli's spin operators & their commutation relations. (3)

Books Recommended.

Quantum Mechanics A.

1. Quantum Mechanics A.K.Ghatak and S. Lokonathan(The Macmillan Co. of India latest revised edition.
2. Introduction to Quantum Mechanics P.T.Methews.

Further reading

1. Introduction to Quantum Mechanics Pauling & Wilson, McGraw Hill Latest edition.
2. Quantum Mechanics A. Chatwal(Himalaya Publishing House) 1989.
3. Introductory Quantum Mechanics Y.R. Waghmare(S. Chand. & Co. Ltd) 1989
4. Introductory Quantum Mechanics V. Rajansky (Asia Publishing House) latest edition.
5. Quantum Mechanics M.N. Srivastava(Pragati Prakashan) latest edition.

Contd/.../-

Methods of Mathematical Physics II (50)

Ordinary differential equation :

Meaning of ordinary point and singular point, series solution of second order, differential equation by Frobenius method.

Legendre Polynomials : Polynomial solution of Legendre differential equation, Legendre polynomials $P_n(x)$. Rodrigue formulae for $P_n(x)$, generating function for $P_n(x)$ and recurrence relations, orthogonal property of $P_n(x)$, Expansion of a function in a series of Legendre polynomials.

Calculation of potential at a point due to an electric dipole and quadrupole by using Legendre polynomial Bessel functions. (12)

Solution of Bessel's differential equation, Bessel function $J_n(x)$.

Generating function of $J_n(x)$. Recurrence relation for $J_n(x)$.

Integrals for $J_0(x)$ and $J_n(x)$; Bessel function of integral and half integral n . (7)

Hermite Polynomials.

Solution of Hermite differential equation, Hermite polynomials $H_n(x)$. Generating functions, Rodrigue's formula, recurrence relations, orthogonal property of $H_n(x)$. (7)

Partial differential equation.

Solution of partial differential equations by the method of separation of variables. Application of this method in solving.

(i) differential equation of heat flow in one dimension.

(ii) Equation of vibrating string

(iii) Laplace's equation in two dimension (Cartesian & polar co-ordinates)

Complex Variables :

Preliminary ideas of a complex number, functions of complex variables, analytical functions, Cauchy-Riemann conditions, Cauchy's theorem, Cauchy's integral formulae, Simply and multiply connected regions.

Taylor series and Laurent series (both without proof), Poles and residue, Cauchy's residue theorem with proof, application of residue theorem in integrals of functions having simple poles. (16)

Books Recommended:

1. Mathematical Physics B.D. Gupta (Vikash Publishing House, latest edition)

Further reading

1. Applied Mathematics for engineers L.C. Pipes & L.R. Harvill (McGraw Hill International Book Co., latest edition).
2. Mathematical methods of Physics Methews and Walker (Latest edition)
3. Vector analysis and an introduction to Tensor analysis M.R. Spiegel; (McGraw Hill Book Co. latest edition).
4. Mathematical Physics R.K. Gupta & H.C. Sharma (Meenakshi Prakashan, latest edition).
5. Mathematical Physics B.S. Rajput (Pragati Prakashan 1991-92).

Paper X Physics Major : 80 marks

Atomic & Molecular Physics (60) Molecular Physics and Particle Physics (80)

Atomic & Molecular Physics (60)

Atomic Physics (35)

Rutherford's alpha particle scattering experiment, derivation of Rutherford's cross section formula, theory and Rutherford atom model. Sommerfield's elliptical orbits, radial and azimuthal quantum number, total energy, general characteristics, Larmour's theorem, magnetic moment and Bohr's magneton, Sommerfield's relativistic correction, fine structure, fine structure of H-line, He⁺ ion, selection rule for azimuthal quantum number (12) Vector atom model, the spinning electron, space quantization, quantum numbers n, l, s, j, m_l, m_s and their physical interpretation magnetic moments of an atom, and Lande's factor, $L-S$ and $J-J$ coupling selection rules.

Stern-Gehrlach experiment

Pauli's exclusion principle, maximum number of electrons in a given group or subgroup, periodic table

Doublet fine structure of hydrogen and alkali atoms screening constants for monovalent atoms.

Zeeman effect, classical interpretation of normal Zeeman effect, Vector model normal and anomalous Zeeman effect, for one electron systems, Lande factor Paschen-Back effect Zeeman effect in two ideas of $L-S$ and $J-J$ coupling, Stark effect, its explanation and experimental results. (10)

X-rays : Concept of fine structure of X-Rays levels, X-ray fluorescence and the Auger effect.

Molecular Physics : (25)

Introduction : types of molecular spectra rotational, vibration and electronic spectra. Pure rotational spectra rigid rotator, quantum mechanical derivation of energy levels of rigid rotator frequency of spectral line, selection rule and the spectrum.

Nonrigid rotator, energy levels, spectrum, determination of intermolecular distance (HCl, CO, N_2), isotopic effect on rotational spectra

Rotational spectra of polyatomic molecules, Principal moments of inertia, analysis of spectra of symmetric top

contd.; ; ; ; /-----

molecules. energy levels, selection rules. The stark effect in molecular rotational spectra vibrational-rotational spectra: (6)

Vibrating diatomic molecule as a harmonic oscillator, frequency energy levels, selection rules, spectrum, coupling of rotation and vibration, molecule as an harmonic oscillator, energy levels, transition rules, spectrum, fine structure of vibration at rotational bands.

Electronic spectra :

Introduction : electronic band systems, Sequence and progressions, Frank Condon Principle energy levels, selection rules, spectrum rotational fine structure of vibrational transitions, Fortrat diagram.

Raman spectra :

Raman and its brief quantum mechanical explanation, fundamental of vibrational Raman spectra, structure determination from Raman spectroscopy (diatomic molecule), comparison of infrared and Raman scattering. (5)

Books Recommended :

1. Elements of Spectroscopy, Gupta, Kumar and Sharma, Pragati Prakashan
2. Introduction to atomic spectra, H.E.While (McGraw Hill International Book Co, latest edition.
3. T.A. Littlefield and N.Thorley; Atomic and Nuclear Physics (English Language book society and Van Nostrand Reinhold Co. Ltd.)
4. Raman Spectroscopy : D.A.Long , John Willey latest edition)

Further Reading :

1. G.M.Barrow ; Molecular spectroscopy, McGraw Hill Book Co.

Nuclear Physics and particle Physics (80) Structure of the nucleus : Basic properties, charge, mass, size, spin, magnetic moments, electric quadrupole moment, binding energy, binding energy per nucleon and its observed variation with mass number of the nucleus, Coulomb energy, volume energy, surface energy, other corrections, semiempirical mass formula and its simple application.

Radioactivity : Measurements of decay constants, spectra of alpha particle; range of alpha particle, Geiger-Nuttall Law, Gamow's theory of alpha decay, Beta ray spectroscopy, neutrino, hypothesis anti neutrino, elements of Fermi's theory, detection of neutrino. Mossbauer effect, Measurement of gamma ray energies by crystal spectrometer. Nuclear detectors : Proportional counter, GM Counter bubble chamber, photographic emulsion, spark chamber, scintillation counter, semiconductor counters, Cerenkov counter, Neutron Counter. Accelerators : Need for accelerators, Cockcroft Walton accelerator betatron, variable energy cyclotron, electron synchrotron, proton synchrotron idea of interacting beam accelerators, accelerators in India.

Nuclear reactions : conservation laws, calculation of Q values, threshold energy, cross-section of nuclear reactions, Nuclear Model. Liquid drop model, shell model, collective model Neutron Physics : Decay of Neutrons (Robson's apparatus), determination of half life of neutrons, Neutron induced reactions.

Artificial radioactivity & Production and uses of artificial radioactive isotopes, isomerism, clarification of electron capture, Radio carbon dating, Nuclear fission- calculation of energy by different methods, energy and mass distribution of fragments decay of fission products. four factor formula for nuclear reactors (heavy water reactors), classification of reactors. Reactors in India

Bohr and Wheeler theory of nuclear fission Transuranic elements.

Fusion : The plasma, Nuclear fusion reactions in the plasma, conditions for sustained fusion (briefly), Tokamak fusion system (Elementary ideas).

Cosmic rays and elementary particles : Secondary cosmic rays hard and soft components, geomagnetic effects and its interpretation, absorption, showers, extensive air showers, fundamentals of theory of electron shower (Shabha's theory)

Nuclear forces : Strength and range exchange contribution Yukawa's meson theory of nuclear forces. Discovery of strange particles, Multiplet structure, isospin strangeness hypercharge, conservation laws, elementary particle symmetries, quarks.

Reference Books

1. Atomic and Nuclear Physics, (English Language Book Society)
T.A.Littlefield and N.Thorley, latest edition,
2. Nuclear Physics (H.C.Tayal, Himalaya Publishing House, 1991
3. Basic Nuclear Physics & Cosmic rays, B.N.Srivastava, Pragati Prakashan, 1992.

Further Reading:

1. Nuclear Physics, R.C.Sharma, K.Nath & Co, latest edition.
2. Principle of Modern Physics, R.B.Leighton, McGraw Hill Book Co, Student edition, latest edition.
3. Nuclear Physics, A.E.S. Green, McGraw Hill Book Co, latest edition student edition.
4. Introduction to Nuclear Physics - H.A.Bethe (Addison Wesley).

5:2:1(297)

ENGLISH

(Compulsory)

(For Bachelor of Arts)

Annexure - P

PAPER I - POETRY AND DRAMA

Max. Marks: 100

Time : 3 hrs.

A. Poetry :

The following poems from The Siren's Song, Ed. by David Murdoch published by Orient Longman.

1. John Donne : Sweetest Love, I do not go
2. John Milton : On His Blindness
3. Alexander Pope : Extract from An Essay on Man
4. William Blake : London
5. William Wordsworth : Three Years She Grew in Sun and Shower
6. Samuel Taylor Coleridge : Youth and Age
7. John Keats : To Autumn
8. Lord Byron : She Walks in Beauty
9. Percy Bysshe Shelley : To A Skylark
10. Lord Tennyson : Ulysses
11. Robert Browning : Pippa's Song
12. Mathew Arnold : Dover Beach
13. Thomas Hardy : Channel Firing
14. T.S. Eliot : Journey of the Magi

B. Drama :

1. Shakespeare : Julius Caesar

Non-detailed Study :

1. A.A. Milne : Portrait of a Gentleman in Slippers
2. Edgar Wallace : The Forest of Happy Dreams

5211(298)

PAPER II - PROSE, FICTION AND COMPOSITION

Max. Marks : 100

(Compulsory)

Time : 3 hrs.

A. Prose :

Marks : 40

Ten pieces from Creative English edited by Jagdish Chander,
Delhi: Oxford University Press, 1976.

B. Fiction :

Marks : 20

1. Charles Dickens : A Tale of Two Cities

C. Composition :

Marks : 20

Precis/Substance Writing

D. Grammar :

Marks : 20

Use of Preposition, Use of Articles, Concord and Usage
(each carrying five marks)

Suggested Readings :

1. Green David : Contemporary English Grammar
Structure and Composition (Delhi:
Macmillan India Ltd.)
2. Allen W.S. : Living English Structure (Longman)

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ENGLISH
(Compulsory)
(For Bachelor of Commerce)

A. Prose :

Marks : 30

The following 10 pieces from English Prose and Verse for the B.Com. Course published by Orient Longman.

- | | |
|-------------------------|---|
| 1. Clarence B. Bandale | : Management Speaks to the Graduate |
| 2. Lynn Doyle | : Banking without Blarney |
| 3. Melvin Anshen | : A Social Role for Business |
| 4. Michael George | : A Daily Newspaper |
| 5. Herman Wouk | : A Talk on Advertising |
| 6. Nired C. Choudhuri | : Money and the Englishman |
| 7. Daniel Defoe | : The Balance Sheet of Robinson
Crusoe |
| 8. Thomas Henry Huxley | : The Method of Scientific Investi-
gation |
| 9. Max Lerner | : Machine Living |
| 10. Sir Harold Nicolson | : This Modern World |

B. Drama :

Marks : 30

The following four pieces from Selected One Act Plays edited by Sayanarayan Singh, published by Macmillan.

- | | |
|------------------------------------|------------------------------|
| 1. Anton Chekhov | : A Marriage Proposal |
| 2. Norman McKinnel | : The Bishop's Candlesticks |
| 3. A.A. Milne | : The Ugly Duckling |
| 4. W.W. Jacobs and
Charles Rock | : The Ghost of Jerry Bundler |

5:2:1(300)

B. Commercial Correspondence

Marks : 20

The following items :

1. Application for a situation
2. Letters of Recommendation and Credit
3. Inquiries, Quotations and Offers
4. Acceptances and Orders
5. Circular Letters
6. Agency
7. Drafting

D. Grammar :

Marks : 20

Use of Preposition, Use of Articles, Concord, Usage, (each carrying 5 marks).

Suggested Readings :

1. Green David : Contemporary English Grammar
Structure and Composition, Delhi:
Macmillan India Ltd.
2. Allen W.S. : Living English Structure, Longman
3. W.M. Majumdar : Commercial Correspondence, Calcutta,
Bookland Pvt. Ltd.

ALTERNATIVE ENGLISH

(For Bachelor of Commerce)

Essay	: 25
Precis	: 20
Business Correspondence	: 15
Short Stories	: 40

The following short stories from 'Stories British and American' ed. by M.G.Narasinha Murthy, published by Orient Longman.

1. The Lion's skin by W.Somerset Maugham
2. The Doll's House by Katherine Mansfield
3. The £1,000,00 Bank Notes by Mark Twain
4. The Last Leaf by O.Henry.

5.2.1(301)

ENGLISH

(Compulsory)

(For Bachelor of Science)

Max. Marks : 100

Time : 3 hrs.

A. Novel :

Marks : 40

H.G. Wells : The Time Machine

B. Drama :

Marks : 20

The following four pieces from Selected One-Act Plays edited by Satyanarayan Singh, published by Macmillan.

1. Anton Chekhov : A Marriage Proposal
2. A.A. Milne : The Ugly Duckling
3. W.W. Jacobs and Charles Rock : The Ghost of Jerry Bundler
4. Norman Mc. Kinnel : The Bishop's Candlesticks

C. Composition :

Marks : 20

Essay Writing, Precis, Substance Writing.

D. Grammar :

Marks : 20

Use of Preposition, Use of Articles, Concord, Usage (each carrying 5 marks).

Suggested Readings :

1. Green David : Contemporary English Grammar
Structure and Composition (Delhi:
Macmillan India Ltd.)
2. Allen W.S. : Living English Structure (Longman).

5:2:1(302)

ENGLISH

B.Sc. (Home Science)

Max. Marks : 100

(Compulsory)

Time : 3 hrs.

A. Prose :

Marks : 40

Ten pieces from Creative English Edited by Jagdish Chander,
Delhi: Oxford University Press, 1976.

B. Fiction :

Marks : 20

1. Ernest Hemingway : The Old Man and The Sea

C. Composition :

Marks : 20

Precis/Substance Writing

D. Grammar :

Marks : 20

Use of Preposition, Use of Articles, Concord and Usage (each
carrying five marks).

Suggested Readings :

1. Green David

: Contemporary English Grammar

Structure and Composition (Delhi:
Macmillan India Ltd.)

2. Allen W.S.

: Living English Structure (Longman)

5.2.1(303)
PAPER I - POETRY

Max. Marks : 100

(ELECTIVE I)

Time : 3 hrs.

The following poems from Six Ages of English Poetry edited by H.M. Williams, published by George Allen and Unwin:

- | | |
|-------------------------|-------------------------------|
| 1. John Donne | : Death Be Not Proud |
| 2. George Herbert | : Virtue |
| 3. Henry Vaughan | : The Retreat |
| 4. John Dryden | : Portrait of Achitophel |
| 5. Wordsworth | : Resolution and Independence |
| 6. Percy Bysshe Shelley | : Ode to the West Wind |
| 7. John Keats | : Ode to a Nightingale |
| 8. Tennyson | : Tithonus |
| 9. Robert Browning | : My Last Duchess |
| 10. Thomas Hardy | : Darkling Thrush |
| 11. Walter De La Mare | : The Children of Stars |
| 12. W.B. Yeats | : A Prayer for my Daughter |
| 13. T.S. Eliot | : Preludes |
| 14. W.H. Auden | : September, 1939 |

PAPER II - DRAMA

Max. Marks : 100

(ELECTIVE II)

Time : 3 hrs.

- | | |
|------------------------|-----------------------------|
| 1. William Shakespeare | : A Midsummer Night's Dream |
| 2. William Shakespeare | : Antony and Cleopatra |
| 3. Oliver Goldsmith | : She Stoops to Conquer |
| 4. R.D. Shoridan | : The Rivals |
| 5. G.B. Shaw | : Pygmalion |

PAPER III - FICTION I

Max. Marks : 100

(ELECTIVE III)

Time : 3 hrs.

- | | |
|---------------------|---------------------------|
| 1. Daniel Defoe | : Robinson Crusoe |
| 2. Jonathan Swift | : Gulliver's Travels |
| 3. Emily Bronte | : Wuthering Heights |
| 4. Jane Austen | : Pride and Prejudice |
| 5. Ernest Hemingway | : The Old Man and the Sea |

5.2.1(304)
PAPER IV - POETRY

Max. Marks : 100

Time : 3 hrs.

1. Milton : Lycidas
2. William Wordsworth : Tintern Abbey
3. Keats : Ode on a Grecian Urn, Ode to a Nightingale
4. Robert Browning : The Last Ride Together
5. W.B. Yeats : Easter 1916.
The Second Coming, Sailing to Byzantium
6. T.S. Eliot : The Love Song of Alfred J. Prufrock

PAPER V - DRAMA

Max. Marks : 100

Time : 3 hrs.

1. Shakespeare : Othello
2. Ben Jonson : The Alchemist
3. Webster : The Duchess of Malfi
4. Congreve : The Way of the World
5. Shaw : Saint Joan
6. Eliot : Murder in the Cathedral
7. J. Osborne : Look Back in Anger

PAPER VI - FICTION

Max. Marks : 100

Time : 3 hrs.

1. Charles Dickens : Great Expectations
2. Thomas Hardy : Far From the Madding Crowd
3. Joseph Conrad : The Heart of Darkness
4. D.H. Lawrence : Fox and Odour of Chrysanthemums
5. W. Golding : Lord of the Flies
6. J.D. Salinger : The Catcher in the Rye

* Texts with asterisks are meant for detailed study. Annotation questions will also be set on them except in Paper VI (Fiction) where no such question shall be asked.

5:2:1(305)

PAPER VIII- ENGLISH LITERARY CRITICISM

Max. Marks : 100

Time : 3 hrs.

1. Wordsworth : Preface to the Lyrical Ballads (2nd ed)
2. Shelley : A Defence of Poetry
3. Arnold : The Function of Criticism at the Present Time
4. T.S. Eliot : The Function of Criticism
5. Critical Appreciation : (Unseen) Passages from Poetry and Prose.

Suggested Readings:

1. David Daiches : Critical Approaches to Literature
2. Rene Wellek : History of Criticism
3. Cleanth Brooks : History of Criticism
4. Saintsbury : History of Criticism
5. I.A. Richard : Practical Criticism
6. James Reeves : Understanding Poetry
7. H. Coombes (Penguin) : Literature and Criticism
8. Raymond Williams : Reading and Criticism

PAPER VIII - HISTORY OF ENGLISH LITERATURE AND
HISTORY OF ENGLISH LANGUAGE

Max. Marks : 100

Time : 3 hrs.

A. History of English Literature

Marks : 50

The objective of this course is to acquaint the student with the various periods of literary history and the authors who have contributed to the establishment of literary movements.

The Course will entail a study of

1. The Renaissance and Reformation from Spenser to 1660.
2. The Age of Dryden and Pope.
3. The Romantic Movement 1798 - 1840.
4. The Victorian Age.

B. History of English Language

Marks : 50

Suggested Readings :

1. B. Ifor Evans : A Short History of English Literature
2. David Daiches : A Critical History of English Literature
3. Legouis & Cazamian : History of English Literature
4. Jespersen : Growth & Structure of the English Language
5. Simeon Potter : Our Language
6. F.T. Wood : An Outline History of English Language
7. C.L. Barber : The Story of English

512.1(306)

OPTION IN LIEU OF PAPER VIII
I AMERICAN LITERATURE

Max. Marks : 100

Time : 3 hrs.

1. Edgar Allen Poe

The following two stories :

- (a) The Fall of the House of Usher
- (b) The Murders in the Rue Morgue

2. Mark Twain

: Huckleberry Finn

3. Ernest Hemingway

: A Farewell to Arms

4. Eugene O'Neill

: Mourning Becomes Electra

The following poems :

1. Walt Whitman

- (a) In Paths Untrodden
- (b) When Lilacs Last in the doorward
Bloom'd
- (c) On the Beach at Night.

2. Emily Dickinson

- (a) In Years had been from Home
- (b) In Winter in my Room
- (c) A Narrow fellow in the grass

3. Robert Frost

- (a) After apple-picking
- (b) Stopping by Woods on a Snowy
Evening.
- (c) Spring Fields

Suggested Readings :

1. Richard Ellmann (ed)

: The New Oxford Book of American
Verse.

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II. INDIAN WRITING IN ENGLISH

Max. Marks : 100

Time : 3 hrs.

1. R.K. Narayan : Swami and Friends
2. Mulk Raj Anand : Coolie
3. Ruth Prasad Jhabvala : Heat & Dust
4. Nirad C. Chaudhuri : A Passage to England
5. Anita Desai : Where shall we go this summer
6. The following poets to be studied :
 - (1) Nissim Ezekiel
 - (2) A.K. Ramanujan
 - (3) J. Harepatra
 - (4) Dom Moraes
 - (5) Kamla Das

Recommended Text :

Sarang, V. Indian English Poetry since 1950 :
An Anthology; Delhi : Orient Longman, 1989.

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Annexure

SYLLABII OF THREE YEARS DEGREE COURSE

PA

SUB : GEOLOGY

IST YEAR

THEORY

PAPER : General Geology & Structural Geology

Time : 3 Hours

Max.Marks : 70.

(There will be ten questions, five from each group out of five questions are to be answered selecting at least two each group).

Group - A

(General Geology)

Origin and age of the earth. Origin of oceans and continents. Types and origin of mountains. Earthquake waves and their utility in interpreting the earth's interior. Continental drift and Elements of plate tectonics. Earthquake zones of India. Volcanoes-types and products of volcanic activity. Rock weathering and erosion. Geological action of wind, running water and glaciers. Classification and common types of landforms. Isostasy.

Group - B

(Structural Geology)

Attitude of planes and lines - Dip, Strike clinometer compass and its use. Outcrop-Effects of topography on outcrops. Definition of folds, faults, thrusts, nappes, Joints, Cleavages, foliations, lineations and unconformities - their types and recognition in the field. Determination of top and bottom of layered rocks. Geosynclines-definition and types. Structural features of India with special reference to North-East region.

Practical Paper

Paper : General Geology & Structural Geology.

Time : 3 hours

Max.Marks : 25

Study of geomorphological and structural models. Reading of topographical maps. Geometrical solution of problems of dip, strike and outcrop. Study and interpretation of simple geological maps and their sections containing folds, faults, unconformities, dykes and sills. Use of clinometer compass. Determination of dip and strike on inclined surfaces.

Contd/...

Field Work: Marks: 5

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5:2:9(309)

IInd Year

PHYSICS

Paper-I : Crystallography, Mineralogy and Igneous & Metamorphic Petrology.

Time : 3 hours

Max. Marks : 70

(There will be ten questions, five from each group out of which five questions are to be answered selecting at least two from each group. Equal weightage will be given to all the branches).

Group - A

(Crystallography & Mineralogy)

Crystal - its definition. Characteristics of crystals-faces, forms, interfacial and solid angles, zone and zone axis, symmetry, parameters and indices. Study of normal classes of crystal system. Twinning.

Petrological microscope - its use & different parts, Polarisation of light, Pleochroism, extinction, double refraction, refractive index, interference colour, nicol prism, distinguishing characters of isotropic, anisotropic, uniaxial and biaxial minerals.

Physical properties of minerals. Physical, Chemical and optical properties of the following:-

Feldspar Group : With special reference to orthoclase, Microcline and plagioclases.

Feldspathoid Group : With special reference to Leucite Nepheline & Sodalite.

Mica Group : With special reference to Muscovite and Biotite.

Alluminosilicate Group : With special reference to Kyanite, Sillimanite and Andalusite.

Silica Group : With special reference to Quartz, Chalcedony, Opal.

Pyroxene Group : With special reference to Enstatite, Diopside, Hypersthene and Augite.

Amphibole Group : With special reference to Tremolite, Actinolite like and Hornblende. and Stauroilite, Bayl, Tourmaline, Epidote, Garnet, Zircon, Apatite, Calcite Fluorspar, Olivine and Serpentine and ...3. Analcite, Stilbite.

Contd/...3.

-3-
5:27(310)
Group - B

(Igneous and Metamorphic Petrology)

Subdivisions of petrology, Igneous, metamorphic and sedimentary rocks and their distinguishing features.

Magma - its composition, crystallization of uni-and bi-component magma and Bowen's reaction series. Mode of occurrence of igneous rocks. Study of textures and structures of igneous rocks. Mineralogical classification of igneous rocks. Petrographic aspects and genesis of granite, rhyolite, syenite, trachyte, gabbro, basalt, diorite, dolerite and pegmatite.

Factors, and types of metamorphism. Textures and structures of metamorphic rocks. Barrovian zone of metamorphism.

Petrological description and genesis of slate, Phyllite, schist, gneiss, quartzite, amphibolite and marble.

Paper-II : Palaeontology and Stratigraphy.

Time : 3 hours Max. Marks : 70.

(There will be ten questions, five from each group ~~out~~ out of which five questions are to be answered, selecting at least two from each group).

Group - A

(Palaeontology)

~~Fossils - definition, mode of~~

Palaeontology - A broad survey of the different branches.

Fossils - definition, mode of preservation and uses.

A general study of morphological characters and ~~about~~ geological distribution of the following - Brachiopods, anthozoans, molluscs, trilobites, echinoids, and Gondwana floras.

Group - B

(Stratigraphy)

Principles of stratigraphy correlation, Geological divisions of India. Geological time scale.

Geology of India - A brief study of the Pre-Cambrian of Mysore, Singhbhum, Rajasthan, Madhya Pradesh and Assam. Cuddapah supergroup of Cuddapah basin and Vindhyan Supergroup of Son Valley. Gondwana Supergroup of Peninsular India. Palaeozoic and Triassic of ~~Spiti~~ Spiti. Jurassic of Kutch. Cretaceous of Trichinopoly. Tertiary of North-East India. Siwaliks.

Contd/ ...

Paper : Crystallography & Mineralogy,
Palaeontology & Stratigraphy.

Time : 4 hours. Max. Marks: 50

Study of symmetry elements and habit of the crystals and drawing of crystals belonging to the normal class of the Isometric, tetragonal, hexagonal and orthorhombic systems.

Recognition of the following minerals in hand specimens by their physical characters - Quartz, chalcedony, opal, orthoclase, microcline, plagioclases, augite, hornblende, tremolite, actinolite, olivine, muscovite, biotite, chlorite, staurolite, garnet, biotite, chlorite, apatite, beryl, tourmaline and calcite.

Identification of the following minerals under microscope - Quartz, orthoclase, microcline, plagioclases, muscovite, biotite, augite, hornblende, olivine, garnet, tourmaline, calcite.

Recognition of the following rocks in hand specimens - Basalt, dolerite, diorite, dunite, gabbro, pegmatite, rhyolite, syenite, granite, trachyte, gneiss, marble, quartzite, schist, slate, phyllite, charnockite and gneiss.

In thin section - Study of mineral constituents, texture and structures of the following rocks and their identification - Basalt, diorite, dolerite, granite, gabbro, syenite, gneiss, quartzite, schist and marble.

Identification and study of the following fossil genera : Micraster, clypeaster, Hemiaster, Terbratula, Rynchonella, Productus, spirifer, Nucula, Lima, Pecten, Spondylus, OSTREA, Trigonia, Cardita, Comus, Cypraca, Natica, cerithium, Murex, Physa, Turritella, Nautilus, Perisphinctes, Acanthoceras, Baculites, Belemnites, Calceola, Lophrentis, Calymene, Phacops, Glossopateris, Gangamopteris, Vertebraria and Ptillophylum.

Study of rocks from important stratigraphic of North-East India.

Field Work :

Marks: 10

Contd/....5..

Theory

Paper : Economic Geology and Sedimentary Petrology.

Time : 3 hours Max. Marks : 70.

(There will be ten questions - three questions each from sections I & II under Group - A and four questions from Group-B. From Group - A, three questions are to be answered selecting at least one question from each section. From Group - B, two questions are to be answered.)

Group - A

Definition of ore, gangue and tenor. Processes of formation of economic mineral deposits. Classification of mineral deposits. Metallogenic provinces and epochs.

Occurrence, origin, uses and distribution in India of the following - gold, copper, lead, zinc, aluminium, iron, manganese, chromium, kyanite, sillimanite and radioactive minerals. Origin, types, uses and distribution of coal in India with special reference to North-East region, origin, migration and accumulation of petroleum. Distribution of petroleum in India with special reference to North-East region.

Group - B

Sedimentary processes. Simple genetic classification of sedimentary rocks. Textures and structures of sedimentary rocks.

Petrological description of the following rock types - Graywacke, arkose, quartz-arenite, shale, limestone chert and conglomerate.

Practical

Paper : Economic Geology and Sedimentary Petrology.

Time : 3 hours Max. Marks : 20

Recognition of the following minerals in hand specimen by their physical properties-Graphite, malachite, Chalcopyrite, Pyrite, Haematite, magnetite, ilmenite, chromite, Pyrolusite, Psilomelane, Barite, asbestos, Colundum, coal, gypsum, barite, fluorite, galena, sphalerite, Kaoline, sillimanite, kyanite, Calcite, azurite, siderite, magnesite, rhodocrosite, realgar, orpiment, Stibnite, molybdenite, sulphur, apatite, cinnabar, pyrrhotite, bornite, covellite, arsenopyrite, crysolite, cuprite, zincite, limonite and monazite.

Contd/.....6.

5:21(313)

Recognition of the following rocks in hand specimens - conglomerate, limestone, shale, sandstones and graywacke. In this section - Study of mineral constituents, texture and structures of limestone, sandstones and conglomerate.

Field work :

Marks : 10.

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5:2:1(314)

SYLLABUS OF THREE YEARS DEGREE COURSE

B.SC. HONOURS

SUBJECT : GEOLOGY

1ST YEAR

I

Paper-I : General Geology & Structural Geology.

Time : 3 hours Max. Marks: 70

Syllabus as per B.Sc. 1st year theory paper

Paper-II : Geomorphology and Tectonics.

Time 3 hours Max. Marks: 70.

(There will be ten questions out of which five are to be attempted selecting at least two from each group.)

Group - A

(Geomorphology)

Significance of weathering in geomorphology. Cycle of erosion slope and slope problems. Soils and soil formation, soil types of India. Shape and surface relief of the earth with special reference to Indian forms related to geological formations and structures. ^{Earth} flows, ^{Mud flows} soil-creep, solifluction and sheet wash Geological action of sea-waves.

Group - B

(Tectonics)

Origin and development of continents and ocean basins. Concept of sea floor spreading, plate-tectonics and Island arcs. Concept of cratons and mobile belts. Elements ^{of} stress and strain. Rock deformation ^{behaviour}. Mechanism of folding and faulting. Analysis of the elements in folds & faults, of igneous and sedimentary rocks under stress and strain. Major tectonic features of India.

PRACTICAL

Paper-III : Geomorphology & Structural Geology.

Time : 4 hours Max. Marks : 50.

Study of geomorphological models. Drawing of profiles and study of geomorphological features from contour maps.

Study of structural models. Working out of problems related to true dip, apparent dip and thickness of beds of inclined strata. Geometrical solution of problems of dip, strike and out crop. Determination of dip and strike from bore-hole data. Completion of out crops of beds from surface and bore-hole data. Interpretation of structures from geological maps and drawing of cross-section. Solution of problems related to dip and strike using stereonet.

Field Work : - 10 Marks.

II YEAR

THEORY

Paper-IV : Mineralogy, Crystallography & Igneous and Metamorphic Petrology.

Time : 3 hours Max. Marks : 70

Syllabus as per B.Sc. Pass course IInd year theory paper.

Paper-V : Palaeontology

Time : 3 hours Max. Marks : 70.

Study of different branches of Palaeontology. Micro-Palaeontology and its utility. Modes of preservation and uses of fossils. Imperfection of geological records. Techniques of collection and preparation of fossils. A brief idea about organic evolution and palaeontological evidences in support of it.

A study of the morphological features and geological distributions of the following. Class-Sarcodina, Foraminifera (only) Phylum Brachiopoda. Class-Anthozoa, class-Bivalvia-Gastropoda-cephalopoda, class-Trilobita, class - Echinidea and class-Graptolidea. A general idea of Gondwana flora and Siwalik mammals of India.

A study of evolutionary trends in Trilobite, Equidae and Homo sapiens.

Paper-VI : Stratigraphy

Time : 3 hours Max. Marks : 70

(In papers V & VI, there will be ten questions out of which five are to be attempted).

Principles of stratigraphy. Definition and scope of different units, namely, Time-Units, Rock-units, Time-rock-units and Biostratigraphic units. Absolute geological time. Methods of correlation in stratigraphy. Indian stratigraphy and geochronological ages. Principles and methods of dating the rocks - rate of sedimentation, salinity. Varved sediments and radioactivity.

Connotation of the terms -

Indian stratigraphic column, ^{Prayidina,} Dharwar, Purana, Cuddapah and Vindhyan, their correlation with standard stratigraphic columns.

The Archaean stratigraphy of the following areas to be studied with respect to their lithology, tectonic and igneous activity. (a) Mysore (b) Singhbhum -Orissa (c) Assam Plateau, (d) Madhya-Pradesh (e) Rajasthan

The Guddapet Supergroups of basin and Vindhyan Supergroup. Stratigraphy of the following areas-

- (a) Palaeozoic of Spiti and Kasmir.
- (b) Gondwana of Peninsular and extra peninsular India.
- (c) Triassic of Spiti (d) Jurassic of Kutch
- (e) Cretaceous of south and North East India ;
- (f) Deccan traps ; (g) Cenozoics of North-East India; (h) Siwaliks.

PRACTICAL

Paper-VII : Mineralogy, Crystallography, Igneous & Metamorphic Petrology, Palaeontology & Stratigraphy.

Time : 4 hours Max. Marks : 75.

For crystallography, Mineralogy, Igneous and Metamorphic Petrology as per practical paper of B.Sc. (Pass Course) IInd year.

Identification of the following fossils by their external morphology and geological ranges.

- (a) Nummulites, Alveolina, Discocyclina
- (b) Calceola, Zaphrentes.
- (c) Cidarism Hemiasster, Micraster, Clypeaster.
- (d) Orthis, Pecten, Producta, Spirifer, Terebratula, Rhynchonella.
- (e) Arca, Cardium, Gemma, Glycymeris, Inoceramus, Lima, Mytilus, Pecten, Ostrea, Spondylus, Trigonia.
- (f) Bellerophon, Conus, Cypraea, Cerithium, Fusus, Murex, Natica, Physa, Turritella, Voluta.
- (g) Baculites, Belemnites, Ceratites, Hamites, Goniatites, Nautilus, Perisphinctes, Scaphites.
- (h) Calymene, Phacops.
- (i) Glossopteris, Gangopteris, Ptillophylum, Vertebraria.

Study of rocks from important stratigraphic horizons. preparation of maps showing distribution of stratigraphic formation of India during different periods.

Field work : 15 Marks.

III YEAR

THEORY

Paper-VIII : Economic Geology & Sedimentary Petrology.

Time : 3 hours Max. Marks : 70

Syllabus as per B.Sc. (Pass course III year theory paper.

Paper-IX : Petrology

(Time : 3 hours Max.Marks : 70.

(There will be two groups - Group A - Igneous Petrology & Group B - Sedimentary Petrology (Sec.I) Metamorphic Petrology (Sec II). From Group A questions are to be attempted out of four while from Group B, three questions are to be answered out of six selecting at least one from each section.

Group - A

(Igneous Petrology)

Phase rule, ~~Binary system~~ ^{Mixed crystals} and their magma tectonics. Mixed crystals and their petrological significance. Reaction principle. Classification of Igneous rocks based on various criteria.

Binary & Ternary

Phase relationships of the following system and their petrogenesis.

- (i) Albite - Anorthite
- (ii) Nepheline - Silica
- (iii) Forsterite - Silica
- (iv) ~~Diopside~~ ^{Albite} - Anorthite - Albite

Descriptive petrography and genesis of the following :-

- (a) Granite - Rhyolite family
- (b) Syenite - Trachyte family
- (c) Gabbro - Basalt family
- (d) Ultrabasic rocks, anorthosite, alkaline rocks, carbonatite, Pyroxenite, dunite, Lamprophyre and ophiolites.

Group - B : Section - I

(Sedimentary Petrology)

Sedimentary Facies, ~~and Diagenetic~~ ^{Processes} Processes, ~~Depositional~~ ^{Depositional} environments. Geochemical cycle. Statistical techniques in sediment analysis. Grain size parameters and palaeoenvironment. Classification of sandstones and limestones.

Petrographic description and genesis of following rocks. Limestone, dolomite, Phosphorites, Oil shale and an introduction to evaporites, salt domes and carbonates.

Section - II

(Metamorphic Petrology)

Concept of metamorphism, phase rule and equilibrium. Concept of depth zone, retrogressive metamorphism. Elementary idea of ACF, ACF and AFM diagram, concept of metamorphic facies with reference

to mineral assemblages and P-T conditions. Metamorphic differentiation, anatexis metasomatism ~~of~~ and Pneumatolysis. Regional metamorphism of calcareous, pelitic, and basic igneous rocks. Descriptive petrology and genesis of the following - Granulites, Eclogites charnockites, Khondalites, gneisses and migmatites.

Paper-X : Applied Geology

Time : 3 hours Max. Marks : 70

(there will be four groups A,B,C & D containing ten questions out of which five are to be answered selecting at least one from each group)

Group - A

Elements of remote sensing. Types of aerial photographs and films. Aerial photographs and maps, their features and advantages. Pocket stereoscope, Mirror stereoscope. Recognition elements in photo-interpretation. Geological interpretation of aerial photographs for recognition of lithology and structural features.

Group - B

Elementary principles of geological, ^{physical} geological and geochemical prospecting.

Group - C

Engineering properties of rocks, Geological considerations for the construction of dams, highways, tunnels and bridges.

Group - D

Sources of ground water - its occurrence and origin. General consideration affecting ground water supply. Porosity & permeability. Aquifers, water tables - definitions and locations. Confined and unconfined aquifers. Selection of sites for sinking wells. Resistivity as a tool to locate water table. Ground water provinces of India.

PRACTICAL

Paper-XI : Economic Geology, Petrology & Applied Geology.

Time : 4 hours Max. Marks : 75.

For Economic Geology as per practical paper of B.Sc. (Pass Course) IIIrd year.

Identification of following rocks in hand-specimen - Nepheline-synite, norite, granodiorite, andesite, peridotite, pyroxene-dunite, trachyte, anorthosite, aplite, breccia, dolomite, granulite, amphibolites, khondalites, conglomerate, shale, sandstones, limestones.

Study of the following rocks in thin section ~~under microscope~~ - Nepheline-synite, Norite, granodiorite, trachyte, monzonite, ~~shyolite~~, peridotite, pyroxenite, picrite, dunite, anorthosite, aplite, 1 mporphyres. Wackes, arenite, arkose, sandstones, limestones, shales, chloriteschist, granulite, amphibolites, charnockites, eclogite, mylonite augen-gneiss. Identification of important heavy minerals. Determination of sand, silt & clay ratio and plotting.

Identification of the following minerals in powder with the help of dry test-Malachite, graphite, realgar, haematite, calcite, sphalerite, chromite, rock salt, gypsum, zincite, galena, stibnite, pyromelane, nickolite and magnetite.

Topographic survey with the help of chain, and plane table. Engineering properties of rocks. Drawing of ground water contours and determination of flow direction.

Field Work : 15 Marks.

INSTRUCTIONS FOR FIELD WORK

(BOTH PASS & HONOURS)

Ist Year: Local Field work on General Geology and Structural Geology.

<u>COURSE</u>	<u>DURATION</u>	<u>MAX. MARKS</u>
B.Sc. (Hons)	7 days	10
B.Sc. (Pass)	7 days	5

IIInd Year: Field work in areas of typical petrological, stratigraphical and palaeontological settings.

B.Sc. (Hons)	15 days	15
B.Sc. (Pass)	7 days	10

IIIInd Year : Elementary idea of geological mapping. Visit to areas of Economic importance, Laboratories and Engineering Structures.

B.Sc. (Hons)	21 days	15
B.Sc. (Pass)	7 days	10

NORTH-EASTERN HILL UNIVERSITY

Syllabus for Three years degree course in Botany

I. B.Sc. without major (general)

II. B.Sc. with major

There shall be a total of 8 papers. Paper I to IV shall be common to both B.Sc. without major (general) and B.Sc. with major course students. Paper V to VIII shall be offered to those opting for B.Sc. with major.

Year	Paper	Contact hour	Max.Marks	
			Theory	Practical
I. B.Sc. without major (general)				
Paper I	I year	Algal/Bacterial 10 & Viruses/Fungi/ 5 Bryophytes/and 10 Pteridophytes 10 10	= 45	70 30
Paper II	II year	Gymnosperms/Ana- 10 tomy/Morphology/ 15 Embryology/Angios- 15 perm. Taxonomy/ 5 and Palaeobotany	= 45	70 30
Paper III		Plant Physiology 22.5 and Ecology 22.5	= 45	70 30
Paper IV	III year	Cell Biology/ 17.5 Genetics/and 17.5 Plant Breeding 10	= 45	70 30
II. B.Sc. with major				
Paper V	I year	Microbiology/ 20 Plant Pathology/ 15 and Biometrics 10	= 45	70 30
Paper VI	II year	Environmental & 22.5 Conservational 7.5 Biology/Pl.geo- 5.0 graphy/Ethnobotany and computer 10.00 application	= 45	70 30
Paper VII	III year	Embryology/Paly- 20 nology/and 5 Applied Botany 20	= 45	70 30
Paper VIII		Molecular Biology/ 15 Biochemistry/ and 15 Plant Biotechno- 15 logy	= 45	70 30

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Syllabus for Three Year Degree in Botany
(General Papers)

First Year

Paper I - Algae, Fungi, Bacterial & Viruses, Bryophytes and Pteridophytes.

Second Year

Paper II - Gymnosperms, Palaeobotany, Morphology, Embryology, Anatomy and Angiosperm Taxonomy.

Paper III - Plant Physiology and Ecology.

Third Year

Paper IV - Cell Biology, Genetics and Plant Breeding.

N.B. - 1. Maximum marks for each paper will be of 100 out of which 70 marks will be for theory and 30 marks for practical.

2. Duration of each theory examination will be of 3 hours and that of practical examination will be of 4 hours.

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Paper I

(Algae, Bacteria & Viruses, Fungi, Bryophytes and Pteridophytes)

Theory

Maximum Marks : 70

Time : 3 hours

Algae - General account; Fritsch's classification and recent changes; Range of vegetative and reproductive structures. Myxophyceae, (Chlorophyceae, Bacillariophyceae, Phaeophyceae and Rhodophyceae). Economic importance of algae.

Important features of life cycles of Nostoc, Chlamydomonas, Volvox, Oedogonium, Chara, Ectocarpus, Sargassum and Polysiphonia.

Bacteria - Classification, Ultra structure and reproduction
Viruses of bacteria, Structure of virus (TMV and bacteriophages) their multiplication and transmission, economic importance of bacteria and viruses.

Fungi - General account; Origin; Ainsworth's classification; Nutrition; Economic importance.

Important features of life cycles of Pythium, Erysiphe, Ustilago, Puccinia, Agaricus, Aspergillus and Alternaria.

Bryophytes - General account; Origin and classification, Morphology, Thallus structure, reproduction and evolution of sporophytes, Economic importance.

Important features of life cycles of Marchantia, Anthoceros, Sphagnum.

Pteridophytes - General account; Origin and classification; Evolution of Stele, Heterospory and seed habit.

Important features of life cycles of Psilotum, Lycopodium, Selaginella, Equisetum, Adiantum and Marsilea.

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Practicals

1. Study of vegetative and reproductive parts through temporary preparations of the specimens prescribed in the theory paper.

drawing,

dissection, sectioning, /description and identification of the specimens prescribed above.

2. Study of specimens and slides of lichens.
3. Practical note book and collections.

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PAPER II

(Gymnosperms, Palaeobotany, Morphology, Embryology, Anatomy and Angiosperm Taxonomy)

Theory

Maximum marks . 70

Time : 3 hours

- Gymnosperms - General account, classification, Evolutionary trends.
Structure, reproduction and life cycles of Cycas, Pinus and Gnetum.
- Palaeobotany - Fossil formation and types; Geological time scale and general account of dominant fossil flora of different ages, Palaeobotany in relation to exploitation of fossil fuel..
- Morphology, - Development and morphology of an angiospermic flower, Phyllode theory; A general account of Embryology embryology of angiosperms (micro-and mega sporogenesis development of male gametophyte and female gametophyte (monosporic), fertilization, embryo and endosperm development.
- Anatomy - Tissue and tissue systems; Root-stem-transition; Organization of apical meristems; Secondary growth and Anomalous secondary growth (Amaranthus, Mirabilis, Bigonia, Dracaena stems and beet root).
- Angiosperm - Principles of systematics : classical and modern Taxonomy taxonomy; Concept of species, genus and family; Nomenclature; Comparative study of classificatory systems by Linnaeus, Bentham and Hooker and Hutchinson.
Taxonomic studies of the following families (Bentham and Hookers system) :
Dicotyledons - Ranunculaceae, Magnoliaceae, Leguminosae, Asteraceae, Acanthaceae, Solanaceae, Labiatae and Cucurbitaceae.
Monocotyledons - Orchidaceae and Poaceae.

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PRACTICALS

Maximum Marks : 30

Time : 4 hours

1. Study of vegetative and reproductive structures of the prescribed gymnospermous plants by preparing temporary stained slides. Dissection, sectioning, drawing, description and identification.
2. Anatomical studies of primary and secondary structures of monocot and dicot roots and stems (double stained permanent preparations).
3. Taxonomic studies of angiospermous specimens (dissection, drawing, description in technical language and identification upto family level).
4. Study of embryological slides.
5. Study of fossil specimens slides.
6. Practical Note Book, field report and herbarium sheets.

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PAPER III

Plant Physiology and Ecology
(Theory)

Maximum Marks : 70

Time : 3 hours

- Plant Physiology - Plant-soil - water relationships; Macro- and micro-nutrients; Absorption and translocation of water and minerals; Transpiration; Structure and function of enzymes; Mechanism of photosynthesis in C_3 , C_4 and CAM plants; Factors affecting photosynthesis; R.Q.; photorespiration; Nitrogen metabolism : Nitrate assimilation and N_2 fixation; Seed and bud dormancy; Seed germination; Phytochrome structure and function; Photoperiodism and Vernalization; Growth; Physiology of growth regulators (auxins, cytokinins and gibberellins) and their role in plant development; Senescence.
- Ecology - Basic concepts of Ecology, Ecological factors (climatic, edaphic, biotic, physiographic); Ecological adaptations of hydrophytes, xerophytes, epiphytes and halophytes; Attributes of population, growth and population interaction; Community structure and development (Primary and secondary succession); Ecosystem concept - structure and function (productivity, flow of energy and nutrient cycling); Trophic structure - trophic levels, food chains and food web, ecological pyramids; Air and water, pollution and their abatement.

PRACTICALS

1. Comparison of transpiration from two surfaces of a leaf.
2. Effect of light and CO_2 concentration on the rate of photosynthesis using bubble count method.
3. Extraction of plant pigments from green leaves.
4. Measurement of R.Q. in different plant materials.
5. Study of a pond or forest ecosystem.
6. Determination of requisite size and number of quadrat for study of plant community.
7. Study of structure of a plant community by quadrat method. Determination of frequency and density.
8. Adaptational features of xerophytes, hydrophytes and epiphytes.
9. Practical Note Book.

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PAPER IV

Cell Biology, Genetics and Plant Breeding
(Theory)

Maximum Marks : 70

Time : 3 hours

Cell Biology - Organisation and function of cell and its components (Cell wall, plasmamembrane, endoplasmic reticulum; golgi apparatus, lysosomes; ribosomes; mitochondria; plastids; nucleus); Mitosis; Meiosis; structure and function of chromosome; Chromosome theory of heredity; Nucleic acids and Genetic code.

Genetics - Mendel's Laws of inheritance; Gene; Gene interactions; Multiple alleles; Linkage and crossing over; Mutations and mutagens; Role of induced-mutations in crop improvement; Polyploidy; Extranuclear inheritance; Sex chromosome and sex determination; Chromosomal aberrations.

Plant Breeding - Principles of plant breeding; Breeding behaviour - sexual, asexual, apomixis; Polyembryony; Breeding methods - conventional methods of breeding in self and cross pollinated crops; Heterosis.

PRACTICALS

1. Study of gram negative and gram positive bacteria by Gram's staining.
2. Temporary acetocarmine and orcein smear preparations of flower buds and root tips. Description and identification of preparation showing mitotic and meiotic stages.
3. Staining of nucleolus.
4. Study of Polytene chromosomes.
5. Study of monohybrid and dihybrid ratios and modifications of dihybrid ratio using seed samples.
6. Practical Note Book.

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PAPER V

Microbiology, Plant Pathology and Biometrics
Theory

Maximum Marks : 70

Time : 3 hours

Microbiology - General principles of microbiology; Growth and nutrition of microbes; Microbiology of air, soil and water; Microbiology of food (dairy and bakery); Mycoplasma and actinomycetes : a general account; Role of microbes in decomposition and nutrient transformation; General account of biological nitrogen fixation; Carbon and nitrogen cycles; Industrial application of microbes; Antibiotics; Microbes in relation to agriculture.

Plant Pathology - Principles of Plant Pathology; Classification of plant diseases; Host parasite interaction, histological, physiological, biochemical; Defence mechanism in host; Physiology of parasites : mechanism of infection, transmission and dissemination of diseases; Control of plant diseases - physical, chemical and biological; Disease symptoms, disease cycle and control measures of late and early blight of potato, blast disease of rice, citrus canker, tea rust and wheat rust.

Biometrics - Collection of data, sampling - theory and methods; Mean, mode, median; Standard deviation and standard error; co-efficient of variation; Probability; addition and multiplication Laws; Normal and binomial distribution; t-test, chi-square test.

PRACTICAL

1. Preparation of nutritive agar medium (potato dextrose agar) preparation of slants and pour plates.
2. Examination of permanent preparations of Bacillus, Staphylococcus and Streptococcus.

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3. Examination of root nodules of leguminous plant (pea or french bean or Trifolium).
4. Study of selected diseased specimens prescribed in theory paper by temporary and permanent preparations.
5. Acquaintance with commercial fungicides and spray equipments.
6. Practical record.

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PAPER VI

Environmental and conservational Biology, Plant Geography,
Ethnobotany and Computer Application

Theory

Maximum Marks : 70

Time : 3 hours

Environmental
and conserva-
tional Biology

- Dynamic nature of environment and interactions among various environmental factors; Man in the environment - utilization of resources and its effect on environment; Environmental problems: Ozone depletion, Global warming and Desertification.
- General idea of natural resources - Forest, grassland, water and energy; Productivity of natural and agroecosystems; Concepts of carrying capacity; Biological diversity - diversity and ecological stability; Conservation of biological diversity : National Parks, Sanctuaries and Biosphere reserves.
- Concepts and principles of environmental management; Principles of optimized use and sustainable development. Management of forest, aquatic systems and degraded lands.

Plant Geography

- Phytogeography - its scope and importance; Factors affecting plant distribution; Plant dispersal and migration - methods and routes; Barriers of distribution; Vegetation types and floristic regions of India.

Ethnobotany

- Ethnobotany and its significance; Plants used by tribes of North Eastern region in their daily life for food, clothing, shelter, medicine and agriculture.

Computer applica-
tion

- Computers - Definition, history and types; Organisation of digital computers - input devices; Processing unit (CPU) memory, output devices; Operating systems; Programme : programming languages, Data processing concepts; Elements of computer application in Biology.

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PRACTICALS

1. To study the spatial and temporal variation in climatic factors - Light, temperature and humidity.
2. To determine biomass of a herbaceous community by harvest method.
3. To determine B.O.D. of pond and stream water.
4. Study of vegetation in undisturbed and degraded sites and writing of field report.
5. Identification and description of 5 plant specimens of ethnobotanical importance.
6. Analysis of biological data for calculation of mean, mode, median, standard deviation and standard error.
7. t-test and chi-square test.

PAPER VII

Embryology, Palynology and Applied Botany
(Theory)

Maximum marks : 70

Time : 3 hours

Embryology - Microsporogenesis and Microgametogenesis; Megasporeogenesis and Megagametogenesis (monosporic, bisporic and Tetrasporic types); Pollination, pollen-pistil interaction, compatibility and incompatibility, syngamy and triple fusion; Development, structure, and functions of endosperms, types of haustoria; Embryogeny - different types; Functions of suspensor and synergid; Polyembryony.

Palynology - Pollen production and dispersion in time and space; Pollen/spore morphology and its role in Taxonomy; Pollen allergy.

Applied Botany - Plants for man - cereals, pulses, fibres, fats and oil, spices, condiments, beverages, timber, fruit, aromatics, medicinal plants, ornamental plants; Origin of cultivated plants and their centre of origin; ^{origin} cultivation and improvement of rice, jute, sugarcane, mustard, potato; History, cultivation and processing of tea and rubber; characteristics and uses of timber yielding plants - teak, sal, and also medicinal plants - Sinchona and raulfia; A general account and identification of locally available commodities - spices, fruits and ornamentals.

PRACTICALS

1. Preparation of stained squashes of pollen mother cells.
2. Study of pollen morphology by preparing pollen slides using acetolysis method.
3. Dissections of endosperms and embryo.
4. Study of germination of pollen grains.
5. Differences between soft wood and hard woods.
6. Herbarium specimens of economically important plants representing different groups prescribed above.
7. Study of starch, protein, fats, cellulose in plant materials.
8. Study of anther and pollen development, megasporogenesis and female gametophyte; double fertilization; endosperm and embryo development using permanent slides.
9. Practical record.

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PAPER VIII

Biochemistry, Molecular Biology and Plant Biotechnology
(Theory)

Maximum marks : 70

Time : 3 hours

- Biochemistry - Electron configuration of biologically important atoms such as C,H,O,N,P,S; Free radical and ionic reactions, bonds; Structure and classification of carbohydrates, lipids, amino acids and protein.
- Enzymes - Classification, regulation of enzyme activity, coenzymes and vitamins; Laws of thermodynamics; Redox potential and electrochemical gradient; Electron transport, principles of chemiosmotic synthesis of ATP; Secondary plant products - occurrence, properties and function of phenolics, anthocyanins and terpenoids.
- Molecular Biology - Structure and physical properties of DNA and RNA; Biosynthesis of nucleic acids; DNA replication and RNA transcription; Mechanism of protein synthesis.
- Plant Bio- - Historical account, terminology and scope; Cell and tissue culture techniques; Concept of totipotency; Application of plant biotechnology - micropropagation of 'elite' plants, production of secondary metabolites, haploids; Genetic engineering in plant improvement.

PRACTICALS

1. Estimation of soluble protein by Bradford test.
2. Estimation of urease activity.
3. Estimation of amylase activity.
4. Effect of temperature and substrate concentration on urease activity.
5. Separation of plant pigments and amino acids by paper chromatography.
6. Colorimetric estimation of RNA by orcinol method.
7. Preparation of culture medium and demonstration of tissue culture techniques.
8. Practical record.

Suggested ReadingsPAPER I

- Alexopoulos, C.J. and Mims, C.W. 1979. Introductory Mycology 3rd edition. Wiley Eastern Limited, New Delhi.
- Bessey, E.A. 1979. Morphology and Taxonomy of Fungi. Vikas Publishing House, New Delhi.
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- Chapman, V.J. and Chapman, D.J. 1980. Seaweeds and their Uses. 3rd Edition, Chapman & Hall, London.
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- Lee, R.E. 1980. Phycology. Cambridge University Press, London.
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- Vashishtha, B.R. Fungi. - do -
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- Cronquist, A. 1968. The Evolution and Classification of Flowering Plants.
- Davis, P.H. & Heywood, V.H. 1967. Principles of Angiosperm Taxonomy. Oliver & Boyd, Edinburgh.
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- Esau, K. 1985. Plant Anatomy. 2nd Edition. Wiley Eastern, New Delhi.
- Foster, A.S. & Giffard, E.M. 1962. Comparative Morphology of Vascular Plants. Allied Pacific Pvt. Ltd., Bombay.
- Gangulee, H.C., Das, K.S. and Dutta, C.T. 1986. College Botany, Vol.I. New Central Book Agency, Calcutta.
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- Meyen, S.V. 1987. Fundamentals of Palaeobotany, Chapman & Hall, London.
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- Bilgrami, K.S. and Dube, H.C. 1980. A Text Book of Modern Plant Pathology. Vikas Publ. House, New Delhi.
- Butler, E.J. and Jones, S.G. 1986. Plant Pathology. Periodical Expert Book Agency, Delhi.
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- Maheshwari, P. 1985. An Introduction to Embryology of Angiosperms. Tata McGraw Hill, New Delhi.
- Onions, A.H.S., Alisopp, D. and Eggins, H.O.W. 1981. Smith's Introduction to Industrial Mycology. 7th Edition. Edward Arnold, London.
- Shreemali, J.L. 1979. Economic Botany. Kitab Mahal, Allahabad.

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: 22 :

PAPER VI

- Bell, P.R. and Woodcock, C.L.F. 1986. Diversity of Green Plants. 3rd Edition, ELBS, Edward Arnold, London.
- Cain, S.A. 1944. Foundations of Plant Geography, Harper and Row, New York.
- Gangulee, H.C., Das, K.S. and Dutta, C.T. 1986. College Botany, Vol.I., New Central Book Agency, Calcutta.
- Gangulee, H.C. & Kar, A.K. 1986. College Botany. Vol.II., Central Book Depot., Calcutta.
- Hill, A.F. 1952. Economic Botany. 2nd Edition. McGraw Hill, New York.
- Jain, S.K. (Ed.) 1981. Glimpses of Indian Ethnobotany. Oxford & IBH, New Delhi.
- Jain, S.K. 1987. A Manual of Ethnobotany. Scientific Publishers, Jodhpur.

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: 23 :

PAPER VIII

- Bonner, J. and Varner, J.E. 1976. Plant Biochemistry. Academic Press, New York.
- Conn, E.E. and Stumpf, P.K. 1976. Outlines of Biochemistry. Wiley Eastern.
- Gangullee, H.C., Das, K.S. and Dutta, C.T. 1986. College Botany. Vol. I. New Central Book Agency, Calcutta.
- Gangullee, H.C. and Kar, A.K. 1986. College Botany. Vol. II. Central Book Depot, Calcutta.
- Goodwin, T.W. and Mercer, E.I. 1983. Introduction to Plant Biochemistry. Pergamon Press, New York.
- Lehninger, A.L. 1978. Biochemistry. Kalyani Publishers, Ludhiana.
- Smith, J.E. 1988. Biotechnology. 2nd Edition. Edward Arnold, London.

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Annexure - S.

PAPER-I

MACRO ECONOMICS

Total marks:100

1. Macro-economics: Meaning, macro-economic Policy and its objectives and instruments.
2. National income and product: concepts, components, and measurement. Basic circular flow of income model.
3. Classical income and employment theory: The classical economics. Quantity theory of money fisher and cambridge equations. Saving, investment and the rate of interest.
4. Keynesian income and employment theory: Keynesian Economics consumption, saving and investment (concepts only).
5. National income fluctuations: features of the trade cycle. Theories of trade cycle. Policy towards stabilization.
6. Price fluctuations: Inflation - causes, types, effects and control.
7. Money and Banking; commercial and Central Banks, credit creation, monetary policy and tools.
8. Public finance: Public and private finance sources of public finance. Public debt and public expenditure.
9. Balance of payments: Items in the balance of payments account, equilibrium in the balance of payments. Adjustment process.

Suggested Books

1. Samuelson, P.A. Economics McGraw Hill
2. Storer A.W. and Hague, D.C.: A Textbook of Economic Theory, E L B S.
3. Mukherjee Samrat: Modern Economic Theory Wiley Eastern Ltd. New Delhi
4. Linsey, R.G. Introduction to Positive Economics Weidenfeld and Nicolson.

PAPER-II

• MICRO-ECONOMICS

Total Marks 100

1. Definition and Scope of Economics: Definition by A. Smith, A. Marshall, and L. Robbins and their critical examination. Changes in Definition and scope of Economics after the Great Depression. Micro-economics in relation to other branches of economics.
2. Economics of consumption : Law of Demand. Elasticity of demand, concept and measurement. Marshallian theory of consumers behaviour and its critical examination. Indifference curve analysis. Price, income and substitution effects.
3. Economics of Production: Laws of returns, Law of variable proportions. The concepts of form and industry. Revenue and cost curves and short and long runs.
4. Economics of Markets: Definition of market concept of product and factor markets. Different types of market (as under perfect competition, monopoly, imperfect competition, monopolistic competition and oligopoly). Demand supply schedules Expansion, contraction and shift in these schedules.
5. Price determination under perfect competition in long and short runs. Price determination under monopoly, Discriminating monopoly.
6. Theories of rent, Ricardian and modern. Concept of Quasi rent. Rent and price. Theories of wages, Subsistence, wage fund and marginal productivity theory.
7. Theories of interest : Abstinence theory, loanable fund theory, liquidity theory and marginal productivity theory of interest. Theories of profit, risk bearing and justification of profit.
8. International Trade: why nations trade, concepts of absolute and comparative advantages.

Suggested Books

1. Stomer A.W. and Hagve, DC, : A Text book of Economic theory
ELBS
2. Samvelson, P.A. Economics, MacGraw Hill(latest edition)
3. Baumol, W.J. Economic Theory and Operations Analysis
Prentice Hall
4. Alchian, A.A. and Allan, W.R. Unicersity Economics
Wadsworth
5. Boulding, K. R. Economic Analysis harner
6. Laveaster, K.J. Introduction to Modern Micro-economics
Road, Menally
7. Linsey, R. G. An Introduction to Position Economics
Weidenfoel & Micolson.
8. Marshall, A. Principles of Economics ELBS

Paper-III - INDIAN ECONOMIC PROBLEMS

Max. marks=100

1. Basic feature of Indian economy
2. National income - trends and compositions. Sources of capital formation and savings. Sectoral growth.
3. Demographic trends in India and its effect on economic development. Occupational structure of the labour force.
4. Agriculture - Problems of agricultural development - trends in products and productivity of food and non-food crops. Land reforms, agricultural finance and marketing. Green revolution, its features and economic implications. Public distribution of foodgrains.
5. Co-operation - its role in Indian economy, its achievements and weaknesses.
6. Industry - growth and pattern. Growth in investment, problems of industries - industrial finance, its agencies availability and limitations. Monopoly and concentration. Industrial policy - Role of Public sector. Recent changes, liberalisation and its economic implications.
7. Role and problem of small scale and cottage industries.
8. Foreign trade - composition and direction. Balance of payments - problems and policies, role of foreign capital in economic development. Import liberalisation export promotion and their implications.
9. Banking - growth of the banking system in India. Performance of nationalised banks.
10. Inflation - trends and causes. Measures to tackle it.
11. Poverty, inequality and Government policies.
12. Five year plans - Basic features, objectives, achievements and shortcomings.
13. Indian monetary and fiscal policies during the plan periods.

Suggested Text

1. Ruddar Dutt and K.P.M. Sundaran : Indian Economy (S. Chand & Co., New Delhi-110 055, latest edition).
2. C.D. Wadhwa (ed.) : Some problems of Indian Economic Policy (Tata McGraw Hill, New Delhi, latest edition).
3. A.N. Agrawal, : Indian Economy - Problems of Developmental Planning, (Wiley Eastern Ltd., Calcutta - latest edition).

Additional Reference

4. Prarit Choudhuri (ed.) : Aspect of Indian Economic Development (Lord George Allen & Unwin Ltd., London, 1975).
5. S.L. Shetty : Structure Retrogression of Indian Economy since mid sixties (Econ. & Pol. Weekly, Annual No.Feb. 1978).
6. S.L. Shetty : Performance of Commercial Banks since Nationalisation of Major Banks - Promise & Reality (EPW- Sp. No. August, 1978).
7. Economic and Political Weekly, Bombay (Relevant Issues).
8. Government of India, Economic Survey (Annual).

Paper-IV - QUANTITATIVE TECHNIQUES

Total Marks 50+50=100

1. The course has been designed to give an idea to the Undergraduate students of Economics about the application of quantitative techniques to economic problems.

Part-I - Mathematics

Marks : 50

1. Concept of sets-relations and function - Types of Functions of two or more independent variables. Elements of Exponential and logarithmic functions.
2. The concepts of limit and Continuity and Derivative Rules of differentiation maxima and minima; Optimization - First and Second order conditions (one variables case).
3. Vectors and Matrices - Elementary operations with Matrices Determinants - basic properties - solving of simultaneous equations.

Suggested Readings

A.C. Chiang : Fundamental Methods of Mathematical Economics
(McGraw Hill, Kogakusha, Tokyo, 1974).

W.P. Lewis : Mathematics for Economists

Part-II - Statistics

Marks : 50

1. Use of Statistics in Economics
2. Graphical Representation of Data
3. Classification and Presentation of Statistical Data
4. Measures of Central Tendency
5. Measures of Dispersion
6. Skewness and Kurtosis
7. Correlation and Regression (bivariate case)
8. Probability and Probability Distributions
9. Binomial Poisson and Normal Distribution (only), estimates of the mean and variance
10. Index Numbers
11. Time Series Analysis - Determination of trends, Method of moving average, and fitting of time series by OLS method.

Suggested Readings

A.L. Nagar & R.K. Das : Basic Statistics (Oxford University Press, Bombay, 1976).

PAPER-VADVANCE ECONOMIC THEORY

Total Marks 100

Part I Advance Micro-economic Theory (40)

1. Economics of Consumption, Slutsky theorem derivation of law of demand Slutsky and Hicks on decomposition of price effect revealed preference Analysis
2. Economics of Production: Concept of factor substitution, Isoquants and price opportunity line. Concept of Production function. Cobb - Douglas production function. Derivation of cost curve.
3. Price determination under:
 - (a) Monopolistic competition
 - (b) Duopoly (Cournot model)
 - (c) Non-cellusive oligopoly

PART II: Advance Macro-economic's (40)

1. Theory of employment: Say's Identity & equality Keynesian version of quantity theory of money relationship between employment and wage rate full-employment equilibrium.
2. The principle of effective demand. Keynesian consumption function - limitations of Keynesian consumption function. Marginal and average propensities to consume (and save). The theory of multiplier, income determination.
3. Investment function. Marginal efficiency of capital and its determinants. Relationship of interest with investment. Liquidity preference and rate of interest. Concept of acceleration.
4. Equilibrium of saving and investment. General equilibrium IS and LM curves. Income determination explanation of underemployment equilibrium.
5. Real theory of Trade cycle

PART III: International Trade (20)

Heckscher Ohlin theorem . Leontief paradox and its solution.
Factor reversal.

Suggested books

Micro-economics: As in paper I (Micro-economics)
Macro-economics

1. Sapiro
2. Hansen, A.H. A Guide to Keynes McGraw Hill
3. Dernberg & McWongal Macro-economics McGraw Hill
4. Cronen; R: Macroeconomics Harcourt Grace
5. Ackley, G: Macroeconomic Theory and Policy Macmillan
6. Samuelson, P.A. Economics McGraw Hill

International Trade:

Bo Sodersten International Economics
Sapiro

Paper-VI - MONEY, BANKING AND PUBLIC FINANCE

Part I

Money and Banking

- 1.1 Money : Functions, Components of Money Supply in India
High Powered Money - Concept and Uses
- 1.2 Finance : Role and Types of Finance in an Economy
Different forms of Financial Markets
Money and Capital Markets including the role of SEBI
Principal Financial Instruments in Use in Modern Economy
- 1.3 Commercial Banks : Important Functions
Process of Credit Creation and its Limitations
- 1.4 Development Banks in India : Role of IFC, ICICI, IDBI, NABARD,
SIDBI towards sectoral growth
- 1.5 RBI - Functions
Instruments of Monetary and Credit Control

Part 2

Public Finance (with Special Reference to India)

- 2.1 Government Budgeting : Types of Government Budgetary Accounts
Capital and Current Accounts
Economic and Functional Classification of the Central Government Budget
- 2.2 Public Receipts : Growth in Tax and Non-Tax Revenue of the Central Government since Independence
Canons of Direct Taxation
Problem of Tax Evasion
Agricultural Taxation in India
- 2.3 Public Debt : Magnitude and Recent Trends
Instruments of Borrowings in India (short term and long term).
- 2.4 Deficit Financing : Meaning and Definitions - Fiscal, Budgetary, Revenue and Monetary Deficits
Recent trends in India
Economic and Social effects.
- 2.5 Fiscal Federation : Findings and Recommendation of the latest Finance Commission.

Readings : Money and Banking

1. L.V. Chandler and S.M. Goldfeld, The Economics of Money and Banking, 7th Edition, 1977, Chaps.: 1 to 7 and 18.
2. L.V. Chandler, The Monetary Financial System, 1977, Chap.1, 4,5,12,13.
3. S.B. Gupta, Monetary Planning in India, 1979, pp.1-6, 44-48, 51-62, 103-174, 197-200.
4. M.Y. Khan, Indian Financial System - Theory and Practice, 1980.

5. D.N. Ghosh, Banking Policy in India - An Evaluation, 1978, Chaps. 7-13.
6. Reserve Bank of India, Function and Working, 1970, RBI, Publication, Bombay.
7. S.B. Gupta, Monetary Economics, Chaps. 1 to 10, 15 to 20.
8. RBI Bulletin, Report on Currency and Finance Vol. I & II, (Relevant Issues).;

Public Finance

1. Musgrave, R.A. and P.B. Musgrave, Public Finance in Theory and Practice (Third edition), 1980 Chap. 1, 3 (pp.54-61); 7 (pp.139-159); 10, 11, 12 (pp.256-262); 13, 14 (pp. 301-313 and pp.321 to 323); 24.
2. Raja, J. Chelliah, Fiscal Policy in Under-Developed Countries (II edition), Chaps. 2(pp.38-51) and 3(pp.54-65; 85-90).
3. GOI, Ministry of Finance, An Economic-cum-functional classification of the Central Government Budget 1966-67 (Introduction only) and the latest edition (for analytical tools).
4. K.N. Raj, Direct Taxation of Agriculture, I.E.R., Vol.VIII, No.1 (New Series) April 1973.
5. S.B. Gupta, Chap. 6, Monetary Planning in India.
6. Thirumiah, G. Burden of Union Loans on the States, Chaps.1,2 and 3.
7. D.N. Dwivedi (ed.), Readings in India, Public Finance, Readings 1,2,9 and 11,
8. Economic and Political Weekly

PAPER-VII* ECONOMICS OF DEVELOPMENT AND PLANNING

Marks:100

1. Economic Development: Meaning, Measurement, Characteristics of IDC, measures of Development
2. Theories of Development: Classical theory, Smith & Ricardo. Malthusian version.
3. Alternative Theories of Under Development
 - (i) Vicious circle, theory
 - (ii) Rostow & stages of growth
 - (iii) Balanced VS unbalanced growth.
4. Factor in the development process
 - Natural Resources & non renewable & renewable
 - Theory of optimum population, Technical progress.
 - Roles Agriculture & Industry in development process

Suggested Readings:

1. Todaro M.P. (1978), Economic Development in the third World, Longman New York.
2. Kindleberger (1977), Economic Development IIIrd ed. McGraw Hill
3. Higgins, B. (1959) Economic Development, North New York
4. Meir, G.M. (ed), 1984 Leading issues in Economic development Macmillan, London
5. Thirlwall, A.P. (1975) Growth & Development Macmillan London

Paper-IIEconomic Planning:

1. Arguments for & against planning, Types of planning
2. Planning techniques and investment decisions - investment criteria, choice of technique. Planning priorities..
3. Development planning models: Harrod-Dornar, Mahalanobis Model.
4. Growth and role of public sector. Pricing policy and profitability of public enterprises.
5. Centralized & Decentralized planning District & Micro level planning. Limitation of planning.

Suggested readings:

1. A.N. Agrawal & Kundan Lal: Economic planning (Ch.1,2,3,5,7,13 & 17) Vikas publishing House Pvt. Ltd, New Delhi 1977
2. B.C. Tandon: Economic Planning, theory and practice (Ch. 1,4,7,12,15,16,18,19,21,28 & 30).
3. Agrawal and Singh: Economics of underdevelopment (Oxford Univ. Press, London - 1969 3,
4. Joan Robinson & Ewan Entwistle: Introduction to Modern Economics (Tata McGraw Hill), New Delhi 1974
5. Ashok Rudra: Indian Plan Models.
6. Todaro, M.P. (1971): Development planning, models & Method, Ox. Univ. Press, Nairobi
7. Chakravarty S. (1987): Development planning: The Indian experience, clarendon press, oxford.

PAPER-VIII

(OPTIONAL)

Max Marks:100

Time : 3 hrs.

HISTORY OF ECONOMIC DEVELOPMENT OF U.K., U.S.S.R.
AND INDIAPart-I - The U.K. (From Industrial Revolution to 1939) ... Marks:30

Industrial Revolution; Agriculture - The Growth of Capitalism in Agriculture; Enclosure System; The History of Agriculture during the period; Corn Law and its effect.

Commercial Revolution & Commercial Policy - Events leading to the rise of Laissez Faire and Free Trade; Reaction against Free Trade and Protectionist Revival.

Labour conditions in England - Factory Legislation and Trade Union; Movement Problems & Inter-war period (1918-39).

International Trade, Finance & Currency.

Part-II - The USSR (1855-1950) ... Marks: 30

Economic Conditions of Russia before 1917 - The Institution of Serfdom - Emancipation of the peasants.

The Industrialisation Debate; War Communism (1918-21); The New Economic Policy (1921-28); The Five Year Plans; Soviet Economy during War and Reconstruction; Organisation and Technique of Economic Planning; Soviet Financial and Budgetary Systems - The Turnover tax; Trade Unionism.

Part-III - India (1857 to 1956) ... Marks: 40

British Colonialism and its impact on the Indian Economy.

Agriculture - Trends in output and productivity; Government policies with regard to Irrigation; Famine and Credit Rural Indebtedness.

Population Growth and occupational structure; Decline of Handicrafts and de-industrialisation process.

Pattern of industrialisation with special reference to tea, cotton, jute and steel.

Industrial Policy after Independence.

Infrastructure - Transport & Communication and Its impact on Industrialisation Process.

Suggested Readings

S. Kuznets, Modern Economic Growth; Rate, Structure and Spread (Yale University Press, New Haven, 1973 reprint).

A. Ashworth, An Economic History of England, 1970-1979 (Methuen London, 1960).

G.W. Southgate, English Economic History (J.M. Dent and Sons London, 1970 reprint).

A. Birnie, An Economic History of Europe (1760-1939) (Methuen, London, 1930).

- M. Dobb, Soviet Economic Development since 1917 (Routledge & Hegan Paul Ltd., London, 1966,
- Vinode Mehta, Soviet Economy.
- Alex Nove, An Economic History of the USSR (Penguin, London, 1972).
- A. Baykov, The Development of the Soviet Economic System and essay on the Experience of Planning in USSR (Cambridge University Press, Cambridge, 1970).
- A.L. Levkovsky, Capitalism in India : Basic Trend in Its Development (People's Publishing House, Bombay, 1966).
- V.B. Singh (ed.), Economic History in India : 1857-1956.
- D.R. Gadgil, Industrial Evolution in India 1960-1939 (Oxford University Press, Delhi, 1971).
- G. Blyhin, Agricultural Trends in India 1891-1947; Availability and Productivity.

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PAPER VIII

Optional Course: Maths for Economists

1. Number system: Real and complex Numbers, Properties, Graphical Representation of complex numbers, Argand Diagram.
2. Elements of Trigonometry and Analytical Geometry
Trigonometric Functions and numerical values, Functions of sums and difference of angles; co-ordinates of points, lines and circles, conic sections.
3. Linear Algebra: Real and vector spaces, Vectors and Matrices, Matrix operation, Rank of Matrix, inverse of matrix, solution of simultaneous Equations, linear and orthogonal transformations.
4. Differential calculus: Rules of Differentiation, partial and Total Differentiation, Maximization and Minimization of functions of more than one variables.
5. Integration: Rules of integration
6. Difference and Differential Equations: Nature, solution of First and Second order equations

References:

1. Chiang, A.C. Fundamental Methods of Mathematical Economics, McGraw Hill, Tokyo (1974)
2. Mehta, B.C. and Madhani, G.M.K.: Maths for Economists
Sutanchand and sons, N. Delhi (1992)
3. Hadley, G: Linear Algebra, Addison- Weseley, Reading, Mass (1974)
4. Allen, R.G.D. : Mathematical Analysis for Economists, Macmillan, (London 1980)
5. Samuelson, P.A. Foundation of Economic Analysis
HUP, Cambridge Mass

Paper - VIII

(OPTIONAL)

ADVANCED STATISTICAL METHODS

Unit-I

1. Probability - Classical, axiomatic and empirical approach; Theorems of probability, Multiplicative, additive, conditional, total and compound probability; concept of sample space, density function, distribution function.
2. Probability distributions, Binomial Poisson, Normal, Multinomial and Hypergeometric distribution, Mathematical Expectation, Moment Generating functions.
3. Correlation and regression, both bi-variate and multivariate, fitting of regression by OLS Method, Partial and Multiple Correlation, Correlation ratios, Estimates of Variances of parameters, non-linear equations and the estimation of the parameters, Growth curves, Logistic curves and their fitting.
4. Distribution of sample mean, and variances, t-distribution, F-distribution and χ^2 - distribution and their uses.
5. Testing of hypothesis, types of hypothesis, types of errors, Power of a test, application of t, F and χ^2 -tests. Analysis of covariance, two-factor and 3-factor analysis.
6. Theory of sampling, S.R.S., Stratified S.R.S., Systematic Sampling, Cluster Sampling, estimation of totals, means, variances of the study variables.
7. Design and Analysis of Variances, R.B.D., R.B.D. with replications, L.S. design, and ANOVA tests.

References : Text-Books

1. Hoel, P.G., Introduction to Mathematical Statistics, Wiley, 1968.
2. Bez, K., Quantitative Techniques in Economic, Kalyani, 1989.
3. Cramer, H., Mathematical Methods of Statistics, Princeton, 1970.
4. Karmel, P.H., Applied Statistics for Economists, Pitman Publ., 1970.
5. Rao, C.R., Linear Statistical Inference, Wiley, 1966.
6. Kendall, M.G. et al., The Advanced Theory of Statistics, Vol.I, II, III Griffin (latest edition).

PAPER-VIII

(OPTIONAL)

ADVANCED MONETARY THEORY

1. The Nature and Scope of Monetary Theory
2. Classical Dichotomy and Neutrality of Money
3. Linkages between the Monetary Sector and the Real Sector
4. Quantity Theory of Money : The Relation between Money, Nominal Income and Prices
5. Keynesian Contribution towards Quantity Theory of Money
6. The Demand for Money - Sources and Limitations
7. Supply of Money - Theory and Empirical Evidence
8. Monetary Policy - Objectives, Conflicts and Limitations
9. Inflation and forced savings
10. Credit - Role in production and investment; Sources of Credit in India; Aggregate Supply of Bank Credit; Reserve Bank of India and Credit Planning.

Readings

1. D. Patinkin: Money, Interest and Prices, 2nd edition.
2. M. Friedman: Optimum Quantity of Money and Other Essays.
3. V. Chick: The Theory of Monetary Policy.
4. Gurley J. and E. Shaw : Money in a Theory of Finance
5. S.B. Gupta: Monetary Planning for India.

PAPER-VIII

(OPTIONAL)

ECONOMIC DEVELOPMENT AND GROWTH

1. Development and Growth: Concepts, Indicators and Measurements, Production Functions and Population Growth Function of a Primitive Economy
2. Review of Classical Development Theories : Smith, Ricardo and Marx.
3. Modern Theories of Development: Nurkse, Rostow, Leiberstein, Rosenstein - Roden, Myrdal and Schumpeter.
4. Introduction to Growth in the Economy: The Production Function, Technological Improvements, Changes in Savings and Investment Functions, Equilibrium Rate of Growth and Distribution of Income.
5. One Sector Growth Models : Models of Harrod and Domar, Instability of Equilibrium.
6. Neo-Classical Growth Models : Models of Solow, Swan and Phelps, Golden Rule of Capital Accumulation.
7. Criticisms of Neo-Classical Models : Modern Cambridge School - Robinson and Kaldor.

References

1. Neher, P.A.: Economic Growth and Development, John Wiley and Sons, N.Y. (1971).
2. Sen, A.K., Growth Economics, Penguin Books Harmondsworth (1970).
3. Todaro, M.P.: Development and Planning Models and Methods, OUP, Oxford (1971).
4. Thirlwall, A.P., Growth and Development, Macmillan, London, (1975).
5. Myrdal, L., Economic Theory and Underdevelopment regions, London (1957).
6. Hicks, J., Capital and Growth; Clarendon Press, Oxford (1965).
7. Baumal, W.J., Economic Dynamics, Macmillan, N.Y. (1970).
8. Levaik, R., Macroeconomics, Macmillan-ELBS, London (1981).

PAPER-VIII

(OPTIONAL)

MATHEMATICAL ECONOMICS

1. Role of Mathematics in Economic Analysis, Introduction to Static, Comparative Static and Dynamic models.
2. Theory of Consumers Behaviour: Utility Function.
Existence and Maximization of Utility: Separative and additive Homogeneous and Homothetic Utility Function; Demand Function.
Substitution and Income Effects - Slutsky Equations.
Revealed Preference - Axioms, Substitution Effects.
3. Theory of Firm: Production Function; Properties Product Curves and Isoquants, Substitution Elasticities, Optimizing Behaviour, Cost Function - Short Run and Long run.
4. Linear Programming - Basic concepts, solution of L.P.
Problems - Graphic and Simplex, Duality
5. Applications of Linear Programming to Economic Analysis :
Marginal Analysis vs. Linear Programming of the Firms.
Input-Output Analysis.
6. Period Analysis : Cobweb and other simple Dynamic Models -
Features, models with stock. Stability of Equilibrium.
7. Multiplier and Accelerator: Static and Dynamic Multiplier Models. Harrod-Domar Growth Theory.

References

1. Allen, R.G.D.: Mathematical Economics, Macmillan (1973).
2. Chiang, A.C. : Fundamental Method of Mathematical Economics, McGraw Hill, N.Y. (1974).
3. Handerson, J.M. and Quandt, R.E., Micro-Economic Theory : A Mathematical Approach: McGraw Hill, Tokyo (1980).
4. Samuelson, P.A.: Foundations of Economic Analysis, HYP, Cambridge, (1971).
5. Baumol, W.J., Economic Theory and Operations Analysis, Prentice Hall, New Delhi (1985).
6. Baumol, W.D., Economic Dynamics, Macmillan, N.Y. (1970).

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Annexure T.

Syllabus for the three years' integrated course for the degree level.- Khasi

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B.A. without Major : (1) M.I.L.

Paper I Drama & Fiction 100 marks

Drama : 50 marks

1. Peace Roy Pariat, Ka Shanghawiah Ki Rang

Fiction 50 marks

2. S.J.Duncan, "Ki Mad ia ka Shyllong"

3. K.Kharlukhi, "Ka Melody"

Paper II

Khasi Poetry & Prose

Poetry 50 marks

1. Amjad Ali, "Leng Riw Khasi", "Synshar Riw Khasi"

2. John Roberts, "Ri Khasi"

3. R.S.Berry, "Ka Jingstad"

4. Mondon Bareh, "Ka Jinghisha".

all four from Na Ka Thiar Ki Longshura

5. Soso Tham, "Ki Symboh Ksiar", "U Lyoh" from Ki Sngi Ba Rim u Hynhiew

6. H.Elias, "Kapongnai Ksiar", and "Lum Lawbah".

7. W.R.Laitflang, "Ka Juban ba la Khlei", "Ban Long Rangbah" from Ki Myllung Khasi.

Prose 50 marks

A text to be edited by the Khasi Department.

ELECTIVE PAPER

Paper III, Khasi Culture 100

1. Sylvanus Lemare, Ki That ka Kilshor

2. H.Lyngdoh, "Ka Pomblang Nongkrem, Ki Mawbyrna, Ki Jait Syiem Jait Lyngdoh"

Contd./.../-

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3. Costa, G. "Ka Riti Ki Laiphew Syiem"
Ch. XX (excl. Ki Mawbyinna) and
Ch. XXIII (Ka tem ka put ki Khasi)
4. Mawrie, H. W. - Ka Pyrkhath
5. Roy, Sib Charan - Ka 'Tien Ruidphang: Ka Shongburon Sahbarom Ha
Pyrthel (from "Ka Niam Ki Khasi")
6. Lalco, D. T. - Ka Tynrai ka Ksaw ka Kpong (from "Ka Ksaw ka Kpong
u Hynniew Trep")

Paper II

History of Khasi Literature : 100 marks
(1842-1980)

1. H. Bareh, A Short History of Khasi Literature
2. R. S. Lyngdoh, Ka Histori Ka Thoh ka Tar

Paper III

The Study of language : 100 marks

1. H. W. Sten, Shaphang ka kitien Khasi (minus pages 55- 58 dealing with bars).
2. M. B. Jyrwa, Ka Jingpule shaphang ka Ktien
3. H. Marwein, Ki Verb Khasi

Major papers

Paper-IV

Khasi Literary Theory & Criticism 100 marks

1. Soso Tham, "Ka Jingpynshai" from Ki Sngi Barim u Hynniew Trep
2. F. M. Pugh, "Ha Ki Nongpule" from Ka Sawangka ia Ki Saw Ngut Ba Lap
Mynsaw
3. H. W. Sten, Shaphang ka Novel
4. J. S. Shangpliang, Ki Snap Ka Novel (excluding chs. 5, 6, 7).

Paper V

Khasi Drama : 100 marks

1. Dino Nath Roy, U Arbnai
2. S. J. Duncan, Ka Tiew Larun
3. H. W. Sten, Ka Mahadei
4. J. S. Shapliang, Ka Ri Umsnem

Contd./.../-

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PAPER VI

Khasi Fiction : 100 marks

1. B.J.Jyrwa, U Kyrdoh Mawlynnai
2. W.Tiewseh, Ka Jinkwah u Kpa
3. L.H.Pde, U Moolong
4. H.W.Sten, Kwah Bynjukut
5. Firmly Star Lyngdoh, Jingieit Ba Nylla

PAPER VII

Essay - 100 marks

The essay should be relevant to the prescribed texts/topics in the course. Students will write for three hours.

PAPER VIII

Khasi Poetry : 100 marks

1. B.Thangkhiew, "Ka Pyrthel u Mendih"
2. KAS , "U Ngap ka Ri War", "U Dahi Kynthah" from "Na Ka Thieng ki Longshuwa"
3. V.G.Bareh, "Ka Duitara Jong Nga", "Ka Schra " from Ki Poetry Khasi
4. O.M.Wahlang, "Ka Sohlyngngem", "Ki Ummat Keiar" from Ka Jutang Ka Sur Pangmud u Khasi
5. H.W.Sten, Ka Burom Ba La Jah (Kitab II), and "U Fremkar"
6. Jerome K.Diengdoh, 2 sonnets*

* to be finalized by the sub-committee of the BUGS.

Sd/- H.W.Sten,
Chairman,
Board of Under-Graduate Studies Khasi