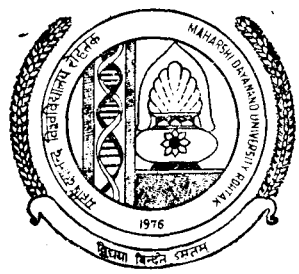
# Maharshi Dayanand University
# Rohtak




## Ordinances, Syllabus and Courses of Reading for B.A./B.Sc. Part-III Examination

## Session—1999-2000

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*Available from :*

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By Regd. Parcel : Rs. 75/-
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## ORDINANCE : B.A./B.Sc./B.Com./B.Sc.(Home Science) EXAMINATIONS

1. The duration of the course of instruction for the B.A./ B.Sc./ B.Com./ B.Sc. (Home Science) shall be three years and the examination shall be held in three parts. Part-I examination shall be held at the end of Ist year, Part-II examination at the end of 2nd year and Part-III examination at the end of 3rd year. The examination in Part-I and Part-II shall be held once a year ordinarily in the month of April on such dates as may be fixed by the Vice-Chancellor.

   The examination in Part-III shall be held twice a year ordinarily in the month of April and September on such dates as may be fixed by the Vice-Chancellor.

2. The date of commencement of the examination as well as the last date for the receipt of examination forms and fee as fixed by the Vice-Chancellor, shall be notified by the Registrar/Controller of Examinations to all the colleges admitted to the privileges of the University.

3. A candidate's admission form and fee may be accepted after the last date of payment of late fee of Rs. 105/- up to the period notified by the University.

4. No one shall be eligible to join the first year (Part-I) class of B.A./B.Sc./B.Com./B.Sc. (Home Science) unless:-

   i) he/she has passed one of the following examinations with 33% marks in aggregate for admission to B.A. Part-I, 35% for admission to B.Sc. (Home Science) Part-I, 40% for admission to B.Com. Part-I and 45% for admission to B.Sc. Part-I.

   a) Senior Secondary Certificate Examination of Haryana Education Board, Bhiwani.

   OR

   b) B.A./B.Sc. (Home Science) Part-I examination under old scheme of this University.

   OR

   c) Diploma in Pharmacy Course (for B.A./B.Sc.-I only)

d) Any other examination recognised by the Academic Council as equivalent to (a) or (b) or (c) above.

*Note:1. The candidate seeking admission to B.Sc. (Non-Medical Group) Part-I should have passed the above examination with English, Physics, Chemistry and Mathematics and those seeking admission to B.Sc. (Medical Group) Part-I should have passed the above examination with English, Physics, Chemistry and Biology.*

*2. The admission to B.Sc. (Home Science) Course shall be open to Women candidates only.*

*3. If a candidate of another Board did not pass in the subject of English at 10+2 level, he/she may be allowed provisionally to join the B.A./B.Sc./B.Com./B.Sc. (Home Science) Part-I class as the case may be under new scheme of this University subject to his/her qualifying in the subject of English of 10+2 examination at the Supplementary Examination of the same year or in the next annual examination held in March from the Board concerned. Such a candidate shall have to furnish to the University proof of his/her having cleared the subject of English before the declaration of result of B.A./B.Sc./B.Com./B.Sc. (Home Science) Part-I examination failing which his/her result of B.A./B.Sc./B.Com./B.Sc. (Home Science) Part-I examination shall be withheld.*

5. No one shall be eligible to join the second year (Part-II) class of B.A./B.Sc./B.Com./B.Sc. (Home Science) course unless he/she has passed :

a) B.A./B.Sc./B.Com./B.Sc.(Home Science) Part-I examination as the case may be, under new scheme of this University.

OR

b) B.A./B.Sc./B.Com./B.Sc. (Home Science) Part-II examination as the case may be, under old scheme of this University.

OR

c) an examination recognised as equivalent to (a) or (b) above.

A student who wishes to seek admission/migration to Part-II Course after passing the Senior Secondary Certificate Examination under (10+2 system) or an examination recognised as equivalent thereto and also after having passed the Ist year examination of any statutory University, recognised by this University as equivalent to Ist year examination of this University under new scheme may be allowed to do so provided, that he/she has secured 33% or 40% or 45% or 35% marks, as the case may be in aggregate of the Senior-Secondary Certificate Examination or of any equivalent examination and the minimum percentage of marks in the Ist year examination of the degree course equivalent to the percentage of marks as laid down in Clause-16.

6. A person who has passed one of the following examinations shall be eligible to join III year (i.e. Part-III) class of B.A./ B.Sc./ B.Com./ B.Sc.(Home-Science) course:

a) B.A./B.Sc./B.Com./B.Sc. (Home-Science) Part-II examination as the case may be, under new scheme of this University.

b) B.A./B.Sc./B.Com./B.Sc. (Home-Science) Part-II examination as the case may be, under scheme of other statutory Universities. Provided that the subjects offered for B.A./B.Sc./B.Com./B.Sc. (Home-Science) Part-II were the same as are available at this University and the syllabi were not materially different.

In case the subject/paper offered for the B.A. /B.Sc. /B.Com./ B.Sc. (Home-Science) Part-II were not the same as are available at this University, the candidate may be given exemption in the Part-III for the subject(s)/paper(s) already studied/passed by the student and the subject(s)/paper(s) which the candidate has not studied/passed in Part-I & II shall have to be Studied/Passed alongwith remaining subject(s)/paper(s) of Part-III.

7. The examination in Part-I,II & III shall be open to a student who :-

   a) has passed not less than one academic year previously the requisite examination as laid down in Clause-4, 5 & 6 above.

      In case of a candidate who passed the requisite exam. under the rule relating to compartment the period of one academic year shall be counted from the examination in which he/she is first placed under compartment.

7.(a) A candidate who is placed under compartment in one subject only in 10+2 examination of the Board of School Education *Haryana, Bhiwani or of any other Board/University* recognised by this University may be allowed provisionally to read for TDC-I exam. and to clear the compartment subject in two consecutive chances. If he/she fails to produce/submit the proof of having passed the compartment subject even at the second chance to be held simultaneously with TDC-I exam. his/her candidature/result for the TDC-I exam. shall stand automatically cancelled.

Provided that a candidate who joins Part-I of B.A., B.Sc. (Home-Science),B.Com., B.Sc., as the case may be must have obtained atleast 33%, 35%, 40%, 45% marks respectively in the aggregate (by adding minimum qualifying marks in the compartmental subject) in the Sr. Secondary Certificate Examination (+2 Examination) or an examination recognised equivalent thereto.

A candidate who is placed under compartment / re-appear in upto 50% subject in TDC-I exam. of this University may be allowed promotion to TDC-II, Similarly, a candidate who is placed under compartment/re-appear in upto 50% subjects TDC-II examination of this University may be allowed promotion to TDC-III. Two additional consecutive chances for each of three parts of TDC Exam. shall be admissible for passing/clearing compartment this is however, subject to Clause 9.2.

b) has his/her name submitted to the Controller of Examinations by the Principal of the College he/she has most recently attended and produces the following certificates signed by the Principal of that college.

i) of having remained on the rolls of a recognised college for the academic year preceding the exam;

ii) of having satisfactorily performed the work of his/her class;

iii) of having attended not less than :

1. 75% of the full course of lectures delivered to his/her class in each of the subjects offered, (the course to be counted from the date of admission upto the last date when the classes break up for preparatory holidays, viz. 21 working days before the commencement of the examination); and

2. 75% of the periods assigned to Practical Work in each of the Science subject or Psychology or in the case of Geography Map Work and Practical (the minimum number of periods of Practical Work and in the case of Geography Map Work and Practical required to be arranged by each college shall not be less than 40% in each subject).

iv) of having obtained not less than 25% marks in the aggregate of all the subjects in the result of half yearly house examination held in November/December with 100 marks for each subject.

8.a) A student who is unable to appear in the annual examination due to shortage in attendance and has complied with the requirement in Clause-7 (b) (iv) above may be exempted from this requirement while taking the examination in the following year as an ex-student in terms of Clause 9.1.

b) A student who has completed the required percentage of lectures but has failed to comply with the requirements in Clause-7(b) (iv) may be allowed on the recommendation of Principal of the College concerned to appear as an ex-student in the following year.

9.1. A student who has completed the prescribed course of instruction in recognised college for-I, II, III Examination, but does not appear in it or, having appeared fails, may be allowed on the recommendation of the Principal of the College concerned, to appear in the examination as an ex-student without attending a fresh course of instruction. This is however, subject to Clause 9.2 below.

9.2 The period of passing TDC Final year examination shall be 6 years from the year of joining the TDC-I for the first time i.e. within six academic years.

10. A candidate who re-appears in B.A. Part-I examination as an ex-student (in full subjects) may change one of his subjects.

11. The amount of examination fee to be paid by a candidate for each part shall be as under :

| | B.A.Part-I ,II & III | B.Sc.Part-I ,II & III | B.Sc.(Home Science) [illegible] III | B.Com. Part-I,II & [illegible] |
|---|---|---|---|---|
| College C andidates | Rs. 90/- | Rs. 110/- | Rs. 90/- | Rs. 90/- |
| Ex-Studen ts | Rs. 100/- | Rs. 120/- | Rs. 110/- | Rs. 110/- |

A candidate taking up a subject which includes a practical examination shall pay an additional fee of Rs. 10/- per subject.

12. i) The medium of instruction shall be Hindi/English.

ii) The question papers will be set in :

a) Hindi in case of Sanskrit.

b) the language concerned in case of other languages.

c) in both Hindi and English in case of other subjects.

iii) The candidates shall write their answer in :

a) the language concerned in case of English and Modern Indian and Oriental Language except Sanskrit in which case the answer may be written in Hindi; and

b) Hindi, English, Punjabi or Urdu in case of other subjects.

13.1 The examination shall be held according to the Syllabus prescribed by the Academic Council. A candidate who fails in an examination, or having been eligible fails to appear in an examination shall unless approved otherwise by the Academic Council take the examination as an ex-student according to the Syllabus prescribed by University for regular students appearing for that examination, provided that the Syllabus for the candidates for the compartment/Re-appear examination to be held in September/April as the case may be shall be the same as was in force for the regular student in the last Annual Examination.

13.2 A candidate for B.A. Examination shall take up Englsih and Hindi/Punjabi/Sanskrit/Urdu as compulsory subjects and two elective subjects in each of three parts. Two elective subjects may be selected from the subjects prescribed for the examination as per syllabus, subject to the following :

a) A candidate shall offer Military Science if he is a regular student.

b) A candidate shall offer Statistics if he/she offers it alongwith Mathematics/Computer Applications.

c) Every candidate shall offer Hindi either as a compulsory subject or as an elective subject.

d) Language offered as compulsory subject cannot be offered as an elective subject.

e) A cnadidate shall offer Computer Application with Math., Statistics for B.A. only.

13.3 A candidate for B.Sc. examination shall offer one paper of English in the Ist year and one paper of Hindi/Punjabi/Sanskrit/Urdu in the 2nd year. In addition he/she shall be required to offer the subjects of B.Sc. as the case may be, according to the scheme of examination and syllabus approved by the Academic Council.

13.4 A candidate for B.Com. examination shall offer the papers according to the scheme of examination and the syllabus approved by the Academic Council.

13.5 A candidate for B.Sc. (Home Science) examination shall offer one paper of English in the 2nd year and the subject of B.Sc. (Home Science) in the Ist year, 2nd year and 3rd year, according to the scheme of examination and the syllabus approved by the Academic Council.

*Note : A candidate coming from a Non-Hindi speaking area shall if, he/she did not offer Hindi/Punjabi/Sanskrit/Urdu in the examination qualifying for admission, offer in lieu of compulsory Hindi/punjabi/Sanskrit/Urdu, the subject of Additional English which shall carry the same marks as for Hindi/Punjabi/Sanskrit/Urdu.*

14. College students offering a U.G.C. Scheme of restructured/vocational courses, shall be required to take up the combination of traditional and compulsory subjects in each of the TDC Part-I,II & III as mentioned against each course in the Scheme of Examination.

15. The minimum number of marks required to pass the examination shall be 35% in each subject in case of B.A./B.Sc./B.Sc. (Home Science) examination. 35% marks in each paper in case of B.Com. examination. Provided that in a subject in which there is a practical examination, this percentage shall be required separately in written and practical parts (including map work in case of Geography) of the examination.(A candidate of the University who fails in theory or practical or both parts of subject may be allowed to re-appear/ compartment in the theory or practical or both parts, as the case may be of that subject).

16. The successful candidates shall be classified in three divisions as under :-

    i) those who obtain 60%or more of the aggregate number of marks in all the subjects including the compulsory subjects in Part-I,II & III Examination taken together shall be placed in the First Division.

    ii) those who obtain less than 60% but not less than 50% marks in all the subjects' including the Compulsory subjects in Part-I, II and III examinations taken together, shall be placed in the Second Division.

iii) those who obtain below 50% marks in all the subjects including the Compulsory subjects in Part-I, II and III examination taken together, shall be placed in the Third Division.

A student who has passed B.A./B.Sc./B.Com./B.Sc. (Home Science) Part-I and or Part-II examination under new scheme from other University, the marks obtained in B.A./B.Sc./B.Com./B.Sc. (Home-Science) Part-I and/or Part-II shall be counted towards division of successful candidates at Part-III examination by increasing or decreasing the marks obtained in accordance with the maximum marks prescribed for Part-I and II by the M.D. University, Rohtak.

17. A candidate while appearing in the supplementary examination or the next Annual Examination shall be required to pay examination fee as for the whole examination and shall not be eligible for a scholarship, a prize or a medal.

18. Six weeks after the termination of the examination or as soon thereafter as is possible the Registrar/Controller of Examinations shall publish a list of successful candidates. Each succesful candidate of B.A./B.Sc./B.Com./B.Sc. (Home Science) Part-III examination shall be awarded a degree mentioning the division.

19. A candidate :-

i) who has passed B.A./B.Sc. Examination of this University;

ii) who resides within the territorial jurisdiction of this University and has passed an examination declared equivalent to the B.A./B.Sc. examination of this University may appear in a subsequent B.A./B.Sc. examination in additional subjects prescribed for the examination except the subject in which he/she has already passed the examination.

iii) A candidate appearing under this Clause shall sit for Part-I and Part-II in annual examination and for Part-III in supplementary examination. Such a candidate shall apply on one examination form available at Rs. 125/-. In case, he/she fails in Part-I/II/III he/she may appear in the immediate next annual examination. Such a candidate

shall submit one examination form for Part-I and II or Part-I,II,III (in case of failure). In case, he/she fails to pass any of the Part(s) in next annual examination, he/she shall appear in all the Parts denovo. Provided that if the candidate is appearing in the subject(s) involving practical, he/she shall study in a college admitted to the privileges of this University for Part-I, II & III classes and submit a certificate from the Principal for having completed the prescribed course of lectures, one month before the commencement of examination. However a candidate who has passed B.Sc. examination may appear in subsequent examination in additional subject of Hindi (Elective) of B.A. (pass course) and a candidate who has Passed B.Com. examination may appear in an additional subject of Hindi (Elective) and Mathematics in subsequent examinations of B.A. (Pass Course).

iv) The minimum marks required to pass in each subject shall be 35% in theory and practical separately.

20.i) The candidates who have passed the B.A./B.Sc./B.Com./B.Sc. (Home-Science) examination in the second or third division be allowed to reappear in one or more subject(s)/in theory papers only of the Part-I, II and Part-III examinations for improvement of division. The candidate may also be allowed to improve their score of marks upto 45% in the same manner. However, for improvement of division from III to II and II to I as well as improvement of score of marks upto 45% only one chance shall be allowed. Such a candidate, after his/her passing the B.A./B.Sc./B.Com./B.Sc.(Home Science) in the annual examination held in April/May shall appear for Part-III in the immediate supplementary examination and Part-I and/or Part-II in April/May next. His/her result of improvement of Part-III supplementary examination shall be finalized by taking into consideration the marks obtained by him/her in Part-I and/or Part-II in April/May next. Provided that the result of the said Part-III supplementary examination shall be declared if the candidate had furnished undertaking at the time of submission of examination admission form to the effect that he/she is not interested in the improvement of Part-I & II. Like-wise a candidate passing his/her Part-III in

September of the following calendar year. However, if such candidate gives an undertaking at the time of submission of examination admission form of Part-I and/or Part-II for improvement in the next annual examination that he/she is not interested in improvement of Part-III, his/her result of improvement shall be finalized on the basis of Part-I and II.

ii) The higher score in the paper(s)/subject(s) in which he/she re-appears for improvement will be taken into account towards the final result and the marks already obtained by the candidate in the paper/subject(s) in which he/she has not opted to improve his/her result shall be carried forward. In case the candidate does not improve the division his/her result shall be declared as Previous Result Stands.

21.1) In order to provide opportunity for women candidates who have already passed B.A. examination of this University with Home-Science as a subject to join the M.Sc. (Home-Science) Course an examination of B.Sc. standard in the following subjects shall ordinarily be held once a year in the month of April on a date fixed by the Vice-Chancellor:-

a) Nutrition and Foods.

b) Textiles and Clothing

c) Art and Everyday Life

d) Home-Management

e) Biology

f) Psychology and Human Relationship

g) Household Chemistry

h) Sociology

i) Principles of Economics

2) Every candidate for this examination shall be required to produce the following certificates signed by the Head of a College recognised for B.Sc. Home-Science course:-

a) of having attended not less than 75% of the lectures delivered to the class in theory and practical of each subject during the academic year preceding the exam.

b) of having completed the sessional work in each subject prescribed in Clause-21(1).

3) The last date for receipt of admission forms and fees shall be the same as for the B.Sc. Home-Science examination. The amount of admission fee to be paid by a candidate shall be Rs.110/- and additional fee of Rs.10/- per practical subject. Every candidate shall be examined according to the syllabus prescribed for these subjects by the Academic Council.

4) The Minimum number of marks required to pass the examination shall be 40% in each theory and practical examination separately.

5) Candidates who obtained pass marks in all the subjects shall be admitted to the Degree of B.Sc. Home-Science and shall be eligible to join the M.Sc. Home-Science Course.

22. Notwithstanding the integrated nature of the B.A./B.Sc./ B.Com./ B.Sc./ (Home-Science) Course which is spread over more than one academic year, the Ordinance in force at the time a student joins course shall hold good only for the examination(s) held during or at the end of the academic year and nothing in these Ordinances shall be deemed to debar the University from amending the Ordinances subsequently and the amended Ordinances, if any, shall apply to all students whether old or new.

# SCHEME OF EXAMINATION

## for B.A. Part-I,II and III

**Compulsory Subjects**

1. English — Two papers of 50 marks each in Part-I, Part-II & Part-III
2. Hindi/Punjabi/Sanskrit/Urdu

*Note :*
1. *Every Candidate must offer Hindi either as a Compulsory subject or as an Elective subject.*
2. *Language offered as compulsory subject shall not be offered as an Elective subject.*
3. *A candidate coming from a Non-Hindi speaking area shall if he/ she did not offer Hindi /Punjabi/ Sanskrit/ Urdu in the examination qualifying for admission, offer in lieu of compulsory Hindi/Punjabi/Sanskrit/Urdu, the subject of additional English which shall carry the same marks for Hindi/Punjabi/Sanskrit/Urdu.*

**Elective Subjects**

Any two of the following subjects, in each part, subject to restrictions as given in the Ordinance :-

| | |
|---|---|
| 1. Hindi or Punjabi or Urdu or Sanskrit or French | |
| 2. Ancient Indian History, Culture and Archaeology | One paper of 100 marks each except for French where there will be one paper of 75 marks and one Practical (Dictation and Oral of 25 marks). |
| 3. Economics | |
| *4. Education | |
| 5. History | |
| *6. Linguistics | |
| 7. Pol. Science | |
| 8. Philosophy | |
| 9. Public Administration | |
| 10. Sociology | |
| 11. Mathematics | Two paper of 50 marks each. |
| 12. Art OR | One paper of 30 marks and three Practicals of 20 marks each and 10 marks for sessional work. |
| History of Art OR | One Paper of 100 marks. |
| Clay Modelling | One paper of 30 marks and two practicals of 30 marks each and 10 marks for sessional work. |

| | |
|---|---|
| 13. Applied Art | One paper of 25 marks & three practicals of 20 marks each & 15 marks for sessional work. |
| 14. Music (Vocal) | One paper of 40 marks and one practical of 60 marks. |
| 15. Music (Instrumental) OR | One paper of 40 marks and one practical of 60 marks. |
| Music (Tabla) | One paper of 40 marks and one practical of 60 marks. |
| 16. Indian Classical Dance | One paper of 40 marks and one practical of 60 marks. |
| 17. Geography | One paper of 60 marks and one practical of 40 marks, in case of Part-III two Theory papers of 40 and 20 marks and one Practical of 40 marks. |
| 18. Psychology | One paper of 70 marks and one practical of 30 marks. |
| 19. Defence Studies | One paper of 70 marks and one practical of 30 marks. |
| 20. Home Science | One paper of 60 marks and one practical of 40 marks. |
| 21. Statistics | Two papers of 35 marks each and one practical of 30 marks. |
| 22. Computer Applications | Two papers of 35 marks each and one practical of 30 marks. |
| 23. Cummunicative English | Two papers of 50 marks each. |
| 24. Health and Physical Education | One paper of 60 marks and one practical of 40 marks. |

*Note : The following combinations of the elective subjects shall not be allowed :*

a) (i) History and Ancient Indian History, Culture & Archaeology.
   (ii) Education and Mathematics.
   (iii) Education and Art and History of Art.
   (iv) Home Science and Geography.
   (v) Music (Vocal) and Sociology.
   (vi) Clay Modelling and Psychology.

(vii) Linguistics and Indian Classical Dance.

(viii) Defence Studies and Music (Instrumental/Tabla).

b) A candidate shall :-

(i) Offer Defence Studies if he is regular student.

(ii) Computer Applications only if he offers it alongwith Mathematics / Statistics.

A candidate shall offer the elective subjects mentioned above, subject to the following :-

c) A candidate may offer Psychology, Home Science and/or Geography, if he/she produces a certificate from the Head of Institution recognised to teach this/these subjects or an Institution approved for this purpose by the Board of Studies concerned, to the effect that he/she has completed the course prescribed for practical work in these subjects.

**Exception :** A candidate who has obtained :-

(i) Two Year Home-Science Diploma or One Year Teachers Training Diploma from the Institute of Home Economics New Delhi.

OR

(ii) Home-Science Diploma (2 Year Course) from Lady Irvin College New Delhi.

May be taken as having completed the prescribed course in Home-Science.

*Note : The Syllabus of Applied Art is the same as that of Commercial Art, Painting & Designing under the scheme of Restructured Course.*

## SCHEME OF EXAMINATION

### for B.Sc. Part-I,II and III

**Compulsory Subjects**

B.Sc. Part-I

1.English — One Paper of 50 marks

B.Sc. Part-II

Hindi/Punjabi/Sanskrit /Urdu — One Paper of 50 marks

*Note : A Candidate coming from a Non-Hindi speaking area shall if he/she did not offer Hindi/Punjabi/Sankrit/Urdu in the Examination qualifying for admission, offer, in lieu of compulsory Hindi/Punjabi/Sankrit/Urdu, the Subject of Additional English which shall carry the same marks as for Hindi/Punjabi/Sankrit/Urdu.*

**Elective Subjects**

Any three of the following subjects in each part, subject to restriction given in the Ordinance :-

| | | |
|---|---|---|
| 1. | Physics | Two papers of 55 marks each and one practical of 40 marks. |
| 2. | Chemistry | Three papers of 35 marks each and one practical of 45 marks. |
| 3. | Botany | Two papers of 55 marks each and one practical of 40 marks. |
| 4. | Zoology | Two papers of 55 marks each and one practical of 40 marks. |
| 5. | Mathematics | Two papers of 75 marks each. |
| 6. | Statistics | Two papers of 50 marks each and one practical of 50 marks. |
| 7. | Geology | Two papers of 45 marks each and one practical of 60 marks. |
| 8. | Home Science | One paper of 100 marks and one practical of 50 marks. |
| 9. | Geography | One paper of 90 marks and one practical of 60 marks, in case of Part-III two papers of 60 and 30 marks and one practical of 60 marks. |
| 10. | Anthropology | Two papers of 50 marks each and one practical of 50 marks. |
| 11. | Bio-Chemistry | The scheme of papers will be notified later if required. |
| 12. | Human Anatomy | |
| 13. | Physiology | |
| 14. | Micro Biology | |

A candidate for B.Sc. Part-I examination shall not offer any subject (except Geology, Geography, Home Science and Statistics or a subject which is not included in the Scheme of Examination for the +2 stage of the Sr. Secondary Certificate Examination) unless he offered the corresponding subject in the lower examination.

Provided that :-

(i) A candidate who did not take up Physiology in the XII class of Sr. Secondary Certificate examination may if he took up Biology, offer Physiology for B.Sc. examination.

(ii) A candidate who took up Agriculture as one of his Elective group subjects for XII class of Sr. Secondary Certificate Examination may offer Botany or Zoology or both for the B.Sc. Examination.

(iii) A candidate who took up Biology or Physiology as one of his Elective Group subjects for XII class of Sr. Secondary Examination may offer Zoology/Botany/Physiology for B.Sc. Examination.

The following combination of subjects at B.Sc. Part-I,II and III be allowed :-

1. Computer Science/Computer Application with any two of the following subjects :-
   i) Mathematics ii) Statistics iii) Physics
   iv) Chemistry v) Botany vi) Zoology
   Subject to the condition that Botany and Zoology should be offered together. Those who opt above combination must had studied Mathematics at 10+2 level.

2. Electronics alongwith Physics and any one of the following subjects :-
   (i) Computer Science/Computer Application
   (ii) Mathematics
   (iii) Chemistry
   (iv) Statistics

   Subject to the condition that the students opting for above combination must have studies Mathematics at 10+2 level.

Students offering Industrial Chemistry as an elective subject in B.Sc. Pass Course should be required to offer Chemistry and Mathematics as other two subjects, besides offering English (Compulsory in B.Sc. Part-I and Hindi/Punjabi/Sanskrit/Urdu (Compulsory) in B.Sc. Part-II.

## SCHEME OF EXAMINATION FOR B.A. PARTS-I,II,III

### (General) of Restructuring Courses (Under the U.G.C. Scheme) for Students in Colleges

Candidates offering a restructured course, shall be required to take up combination of traditional and compulsory subjects in each of the Part-I,II and III as mention below against each course; subject to the restriction given in the Ordinance :-

| Sr. No. | Name of the Restructured Course | Combination of Traditional Subjects (any two of the following) | Compulsory Subjects |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 1. | Office Management | English or Hindi, Commerce, Economics, Political Sc., History, Sociology, Geopgraphy, Public Administration. | (a)If a candidate Offers English as an Elective subject, he will take up Hindi as compulsory in Part-I, II of 100 marks each. If he takes Hindi as elective, he will take English, as compulsory in Part-I, and II of 100 marks each.<br>(b)If a candidate does not take English / Hindi as Elective then he will have one paper of English of 100 marks in Part-I and one paper of Hindi of 100 marks in Part-II. |
| 2. | Archaeology, Museum and Tourism | English or Hindi or Sanskrit, History, Pol. Sc.,Sociology, Geography, Economics | -do- |

| | | | |
|---|---|---|---|
| 3. | Commercial Art, Designing & Painting | English or Hindi or Sanskrit or Punjabi / Urdu, History or Economics, Commerce, Pol.Sc., Sociology, Music or Dance, Psychology. | -do- |
| 4. | Rural Industrialisation | English or Hindi or Economics, Commerce, Public Administration, Sociology, Pol.Sc., Geography. | -do |
| 5. | Local Self Government | English or Hindi, Pol.Sc., Economics, History, Sociology, Geography, Public Administration. | -do- |
| 6. | Marketing | English or Hindi, Economics, Commerce, Pub. Adm.,Pol.Sc., Sociology, History, Geography. | -do- |
| 7. | Labour Welfare | English or Hindi, Economics, Pol.Sc., Sociology, Pub. Adm., Commerce, History, Psychology. | -do- |
| 8. | Fruit Preservation, Applied Nutrition Bakery, Tailoring and Hoisry | Home Science and any one of the following: English / Hindi, History, Commerce, Economics. Pol.Sc., Chemistry and Music (Instrument and Vocal) | -do- |
| 9. | Insurance and Acturial Science | Commerce, Mathematics Economics | English of 100 marks in Part-I and Hindi of 100 marks in Part-II. |

*Note : 1. In addition to the above combination the candidate shall be required to offer a compulsory subject of Hindi/English as per Scheme of Examination.*

*2. The syllabus of English elective if any for the students of Restructured course will be the same as for English compulsory for all corresponding class of B.A.*

*3. A candidate coming from a Non-Hindi speaking area shall, if he/she did not offer Hindi in the Examination qualifying for admission, offer in lieu of compulsory Hindi, the subject of Additional English which shall carry the same marks as for Hindi.*

## SCHEME OF EXAMINATION FOR B.Sc. PARTS-I,II,III OF RESTRUCTURING COURSES (UNDER THE U.G.C. SCHEME)

### for Students in Colleges

A candidate shall be required to offer English compulsory in B.S.c Part-I, Hindi compulsory in B.Sc. Part-II and any one of the following subjects alongwith two subjects mentioned in the Scheme of Examinations or traditional subjects (subjects to restrictions given in the Ordinance) in each Part-I, II and III.

1. Electronics
2. Computer Science
3. Micro-Biology
4. Plant and Crop Genetics
5. Fish and Fisheries
6. Pest control
7. Horticulture and Vegetable Cultivation
8. Pharmacy
9. Industrial Chemistry
10. Analytical Methods
11. Agricultural Chemicals and Fertilizers
12. Soils and Soils Conservation
13. Animal Husbandary and Poultry
14. Textile Chemistry
15. Farm Management

*Note : A candidate coming from a Non-Hindi speaking area shall, if he/she did not offer Hindi in the Examination qualifying for admission, offer in lieu of compulsory Hindi, the subject of Additional English which shall carry the same marks as for Hindi.*

## ENGLISH (Compulsory)

Paper-A — M.Marks : 50
Time : 3 Hours

### Prescribed Books

1. Poetry : A book of Poems edited by Prof. Bhim S.Dahiya, former Vice-Chancellor, Kurukshetra University, Kurukshetra.
2. A Play by Shakespeare : The Merchant of Vanice, edited by Dr.S.M. Paul, Reader, Dept. of English, Kurukshetra University, Kurukshetra.

### Scheme of Examination

1. One passage each from the two books each with internal choice, for explanation with reference to the context/answering a set of questions relating to the content/usage. (5+5=10 Marks)

2 & 3 Essay type questions, with internal choice on the texts included in Book No. 1 requiring first hand study and critical appreciation of the text. (10+10=20 Marks)

4 & 5 Essay type questions, with internal choice based on the prescribed edition of book No. 2 requiring first hand study and critical appreciation on the text. (10+10=20 Marks)

Paper-B — Max. Marks : 50
Time : 3 Hours

### Prescribed Books

1. Prose : A Prose-Collection, edited by Dr. M.K. Bhatnagar, Dept. of English, M.D. University, Rohtak.
2. Grammar & Composition: A book of Grammar and composition written by Sh. Sham S. Awasthy and Sh. Satish C. Arya, Senior Lecturers, Govt. Post Graduate College, Bhiwani.

### Scheme of Examination

Q.I Short answer questions (of about 250 words each) on the texts included in Book No. 1 requiring first hand study and critical appreciation of the texts concerned (three out of six such questions to be attempted) (7+7+6=20 Marks)

Q.II A passage of suitable length for comprehension with a set of 4 questions pertaining to the content and or usage out of which two would be required to be attempted. (6 marks)

Q.III Essay (in about 500 words) out of four or five given topics one to be attempted. (15 marks)

Q.IV Grammar with adequate internal choice. (9 marks)

Q.No. II, III, & IV

In their scope and format would be based on the lines suggested in Book No. 2

# ADDITIONAL ENGLISH

One Paper — Max. Marks : 100
Time : 3 Hours

**A. Outline**

a) Text — 60 Marks
b) General English — 40 Marks

**B. Details**

a) Text

The students will be required to study the following text intensively.

1. The Rape of the Lock by Alexander Pope Recommended edition edited by E.V. Sunderam in 'Macmillan's Annotated Classics Series.' (20 Marks)
2. All my Sons by Arthur Miller (Recommended edition by Nissim Ezkiel), in the 'Modern Plays for students' published by O.U.P. (20 Marks).
3. Select Short Stories (Book One) compiled by Nagpur University, Published by O.U.P. (20 marks)

b) General English

1. Essay Writing (a reflective and autobiographical types) and speech writing — 20 Marks
2. Precis — 20 Marks

**C. The Scheme of the question papers**

1. There will be one question consisting of three parts asking for explanation with reference to the context of three passages from the three prescribed texts (one each from each of the three prescribed books with internal choice in all the three cases). 5X3=15 Marks
2. Question I, III and IV will be of essay type. These questions will be based on the prescribed texts only. No question will be put on the authors or their other works. There will be internal choice in each case. 15X3=45 Marks.
3. Essay/Speech Writing — 20 Marks
   The candidates will be required to write on any one of the four/five topics.
4. Reducing a given passage to about one third of the given passage of about 300 words. (20 marks)

## हिन्दी (अनिवार्य)

पूर्णांक : १००
समय : ३ घन्टे

१ खण्ड काव्य ३० अंक

निर्देश : व्याख्या के लिए दिए गये तीन अंशों में से किन्हीं दो की व्याख्या लिखनी होगी। आठ आठ के हिसाब से दोनों व्याख्याएं सोलह अंकों की होंगी। व्याख्या के लिए प्रथम चार खण्ड पाठ्यक्रम में निर्धारित हैं। पूछे गये तीन समीक्षात्मक प्रश्नों में से किसी एक का उत्तर लिखना होगा, जो चौदह अंकों का होगा।

२ एकांकी संकलन : २० अंक

इसमें निम्नलिखित पांच एकांकीकरण का एक एक एकांकी संकलित किया जायेगा।

१-डा० रामकुमार वर्मा २-विष्णु प्रभाकर ३-उपेन्द्रनाथ अश्क, ४-चिरंजीत ५-लक्ष्मी नारायण लाल।

निर्देश : व्याख्या के लिए दिये गये दो अंशों में से किसी एक की व्याख्या लिखनी होगी, जो आठ अंकों की होगी। एकांकियों पर दो समीक्षात्मक प्रश्न पूछे जायेंगे जिनमें से एक का उत्तर देना होगा, जो बारह अंकों का होगा।

३ कहानी संकलन २० अंक

इसमें निम्नलिखित कहानीकारों की एक-एक कहानी संकलित की जायेगी।

१. प्रेमचन्द २. प्रसाद ३. जैनेन्द्र ४. राजेन्द्र यादव ५. कमलेश्वर
६. यशपाल ७. दीप्ति खण्डेवाल।

निर्देश : व्याख्या के लिये दिये गये दो अंशों में से किसी एक की व्याख्या लिखनी होगी जो आठ अंकों की होगी। कहानियों पर दो समीक्षात्मक प्रश्न पूछे जायेंगे, जिनमें से एक का उत्तर देना होगा, जो बारह अंकों का होगा।

४ इन विधाओं (खण्ड काव्य, एकांकी और कहानी) से सम्बन्धित इतिहास की रूपरेखा। २० अंक

निर्देश : तीन प्रश्न पूछे जायेंगे जिनमें से एक का उत्तर देना होगा।

५ अनुच्छेद लेखन १० अंक

पाठ्य-पुस्तक

१- खण्ड काव्य 'कुरुक्षेत्र', रामधारी सिंह दिनकर, राजपाल एण्ड सन्स कश्मीरी गेट, दिल्ली।

२- एकांकी संकलन कुरुक्षेत्र विश्वविद्यालय, कुरुक्षेत्र प्रकाशन।

३- कहानी संकलन कुरुक्षेत्र विश्वविद्यालय, कुरुक्षेत्र प्रकाशन।

प्रस्तावित पुस्तकें :

१ हिन्दी साहित्य का संक्षिप्त इतिहास— डा० लक्ष्मी सागर वार्ष्णेय, लोक भारती प्रकाशन, १५-ए महात्मा गांधी मार्ग, इलाहाबाद।

२ हिन्दी साहित्य का विवेचनात्मक इतिहास— प्रथम तथा द्वितीय खण्ड डा० तिलक राज शर्मा, आर्य बुक डिपो, करोल बाग, नई दिल्ली।

३ हिन्दी का सामान्य ज्ञान भाग-२— डा० हरदेव बाहरी, लोकभारती प्रकाशन १५-ए, महात्मा गांधी मार्ग, इलाहाबाद।

## हिन्दी (ऐच्छिक)

पूर्णांक : १००

समय : ३ घण्टे

१ खण्ड काव्य : आधुनिक ३० अंक

निर्देश : व्याख्या के लिए दिए गए तीन अंशों में से किन्हीं दो की व्याख्या लिखनी होगी। आठ आठ के हिसाब से दोनों व्याख्याएं सोलह अंकों की होंगी। पूछे गये तीन समीक्षात्मक प्रश्नों में से किसी एक का उत्तर लिखना होगा, जो चौदह अंकों का होगा।

२ उपन्यास २० अंक

निर्देश : व्याख्या के लिए दिए गए दो अंशों में से किसी एक की व्याख्या लिखनी होगी जो आठ अंकों की होगी। उपन्यास से सम्बन्धित दो समीक्षात्मक प्रश्न पूछे जायेंगे, जिनमें से एक का उत्तर देना होगा, जो बारह अंकों का होगा।

३ हिन्दी साहित्य का इतिहास ३० अंक

(रीतिकाल और आधुनिक काल)

निर्देश : रीतिकाल और आधुनिक काल पर दो दो प्रश्न पूछे जायेंगे। जिनमें से एक-एक का उत्तर देना होगा। प्रत्येक काल से एक प्रश्न करना अनिवार्य होगा तथा प्रत्येक १५ अंकों का होगा।

४ समीक्षा शास्त्र-शेष भाग — २० अंक
(विधाओं का तात्विक विवेचन)

निर्देश : तीन प्रश्न पूछे जायेंगे जिनमें से एक प्रश्न का उत्तर देना होगा, जो बीस अंकों का होगा।

पाठ्य-पुस्तक :

१ खण्ड काव्य– शम्बूक' — डा० जगदीश गुप्त लोकभारती प्रकाशन १५-ए महात्मा गांधी मार्ग इलाहाबाद।

२ उपन्यास-'पानी के प्राचीर' रामदरश मिश्र, अंकूर प्रकाशन दिल्ली-११००३२

३ हिन्दी साहित्य चिन्तन (द्वितीय खण्ड) — डा० पुष्पा बंसल : कुरुक्षेत्र विश्वविद्यालय, कुरुक्षेत्र प्रकाशन।

प्रस्तावित पुस्तकें—

१ हिन्दी साहित्य का संक्षिप्त इतिहास — डा० लक्ष्मी सागर वार्ष्णेय लोकभारती प्रकाशन १५-ए महात्मा गांधी मार्ग, इलाहाबाद।

२ हिन्दी साहित्य का विवेचनात्मक इतिहास (प्रथम तथा द्वितीय खण्ड) — तिलक राज शर्मा, आर्य बुक डिपो करोल बाग नई दिल्ली।

## संस्कृत (अनिवार्य)

कुल अंक : १००
समय : ३ घण्टे

१ शिवराज विजय-प्रथम निःश्वास — २० अंक
क) सप्रसंग व्याख्या (दो खण्ड) — ६×२=१२ अंक
ख) लेखक, पात्र तथा पाठ्यांश से सम्बद्ध प्रश्न — ८ अंक

२ भर्तृहरि—नीतिशतक (पद्य १ से ५० तक) — ३० अंक
क) व्याख्या — ८×३=२४ अंक
ख) पाठ्यांश से सम्बद्ध एक प्रश्न — ६ अंक

| | | |
|---|---|---|
| ३ | संस्कृत साहित्य का इतिहास - अश्वघोष, कालिदास, भारवि, भवभूति, शूद्रक, बाणभट्ट, जयदेव, भर्तृहरि | ३० अंक |
| ४ | व्याकरण (क) कारक उपपद, विभक्ति सहित सामान्य परिचय एवं प्रयोग | १५ अंक |
| | ख अशुद्धि शोधन - कारकों के आधार पर | ५ अंक |

## संस्कृत (ऐच्छिक)

पूर्ण अंक : १००

समय : ३ घण्टे

| | | |
|---|---|---|
| १ | नाटक अभिज्ञानशाकुन्तलम् | ५० अंक |
| २ | संस्कृत साहित्य का इतिहास | २५ अंक |
| ३ | संस्कृत में निबन्ध | १० अंक |
| ५ | व्याकरण — | १५ अंक |

संस्कृत साहित्य का इतिहास :

रामायण, महाभारत, भास अश्वघोष, कालिदास, भारवि, माघ, श्री हर्ष, बाण, सुबन्धु, दण्डी, जयदेव, भर्तृहरि, भवभूति, कथा सरितसागर, वृहत्कथा मंजरी, पंचतन्त्र, हितोपदेश।

व्याकरण

| | |
|---|---|
| सन्नन्त | ३ अंक |
| नामधातु, यङ्, काम्यच्, विवप | ३ अंक |
| तद्धित — इन्, मतुप्, वतुप्, त्व, अण | ३ अंक |
| मुख्य समास अव्ययी भाव, तत्पुरुष, बहुव्रीहि, द्वन्द्व | ६ अंक |

## PUNJABI (COMPULSORY)
### Outlines of Test

One Paper — Max. Marks : 100
Time : 3 Hours

| | | |
|---|---|---|
| 1. | Selection of Punjabi Poetry upto 1700 A.D. | 30 Marks |
| 2. | A Book of Punjabi Prose | 30 Marks |
| 3. | Precis | 20 Marks |
| 4. | Applied Grammar (Samanvachi Shabad ate Vipritavachi Shabad) | 20 Marks |

### Syllabus and Courses of Reading

1. Kaav Sudhakhar, Ed. Dr. Tarlochan Singh Bedi, Patiala, Punjabi University, 1989.

*Note : Only the following five Poets to be studied :-*

Guru Nanak, Guru Arjan, Shah Hussain, Damodar, Guru Gobind Singh.

2. Adhunik Punjabi Vartak, Ed. Dr. Gurdev Singh, Patiala, Punjabi University, 1976.

*Note : Only the following seven writers to be studied :-*

Bhai Veer Singh, Lal Singh, Kamla Akali, Teja Singh, Puran Singh, Gurbachan Singh, Talib, Suba Singh, Kirpal Singh Kasel.

## PUNJABI (Elective)
### Outlines of Test

**One Paper** — Max. Marks : 100
Time : 3 Hours

| | | |
|---|---|---|
| 1. | A Selection of Punjabi Poetry upto 1700 A.D. | 20 Marks |
| 2. | A Book of Punjabi Prose | 20 Marks |
| 3. | History of Punjabi Literature upto 1700 A.D. | 20 Marks |
| 4. | Sahit de Roop | |
| | (A)Var, Qissa, Gazal Baramaha, Mahakav | 10 Marks |
| | (B) Novel, Short Story, Drama, One Act Play and Essay | 10 Marks |

*Note : The questions relating to 'Sahit De Roop' will be asked in four parts with short answers.*

| | | |
|---|---|---|
| 5. | A Book of Reminiscences | 20 Marks |

## Syllabus and Courses of Reading

1. Kaav-Sudhakar Ed. Dr. Tarlochan Singh Bedi, Patiala, Punjabi University, 1989.
2. Adhunik Punjabi Vartak, Ed. Dr. Gurdev Singh, Patiala, Punjabi University, 1976.
3. Punjabi Sahit Da Itihas, Ed. Dr. Parminder Singh, Patiala, Punjabi University.
4. Sahit de Roop, Dr. Parminder Singh, Dr. Kirpal Singh Kasel and Dr. Asha Nand Vohra, Ludhiana, Lahore Book Shop.
5. Yaadan di Kahani, Balraj Sahni, Amritsar, Nanak Singh Pustakmala, 1988.

### URDU (Compulsory)

**One Paper** **Drama, Nazam & Ghazaliat** Max. Marks : 100
Time : 3 Hours

(a) Texts: Explanation and paraphrase 45 Marks
(b) Critical appreciation and assessment with emphasis on relevant portions prescribed. 45 Marks
(c) Prosody 10 Marks

**Detailed Course of Study :**

1. Nai Drama by Dr. Mohd. Hasan Published by Anjuman Tarraqi Urdu Hindi.

   Following One Act Plays from the above Chotemain Fanker Mehal Sava.
2. Khavaban-i-Adab (Poetry)

   Meer-Dard-Alish-Ghalib-Momin-Dagh

   Masnavyat; Mir Hassain-Naseem

   Marasi : Anis-Dabeer

   Jadeed Shairi-Nazir-Hali-Akbar-Iqbal.

### URDU (Elective)

**Paper-III** **Drama, Nazam Ghazalyat** Max. Marks : 100
Time : 3 Hours

**1. Text** 60 Marks

Khyabani-i-Abad (Poetry) Published by Educational Book House, Aligarh.

Ghazalyat : Meer-Dard-Atish-Ghalib-Momin-Dagh Masnawiat : Mir Hasan

Marsi : Mir Anees

Jadid Shairi : Nazir, Hali-Akbar-Iqbal

**2. Drama** 40 Marks

Darwaze Khol Do by Krishan Chander-Published by Maktaba Jamia, Delhi.

## FRENCH

Max. Marks : 100
Time : 3 Hours

Theory 75 Marks
Viva-Voce 25 Marks

| | | |
|---|---|---|
| 1. | Translation from Prescribed Text. | 10 Marks |
| 2. | Translation from Unseen (Moderately Difficult) Passage. | 10 Marks |
| 3. | Translation from English into French passage from News Paper (120 Words) | 10 Marks |
| 4. | Essay on a current Topics in French (250 words) | 15 Marks |
| 5. | Questions on Grammar from prescribed text | 20 Marks |
| 6. | Questions on text to be answered in French | 10 Marks |
| | | = 75 Marks |
| | Viva :- Dictation (Unseen) | 10 Marks |
| | Conversation on daily life. | 15 Marks |
| | | = 25 Marks |

**Suggested Readings**

1. Course-de-langue at de civilization Francaise Tome-III

   Manager : (Lessons to be intimated Later on)

2. Menual de Francaise a L'usage scientifique Part-I (Available at Indian Institute of Sciences, Bangalore).

3. Suggested Journals.

   Passtpartout

   Le nouvelic Observateur

*Note : Internal Choice may be given in each question.*

## HISTORY
### Outlines of Test

| | | |
|---|---|---|
| Option-I | Modern World | Max. Marks : 100<br>Time : 3 Hrs. |
| Option-II | Ancient & Medieval World | Max. Marks : 100<br>Time : 3 Hrs. |

### Syllabus and Courses of Reading

Option-I **Modern World** Max. Marks : 100
Time : 3 Hrs.

*Note:1. Atleast ten questions, spread over the entire syllabus more or less proportionately, shall be set in the paper out of which the candidates shall be required to attempt five questions in all. All questions shall carry equal marks.*

2. *There shall be a compulsory question on map carrying 20 marks (12 for map work and 8 for explanatory note. Blind candidates may not attempt the map question which is compulsory for all other candidates. In lieu of the map question they may attempt any other question. However, in case they wish to attempt the map question the part relating to the explanatory aspect will carry full marks.*

3. *There shall be one objective type question. This question will be divided into three Sections : Section-I will have snap-short type questions of 10 marks, Section-II will have multiple choice questions of 5 marks, Section-III will have matching type questions of 5 marks.*

**Section-I**

Age of Mercantalism and beginning of Capitalism, Agricultural revolution in Western Europe and its impact; industrial Revolution-Social, economic and technological aspects. Development of Capitalism in Europe in the 19th Century. Imperialism in the 19th century with special reference to Africa.

**Section-II**

Origin, Achievements and character of French Revolution, 1979-95; Nationalism in Europe in the 19th Century-Italy and Germany; Rise of Liberalism in Britain in the 19th Century Parliamentary Democracy and social legislation; the Russian Revolution of 1917; the Naxism in Germany, Fascism in Italy.

**Section-III**

The opium war and the Development of the treaty port system in China 1840-1860; Battle of Concessions China; Open Door Policy, Chinese Revolution, 1911 & 1949; Japan as a World Power 1894-1945; Anti-Imperialist Movements in Indonesia & Egypt. Emergence of USA as World Power upto 1919. The Indian National Movement with reference to Non-cooperation Movement. Civil Disobedience Movement & Quit India Movement.

**Section-IV** Objective type-question (One Question)

**Section-V** **Map**

1. On an outline map of Europe show the countries which witness Agricultural Revolution during 16th, 19th Centuries.
2. Europe on the eve of the French Revolution.
3. Unification of Italy.
4. Unification of Germany.
5. British Rule in India 1857.
6. Two separate maps i.e. one of Asia & one of Africa may be provided.

**Books Recommended**


| | | |
|---|---|---|
| 1. | Christopher Hill | From the Reformation to the Industrial Revolution. |
| 2. | Leo Gershoy | French Revolution and Napolean . |
| 3. | A. Wood | Nineteenth Century Britain. |
| 4. | David Thomson | Europe Since Napolean (London, 1978). |
| 5. | N. Peffer | Far East : A Modern History. |
| 6. | Clyde and Beers | The Far East (London, 1966, 1977). |
| 7. | K.P. Dutt | India-today. |
| 8. | Sumit Sarkar | Modern India, 1885-1947, Delhi, 1984. |

Option-II **Ancient & Medieval World** Max. Marks : 100
Time : 3 Hrs.

*Note :*

1. *At least ten questions, spread over the entire syllabus more or less proportionately, shall be set in the paper out of which the candidates shall be required to attempt five questions in all. All questions shall carry equal marks.*
2. *There shall be a compulsory question on map, carrying 20 marks (12 for map work and 8 for explanatory notes). Blind candidates may not attempt the map question which is compulsory for all other candidates. In lieu of the map question they may attempt any other question. Howeer, in case they wish to attempt the map question the part relating to the explanatory aspect will carry full marks.*
3. *There shall be one objective type question. This question will be divided into three Sections : Section-I will have snap-short type questions of 10 marks, Section-II will have multiple choice questions of 5 marks, Section-III will have matching type questions of 5 marks.*

**Section-I**

The Neolithic Revolution, Bronze Age Civilization : Egypt, India and Sumer, Greek Civilization : Social and Economic Structure, Nature of Greek Polity, Rome : Polity and Economy from the Republic to the Empire, Rise of Christianity, Decline of the Roman Empire. (Three Questions)

**Section-II**

Theories of the origin of Feudalism in Western and Central Europe, Monorial System. Ties of Inter-dependency. Position of Peasantry under Feudalism-Role of Church in medieval Europe, Feudal Dynamism : Technological innovations; population growth; Revival of long-distance trade and rise of towns. Decline of Feudalism. (Three Questitons)

**Section-III**

Rise of Islam, The Umayyids and Abbasids. Organisation of State and Society. (Two Questions)

**Section-IV** Objective type-question (One Question)

**Section-V** **Maps** (One Question)

1. An outline map of Bronze Age Civilizations indicating important sites.
2. Locating important Towns of Greek Civilization.
3. Locating important Towns of Roman World.
4. Trade roots and Towns.

**Books Recommended**

| | | |
|---|---|---|
| 1. | V. Gordon Childe | What Happened in History? |
| 2. | -do- | Man Makes Himself |
| 3. | S.N. Kramer | The Sumarians. |
| 4. | A.R. Burn | Pelican History of Greece. |
| 5. | M.I. Fonley | The Ancient Economy. |
| 6. | A.H.M. Jones | Constantine and Conversion of Europe. |
| 7. | Perty Anderson | Passages from Antiquity to Feudalism. |
| 8. | March Bloch | Feudal Society, Vol. I & II. |

## POLITICAL SCIENCE
### Outlines, Syllabus and Courses of Reading

There will be two optional papers. The students will have to opt only one paper out of two.

Option(i) **Indian Political Thought** Max. Marks : 100
Time : 3 Hours .

*Note : Out of 10 questions 5 questions will have to be attempted. There will be one objective Type (multiple choice) question.*

**Political Ideas of :**

Raja Ram Mohan Roy, Gokhle, Aurobindo Ghosh, Tilak, Jinnah, M.N. Roy, Vinoba Bhave, Gandhi, Jai Parkash Narain, Jawahar Lal Nehru.

**Books Recommended**

| | | |
|---|---|---|
| 1. | U.N. Ghoshal | A History of Indian Political Ideas. |
| 2. | R.Iyer | The Moral and Political Thought of Mahatma Gandhi. |

| | | |
|---|---|---|
| 3. | S. Ghose | Modern Indian Political Thought. |
| 4. | V.S. Narvane | Modern Indian Thought. |
| 5. | B. Prasad | Gandhi, Nehru and J.P. |
| 6. | V.P. Verma | Modern Indian Political Thought. |
| 7. | Thomas Pantham and Kenneth Deutsch, ed. | Political Thought in Modern India. |
| 8. | A. Appadorai | Indian Political Thinkers of Twentieth Century. |
| 9. | M.N. Jha | Modern Indian Political Thought-Ram Mohan Roy to Present Day. |
| 10. | O.P. Goyal | Contemporary Indian Political Thought. |
| 11 | J.P. Suda | Main currents of Social and Political Thought in India. |

Option(ii) **Western Political Thought** Max. Marks : 100
Time : 3 Hours

*Note : Out of 10 questions 5 questions will have to be attempted. There will be one Objective Type (multiple choice) question.*

**Political Ideas of :**

Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau, Mill, Marx.

**Books Recommended**

| | | |
|---|---|---|
| 1. | G.H. Sabine | A History of Political Theory. |
| 2. | W Ebenstein | Great Political Thinkers. |
| 3. | E.M. Sait, ed., | Masters of Political Thought. |
| 4. | E.Barker | Greek Political Theory. |
| 5. | S. Bhattacharya | Machiavelli |
| 6. | T.Bottomore, ed. | Dictionary of Marxist Thought. |
| 7. | J.Gray | Liberalism, Essays in Political Philosophy. |
| 8. | Q.Skinner | Foundations of Modern Political Thought. |
| 9. | L.Strauss and J. Cropsey, eds. | A History of Political Philosophy. |
| 10. | D. Miller, ed. | Encyclopaedia of Political Thought. |
| 11. | William T. Bluhm | Theories of the Political System. |

# ECONOMICS

Max. Marks : 100
Time : 3 Hours

**Unit-I Economic Development**

Concept of development and under development: Nature and characteristics of underdeveloped countries; vicious circle of poverty; determinants and obstacles of growth; capital formation in under developed countries; balanced and unbalanced growth.

Concept and types of planning in developing countries : The need for planning and pre-requisites for its success.

**International Development**

Inter-regional and International trade; Ricardo's comparative cost theory and the opportunity cost approach; The concept of balance of payments.

**Unit-II Population and Development**

Theory of Demographic transition; population as stimulant and obstacle to growth, strategies for controlling population growth: Economic status of women; nature and type of unemployment in developing countries.

**Public Finance**

Nature and scope of public finance; Taxation : Cannons, types, shifting and incidence of taxation; effects of taxation; taxable capacity; Public expenditure-cannons, causes of growth, public debt; Its role and burden.

**Unit-III Planned development in India**

Features and strategies of Economic planning in India, a critical review of our planned development since 1951; outline of the current Five-Year Plan for India; India's population problem and policy to control it. Agricultural Development and transformation in India; Green Revolution; IRDP; Industrial Development in India since 1951; Industrial Policy.

**Foreign Trade in India**

Volume, Composition and Direction of India's Foreign trade; balance of payment problems and policies to cover it; Export Promotion and Import Substitution.

**Indian Public Finance**

Tax Structure in India-draw-backs and remedies; sources of income and heads of expenditure of the Centre and State Governments; Centre-State financial relations; Latest Finance Commission report; Deficit Financing in India. Consumer Protection Act in India (Only elementary Ideas). Disequilibrium in B.O.P. - Concept, causes and measures of adjustment; Rate of Exchange; types and determination; multiple and PPP theory; objectives and methods of exchange control.

*Note : There will be ten questions in all including one compulsory objective type (Multiple choice) question carrying 40 marks. As far as possible objective type questions having Yes/No answers should be avoided to reduce unfair means. However, reasoning in answers in four or five lines must be emphasised. The remaining four questions will be of 15 marks each. There will be atleast three questions from each unit, out of which one question from each unit shall have to be attempted. Five questions to be attempted in all.*

**Books Recommended**


| | | |
|---|---|---|
| 1. | A.N. Aggarwal | Indian Economy, Vikas, N. Delhi. |
| 2. | A.K. Bagchi | The Political Economy of Under Development. |
| 3. | Parnab Bardhan | The Political Economy of Development |
| 4. | Ruddar Dutt & KPM Sundharam | Indian Economy, S. Chand, N. Delhi. |
| 5. | Alok Ghosh | Indian Economy, World Press, Calcutta. |
| 6. | G.M. Meier Robert E. Baldwin | Economic Development. |
| 7. | S.K. Misra & V.K. Puri | Indian Economy. |
| 8. | Benjamin Higgins | Economic Development. |
| 9. | C.P. Kindleberger | International Economic. |
| 10. | Question Bank in Economics | Association of Indian Univ. |
| 11. | M.C. Vaish & Sudama Singh | International Economics. |

# PUBLIC ADMINISTRATION
## Outlines of Test

| | | Max. Marks | Time |
|---|---|---|---|
| Option-I | Development Administration | 100 | 3 Hours |
| Option-II | Local Government and Administration in India | 100 | 3 Hours |

## Syllabus and Courses of Reading

Option-I **Development Administration** Max. Marks : 100
Time : 3 Hrs.

*Note : There shall be one objective type (multiple choice) question in the paper.*

Meaning and Scope of Development Administration. Concept of Welfare State and Constitution of India and the Directive Principles of State Policy.

Organisation of Planning Agencies. Planning Commission, National Development Council. State Planning Boards. Preparation of Five Year Plans. Centre State relation regarding Planning.

Social Welfare Administration in India-Programme of Centre and State Government's for the welfare of Scheduled Castes, Backward Classes, Women and Children. Central Social Welfare Board and Voluntary Agencies.

Rural Development Policy, Programmes and Administration. Planning and Development and Five Years Plans-an over all view.

*Note : 1. Ten questions in all will be set, out of which only five are to be attempted by the examinees.*

*2. Objective type (Multiple Choice) question shall be compulsory.*

### Books Recommended

1. Development Administration (ed) by V.A. Pai Panandikar.
2. Development Administration (ed) by S.P. Verma & S.K. Sharma.
3. Development Administration in India by S.K. Sharma.
4. Development Administration in India by S.L. Goel.

5. Development and Development Administration by R.K. Sapra.
6. Economic Administration in India by S.K. Sharma.
7. Social Administration in India by G.B. Sharma.
8. India's Development Experience by Tarlok Singh.
9. Bharat Kee Arthic Samasyain (Select chapters) by Dr. Chatu Bhuj Mamoria and Dr. S.C. Jain.
10. Bhartiya Krishi Kee Sankshipt Ruprekha-Published by Directorate of Economics and Statistics, Ministry of Agriculture and Rural Development. Govt. of India.
11. Five Year Plan (Govt. of India, Publications).
12. Development Administration by Swinder Singh.

Option-II **Local Government and Administration in India**

Max. Marks : 100
Time : 3 Hours

*Note : There shall be one objective type (multiple choice) question in the paper.*

Local Government-meaning and significance, Evolution of Local Government in India since 1882

Municipalities : Composition, functions, finances, personnel, general working of Municipal bodies with special reference to Haryana and Punjab State Government's control over Municipal bodies.

State Department and Directorate of Municipal bodies-organisation and functions.

Role of the Ministry of Health and Family Welfare as well as the Central Council of Local Self Government in regard to municipalities.

Municipal corporation: composition, functions and finances, Town and Metropolitan Planning in India.

District Administration : its features, purposes, problems, Deputy Commissioner-role and position. administrative changes in the context of planning and development at district level, Divisional Commissionery role and position. State Headquarters control over district administration.

Rural Local Govt. Zila Parishad, Panchayat Samiti, Gram Panchayat, Composition functions, finances personal. State Government's control over their working. Role of political parties in Panchayati Raj.

Role of State and Union Govt. with regard to panchayat Raj Institution in policy, assistance, training, and general control.

Problems of rural-urban relationship.

*Note : 1. Ten questions in all will be set, out of which only five are to be attempted by the examinees.*

*2. Objective type (Multiple Choice) question shall be compulsory.*

**Books Recommended**

1. Local Government in India by S.R. Maheshwari.
2. Bharat Mein Sthaniye Shasan by S.R. Maheshwari.
3. Local Government in India (Hindi) by K.K. Puri and G.S. Barara.
4. Bharat Mein Sthaniya Prasashan by Harish Chander Sharma.
5. Municipal Govt. & Administration in India by R.L. Khanna.
6. Municipal Administration in India by A. Avasthi.
7. Local Govt. in India by B.B. Gupta.
8. The Municipal Administration in India by R.K. Bhardwaj.
9. Local Government in India by M.P. Sharma.
10. Local Self Govt. in India by M.P. Sharma.
11. District Administration in India by S.S. Kehra.
12. Essays in Urban Govt. by Mohit Bhattacharya.
13. Panchayati Raj in India by R.L. Khanna.
14. Community Development and Panchayati Raj in India by S.C. Jain.
15. Local Government(ed.) by T.N. Chaturvedi and Abhijit Datta.

## PHILOSOPHY
### Outlines of Test

**Either of the following two options :**

There will be two optional papers. The students will have to opt only one paper out of two.

Option(i) Logic — Max. Marks : 100, Time : 3 Hours

Option (ii) Scientific Method — Max. Marks : 100, Time : 3 Hours

## Syllabus and Courses of Reading

Option(i) **Logic** Max. Marks : 100
Time : 3 Hours

*Note : (i) Ten questions in all will be set.*

*(ii) Out of the ten questions, one question will be of objective type.*

*(iii) The questions will be distributed equitably over all the units of the syllabus.*

*(iv) All questions will be of equal marks.*

*(v) Out of the ten questions, examinees will have to attempt only five questions.*

Unit-I Definition, Scope and importance of Logic: Kinds of Logic; Induction and Deduction.

Unit-II Language: Use of Language; defects of Language: vagueness and ambiguity; use and mention of words.

Unit-III Propositions : Nature and Traditional and Modern Classification.

Unit-IV Categorical Syllogism : Rules of validity and fallacies, use of Venn diagrams for testing validity of syllogism.

Unit-V Truth functional compound propositions; Truth functional operations, their symbols and Truth table-definitions; expressing compound Propositions in symbolic language.

Unit-VI Construction of truth tables; tautology, contingency and contradictions; testing validity and invalidity by truth table.

Unit-VII Proving invalidity of arguments; reduction and absurdum method for proving validity of arguments.

Unit-VIII Induction : Simple enumeration, scientific Induction and analogy.

Unit-IX Hypothesis : Nature and conditions of valid hypothesis, types of hypothesis, importance of hypothesis in Science.

Unit-X Explanation : Meaning and Nature of Scientific Explanation, types and limits of explanation.

**Books Recommended**

1. I.M. Copi Introduction to Logic.

2. Cohen and Nagel Introduction to Logic and Scientific Method.
3. B.L. Sharma Tarka Shastra Pravesh 3rd Edition.
4. S.N. Gupta Tarka Shastra Ki Ruprekha.
5. R.N. Sharma Tarka Shastra.
6. R.N. Sharma Pratikatmak Tark Shastra.

Option (ii) **Scientific Method** Max. Marks : 100
Time : 3 Hours

*Note : (i) Ten questions in all will be set.*

*(ii) Out of the ten questions, one question will be of objective type.*

*(iii) The questions will be distributed equitably over all the units of the syllabus.*

*(iv) All questions will be of equal marks.*

*(v) Out of the ten questions, examinees will have to attempt only five questions.*

Unit-I Definition, Scope, nature and Importance of Logic; Nature and Classification of Sciences.

Unit-II Fallacies Related to Language: Fallacy of Equivocation, Fallacy of Accent, Fallacy of Amphiboly, Fallacy of Composition, Fallacy of Division, Fallacy of Figure of Speech or Fallacy of Paronymous Terms, Fallacy of Accident.

Unit-III Propositions : Nature and its Traditional Classification; Categorical syllogism and its rules of validity. Deduction and Method of Science.

Unit-IV The Nature and Stages of Scientific Method: Induction: Simple enumeration and Scientific Induction.

Unit-V Observation and Experiment: Nature, Fallacies, Merits and Demerits, Observation and Experiment in Social Sciences.

Unit-VI Hypothesis : Nature, Function, Conditions of valid Hypothesis; confirmation of Hypothesis : verification and proof, rules of formulation of Hypothesis ; Analogy and Hypothesis.

Unit-VII Analogy and Induction : Argument from analogy, Factors determining the force of analogy, Scientific Induction; Popular view of cause, the scientific view of cause; plurality of causes; causation and Induction; Implication of the Law of Causation.

Unit-VIII Mill's Methods of Experimental Enquiry: Methods of Discovery and proof; Exposition of the Methods: Method of Agreement, Method of Difference, Joint Method of Agreement and Difference, Method of Concomitant Variation, Method of Residue; Evaluation of Mill's Methods as Methods of Discovery and Proof: Method of Agreement and Difference, Method of Concomitant Variation, Method of Residue.

The Inductive Syllogism. Uniformity of Nature and Law of Causation. Postulates or Grounds of Induction. Are Inductive Methods Deductive?

Unit-IX Scientific Explanation : What is Explanation ? Is Science Merely Descriptive ? Final Causes. Description and Explanation; Types of Explanation. Scientific and Popular Explanation and Limitations of .Scientific Explanation.

Unit-X Statistical Methods : The Need for Statistical Methods; Elementary idea of concepts of Statistical Averages, Measures of Dispersion and Measures of Correlation; Dangers and Fallacies in the use of Statistics.

**Books Recommended**


1. I.M. Copi — Introduction to Logic; Macmillan Publishing Co.
2. Cohen and Nagel — An Introduction to Logic & Scientific Method, Allied Publishers.
3. B.N. Kaul — A Course in Deductive Logic : Sultan Chand & Sons.
4. B.N. Kaul — Elements of Scientific Method : Sultan Chand & Sons.
5. R.N. Sharma — Tarka Shastra.
6. B.L. Sharma — Tarka Shastra Pravesh, 3rd Edition.

## DEFENCE STUDIES
### Outlines of Test

| Paper-I (Theory) | | Max. Marks | Time |
|---|---|---|---|
| Option-A | National Defence and Security | 70 | 3 Hrs. |
| Option-B | Inter-National Relations (Defence Aspects) | 70 | 3 Hrs. |
| Paper-II | Practical | 30 | 3 Hrs. |

### Syllabus and Courses of Reading

*Note : 1. There will be one theory paper of 70 marks and one paper of practical having 30 marks.*

*2. Two theory papers (Opt.-A and Opt.-B) have been prescribed. The candidates will offer any one of them.*

*3. Examiner should set at least ten questions including one objective type (multiple choice) question covering the entire syllabus. Candidates are required to attempt any five questions. No question is compulsory.*

*4. The candidates are required to pass separately both in theory and in practical papers.*

Paper-I (Option-A) **National Defence & Security** Max. Marks : 70 Time : 3 Hrs.

1. Meaning of National Defence and Security.
2. Essentials of National Defence :
   a) Geographical Factors, Location, Frontiers, Terrain Climate.
   b) Economic Factors Resources, industrial and Scientific development, transport and communication.
   c) Internal Political conditions.
   d) Defence Mechanism of Modern State.
3. India's Defence Problem from 1947 to date.
4. India's Defence Policy.
5. Nuclear Policy of India.
6. Civil Military relations of India.
7. Civil Defence :
   a) Definition.
   b) Need and Importance of Civil Defence.
   c) Organisation and measures of Civil Defence.
8. Military in Aid to Civil power.

9. Geostrategic Location of India.
10. Importance of Indian Ocean in India's Defence.
11. India's Relations with :-

a) Pakistan
b) China
c) Bangla Desh
d) Sri Lanka
e) Nepal
f) Afganistan

12. War Finance Taxation, Borrowing and Inflation.
13. Cost of War (Real cost of war)
14. Economic Mobilization.
15. Comparative study of defence budget of India and Pakistan.

**Books Suggested**

1. India's Defence Problem : S.S. Khera.
2. Defence without Drift; P.V. Rao.
3. India in the Search of Power : M.K. Chopra.
4. India the Indian Ocean : K.M. Panikar.
5. Rastriya Partiraksha : Maj. K. Kumar.
6. India's Quest for Security : L.J. Kevic.
7. Economic Problems of War and Peace : Robbins.
8. Defence Mechanism of the State : Dr. Nagender Singh.
9. Rastriya Partiraksha : B.M. Maliwal.
10. Economic and Commerical Geography of India : A Das Gupta.
11. India Nuclear Estate : Dhirender Sharma.
12. Dimensions of National Security by Prof. M.C. Maheshwari & Dr. Ashok Kumar Singh.

Option-B **International Relations (Defence Aspects)** Max. Marks : 70 Time : 3 Hrs.

**Group-A**

1. **Power** : Definition, methods of exercising power and the measurement of power.

2. **National Power** : Definition, elements of National power and their relative importance and the limitations of National Power.
3. **Ideology** : Its definition, types and the role of ideology in International Politics.
4. **International Morality** : Definition, International moral code pertaining to the protection of human life in peace and war times; Morality of the ruling elite; difference between the state morality and individual morality; its role in International relations.

**Group-B**

5. **Causes of the First World War** :
6. **The Peace Settlement 1919-23**

   The treaty of Versailles; the treaty of St. Germans, the treaty of Trianon; the treaty of neuilly, the treaty of Serves and the treaty of Lausanne; creation of New states.

7. **League of Nations** :

   Its purpose and organisation; league and the Problem of collective security, estimate of League's work and causes of the failure of the League.

8. **Causes of the World War-II**
9. **United Nations Organisation :**

   Its purpose and principle organisation, estimate of its work; its superiority over the League of Nations proposals, for strengthing it. UNO and the problem of collective Security merits and limitations of the UNO Collective system.

**Group-C**

The Theory of Balance of Power and the New Balance of Power; various meaning, evolution of the Balance of Power, methods of the Balance of Power.

11. **National Interest**

    Definition, National Interest and Foreign Policy, Security and National Interest.

12. **Foreign Policy of USSR (Current)**

**Books Recommended**

1. Polities Among Nations : H.J. Morgenthau.
2. Theoretical Aspects of International Polities : Mahender Kumar.
3. International Relation : Raghuvir Chakarvarty.
4. International Relation : Palmar and Perkine.
5. International Relation : D.N. Verma.

6. The Study of International Relation : Quincy Wright.
7. The Foreign Policy of Soviet Russia : M. Bellof.

**Paper-II Practical** Max. Marks : 30
Time : 3 Hrs.

| | |
|---|---|
| Practical Records | 4 Marks |
| Lecture | 4 Marks |
| Laboratory Work | 18 Marks |
| Viva | 4 Marks |

**Elementary Tactics Upto-Infantry Platoon Level**

1. Sand Model-Meaning, Importance and Preparing.
2. Detailed study of an Infantry Platoon including orgaisation weapons and equipments.
3. Study of field craft with reference to the following :
   a) Ground b) Cover c) Camouflage d) Concealment e)Observation.
4. Application of Fire-Fire control and Fire Control orders.
5. Tactical Formations-Section and Platoon.
6. Verbal order.
7. Patrol-Types and stages of Patrolling.
8. Battle procedure.
9. Military Appreciation of a situation in Attack and Defence.
10. Platoon in Attack-Types, Principles of defence, defence exercises.
11. Platoon Attack-Types, Principles of Attack, Stages of attack, Battle craft for platoon in attack and platoon attack exercises.
12. Military Message Writing
13. Ambush-Organisation of ambush party, Ambush operation.
14. Lecture on any theory topic.

*NOTE :The course mentioned above shall be carried out on sand models with a view to prepare candidates upto command of an Infantry platoon. Atleast five exercises of platoon in attack and five exercise of platoon in defence be carried out.*

## PSYCHOLOGY
### Outlines of Test

| | Max. Marks | Time |
|---|---|---|
| Paper-I Abnormal Psychology | 70 | 3 Hrs. |
| Paper-II Practical | 30 | 3 Hrs. |

## Syllabus and Courses of Reading

**Paper-I Abnormal Psychology** Max. Marks : 70
Time : 3 Hrs.

*Notes :*

1. *In total ten questions including one objective type would be set in such a way that there are three questions each from Units II & III and two questions each from Units I & IV.*
2. *Total number of questions to be attempted-5 (at least one question from each Unit).*
3. *One objective type multiple choice (four choices) question would be set from any of the Units. It will, however, have, atleast seven sub-parts.*

**Unit-I**

Introduction : Concept of normalcy and abnormalcy, Criteria of abnormalcy.

General Causes of abnormal behaviour, Biological, Psychological and Socio Cultural.

Structural aspects of Freudian theory and defence mechanisms.

**Unit-II**

Classification : Need for classification, DSM system of classification DSM-III.

Neurosis (Symptoms, Actiology and treatment); Phobic disorder, obsessive-Compulsive, generalized anxiety conversion disorder dissociative disorders.

Psychosomatic disorders : Hypertension and peptic ulcers.

**Unit-III**

Psychotic disorders (symptoms, Actiology and treatment). Functional Psychosis-Depressive disorders, manic depressive Psychosis Schizophrenia.

Drug Abuse : Alcohol, Narcotics-
Stimulants-amphetamines
Hallucinogenis-LSD
Marujuna-hashish

**Unit-IV**

Assessment : Need, types, Psychological assessment, case history interview, observation.

Treatment : Psychotherapies, Psychoanalysis and Behaviour Therapy. Physical and Chemotherapies : ECT, Antipsychotic drugs Anti-anxiety drugs, Anti-depressant drugs.

*Note : A short visit to any nearby mental hospital/Psychiatric ward would be desirable.*

**Books Recommended**


1. Carson, R.C., Butcher, J.N., and Coleman, J.C. (1988) Abnormal Psychology and Modern Life Illinois : Scott, Foresman
2. Neale, J.M. and Davidson, G.C. (1978) Abnormal Psychology : An Experiment Clinical approach, New York : John Willey.
3. Srivastav, D.N. (1985) Adhunik Asamanya Manovigyan, Sahiytya Agra.


**Paper-II** **Practicals** Max. Marks : 30
Time : 3 Hours

**List of Practicals in Abnormal Psychology**

*Notes : 1. Any ten to be performed in the Class room.*

*2. One practical to be performed by the students at the time of examination :*

1. Interview.
2. Case study.
3. EPI/MPI
4. Projective test-TAT.
5. Projective test-Sentence completion/Word association.
6. Projective test-Research Inkolot test.
7. Adjustment inventory.
8. Frustration test.
9. Defence Mechanism test.
10. Anxiety scale.
11. Memory scale.

Sixteen Personality Factor Questionnaire.

**Books Recommended**


Anastasi, A. (1982) Psychological Testing New York: Macmillan.

## MUSIC (VOCAL)
### Outlines of Test

| | Max. Marks | Time |
|---|---|---|
| Paper-I (Theory) | 40 | 3 Hrs. |
| Paper-II (Practical) | 60 | 20 to 30 mts. |

*Note : a) Harmonium will not be allowed as accompaniment in Vocal Music.*

*b) The candidate will be required to sing Vilambit and Drut Khayal in Ragas of the examiner's choice.*

### Syllabus and Courses of Reading

**Paper-I (Theory)** Max. Marks : 40
Time : 3 Hours

a) Notation of the Talas and the compositions of the prescribed Ragas is compulsory :

Ragas : 1) Deshkar 2) Gaud Malhar 3) Yaman Kalyan 4) Ramkali 5) Kamod

b) Contribution of modern Music Scholars and Musicians toward the development of Indian Music.

c) Origin and development of Notation Systems alongwith its Merits and Demerits.

d) Biographical sketches and contributions of the following musicians laying emphasis on the quality of their Gayan Shailies :-

Krishan Rao, Shankar Pandit, D. V. Paulaskar, Ustad Amir Khan Kesar Bai.

e) An Essay related to the following topics :-
"Teaching of Music through Gharana Prampra in Music Institutions and in Universities.

f) Definition of the prescribed ragas and talas including the knowledge of the ragas of T.D.C.H.

**Paper-II (Practicals)** Max. Marks : 60
Time : 20 to 30 mts.

a) One Drut Khyal with Alaps, Boltans and Tans in each of the following Ragas:

1) Deshkar 2) Gaud Malhar 3) Ramkali 4) Yaman Kalyan 5) Kamod

b) Two slow Khayals with extempore Alaps and Tanas in different Talas in any of the prescribed Ragas.

c) One Dhrupad and one Dhamar with Dugun, Tigun and Chaugun.

d) Ability to demonstrate by hands the following talas in Dugun, Tigun and Chaugun Layakaries : Dhaman, Sul Tal, Teen Tal, Jhaptal, Kehara.

e) One Tarana with simple, technical Shailies.

f) Tuning of tanpura.

## MUSIC (Instrumental)
## Outlines of Test

| | Max. Marks | Time |
|---|---|---|
| Paper-I (Theory) | 40 | 3 Hours |
| Paper-II (Practical) | 60 | 20 Mts. |

*Note : The candidates have the Option to take any one of the following Instruments.*
*Sitar, Sarangi, Sarod, Dilruba, Violin, Bansuri, Shahanai and Tabla.*

### Syllabus and Courses of Reading

Paper-I (Theory) Max. Marks : 40
Time : 3 Hours

a) Notation of the talas and the compositions of the prescribed ragas is compulsory.

**Ragas :** 1) Main ki Malhar 2) Tilang 3) Todi
4) Pooriya-Dhansari 5) Tilak Kamod 6) Hindol.

b) Contribution of modern music scholars and musician towards the development of Indian Music.

c) Origin and development of Notation System, alongwith its merits and demerits.

d) Biographical sketches and contributions of the following musicians Laying emphasis on the quality of their Vaddan Shallies. Dr. Lal Mani Mishra, Bismilah Khan, Ali Akbar Khan, Nikhil Banerjee.

e) An Essay relates to the topic :- "Role of Music in International Cultural Exchange".

f) Description of the prescribed ragas and talas definition of the prescribed ragas, including the knowledge of the ragas of T.D.C.H.

**Paper-II (Practical)** Max. Marks : 60
Time : 20 mts.

a) One Drut gat with Alap, Toras and Jhala in each of the following ragas.

1) Main Ki Malhar 2) Tilang 3) Todi 4) Pooriya Dhaneshri
5) Tilak Kamod 6) Hindols.

b) Two slow Gats with extempore Alaps and toras in any of the prescribed Ragas.

c) One Dhun in any Raga other than Bhairvi.

d) One Gat in Jhaptal on Rupak Tal in Medium Tempo with toras in any of the prescribed ragas.

e) Ability to demonstrate by hands the following talas in Dugun. Tigun and Chaugun Layakaries :
Dhamar, Sultal, Teen tal, Jhaptal and Kehrava on Tabla.

## MUSIC (Tabla)
## Outlines of Test

| | Max. Marks | Time |
|---|---|---|
| Paper-I (Theory) | 40 | 3 Hours |
| Paper-II (Practical) | 60 | 30 Minutes |

## Syllabus and Courses of Reading

**Paper-I (Theory)** Max. Marks : 40
Time : 3 Hours

a) Evaluation of Tala and Tala-yantras.

b) Popular Gharanas of Tabla or Pakhawaj Vadan.

c) Comparison of Uttari and Dakshini tal system.

d) Life History of the following:
Kadar Baksh, Pandit Chatur Lal, Parvat Singh, Allahrakha.

e) Importance of Tala in Music.

**Paper-II (Practical)** Max. Marks : 60
Time : 30 minutes

a) Tals prescribed-Ada, Chautal, Tiwara, Dhamar, Mattal Swari and Tappa Tals including the Tals prescribed in the previous courses.

b) Knowledge of Dholak and Mridang.

c) Playing of all the prescribed tals with Vocal and Instrumental performances as well as sole item.

*Note : The students should be able to play teental and jhaptal with efficiency for fifteen minutes each.*

## INDIAN CLASSICAL DANCE (Kathak)
### Outlines of Test

| | Max. Marks | Time |
|---|---|---|
| Paper-A (Theory) | 40 | 3 Hours |
| Paper-B (Practical) | 60 | 20 Minutes |

### Syllabus and Courses of Reading

**Paper-A (Theory)** Max. Marks : 40
Time : 3 Hours

1. Detailed study of Nayak-Nayaka Bheda.
2. Knowledge of Dakshni and Hindustani Taal Padhati.
3. History of Kathak Dance and its development since Vedic Period to 20th Century.
4. Knowledge of the techniques required for composing and India Ballet (Nritya Natika).
5. Biographies and contribution of the following dancers in their field of specilisation.
   i) Udeyshankar
   ii) Sitara Devi
   iii) Rukmani Arundal
   iv) Birju Maharaj
   v) Narayan Parsad
6. Knowledge of the Role of Kavit and Thumri in Kathak.
7. Knowledge of the accompaniment values of an Orchestra in Indian ballet (Nritya Natika)
8. Knowledge of the main folk dances of different states of the country with their origin, constumes and background Music.
9. Detailed study of Abhinaya with all its variations.

*Note : 1.Eight questions set out of the syllabus as given above.*
*2.One question on notation is compulsory.*

**Paper-B (Practical)** Max. Marks : 60
Time : 20 minutes

1. A systemaic performace of Teen Taal.
   a) Advance Tatkar, Paltas, Tihais of different varieties.

b) Amad with all its types.

c) Advanced Paran, Chakardar Paran, Jati Paran, Parmala, Farmaishi Paran.

d) Kavit, Vandana.

e) Gat Bhav on any one of the following Panghat ki Cher Char; Holi, Makhan Chori.

2. Ability to dance skillfully in the following taals:
   a) Dhamaar, Swari (15 Matra), Jhaptal, Ektal.
   b) Thhat
   c) One Amad
   d) Four Advanced Paran
   e) Two Chakardar Paran
   f) One Kavit
   g) Tatkar with Tihai
3. Ability to demonstrate any Folk Dance.
4. Ability to compose Dance on a theme (to be given during practical examination).
5. Ability to do PADHANT in all the Taals included in the syllabus.
6. Ability to play Tatkars and Nagmas of all the Taals included in the syllabus.
7. Practical demonstration of all the mudra learned.
8. Demonstration of Tatkar in Thha, Dugun, Chogun in the following tals :

Laxmi (18) Ashtmangal (22)

*Note:Distribution of marks in practical will be as under:*

| | | |
|---|---|---|
| a) | Choice of the students | 15 marks |
| b) | Choice of the Examiner | 20 marks |
| c) | Thheka on Tabla | 05 marks |
| d) | Playing Nagma | 05 marks |
| e) | Padhant | 10 marks |
| f) | Viva | 05 marks |

# ART
## Outlines of Test

| | Max. Marks | | Time |
|---|---|---|---|
| Paper-I History and Appreciation of Art | 30 | | 3 Hours |
| A) History of Art | 18 | 30 | |
| B) Application of Art | 12 | | |
| Paper-II(Practical) Composition | 20 | | 6 Hours |
| Paper-III(Practical) Poster | 20 | | 6 Hours |
| Paper-IV (Practical) Life Drawing | 20 | | 6 Hours |
| Sessional Work | 10 | | |

## Syllabus and Courses of Reading.

**Paper-I History and Appreciation of Art** Max. Marks : 30
Time : 3 Hours

**A) History of Art** Marks:18

The Art of the Renaissance-the Art of the Baroque, Rococo and Neo-Classicism Modern Movements, Impressionism, Expressionism, Cubism, Surrealism, constructivism.

**B) Appreciation of Art** Marks:12

General principles of Art-appreciation-main qualities of Art technical aspects of art-subject matter and expressive content of art-beauty in Art.

Appreciation of some celebrated specimens of Art-

(a) Sarnath Budha image (b)Padmapani Avalokitesvar of Ajanta (c)The Mother and Child of Ajanta (d)Natraj image of Shiva (e) Death of Inayat Khan (Mughal) Painting (f)Ravana shaking Mt.Kailash (Ellora) (g)Krishana and Radha (Krishangadh Painting) (h)Krishna quelling Serpent Kaliya (Pahari, Kangra painting).

**Paper-II(Practical) Composition** Max. Marks : 20
Time : 6 Hours

Candidates should paint and compose village scenes from the memory and get the effects in colours, light and shade. Total effect of the composition should be bold.

**Paper-III(Practical) Poster** Max. Marks : 20
Time : 6 Hours

Poster should be bold lay-out, using flat colours
Medium-Poster colours
18"x26"

*Note: The thinking of Mahatma Gandhi, Vinobha Bhave and Prohibition Policy be included in Poster Making.*

**Paper-IV(Practical) Life Drawing** Max. Marks : 20
Time : 6 Hours

Simply study of male and female figures in action motionless position.

Students are required to study proportion size : Half-Sheet

Sessional Work. 10 Marks

1. Sketches 50
2. Composition 04
3. Poster 04
4. Life Drawing 04

*Note: The students must submit specimens of his/her work done during the course duly attested by the teacher concerned. The pieces of work include drawing paintings related to the study executed by the students and also private candidates are required sessional work duly attested by the teacher concerned.*

*Note 1. Each theory paper shall be divided into two sections A & B, Section-A will carry six Questions out of which the candidate shall be required to attempt any three. Section B will contain four questions out of which the candidate will be required to attempt any two questions. All the questions shall carry equal marks.*

*2. Questions are to be set as to test the broad survey of the topics and not minute details.*

## CLAY MODELLING
### Outlines of Test

| | Max. Marks | | Time |
|---|---|---|---|
| Paper-I (Theory) History and Appreciation of Art | 30 | | 3 Hours |
| A) History of Art | 18 | 30 | |
| B) Appreciation of Art (including Canon of Indian Art) | 12 | | |

| | | |
|---|---|---|
| Paper-II (Practical) Life Study | 30 | 6 Hours |
| Paper-III (Practical) Imaginative Composition | 30 | 6 Hours |
| Sessional Work | 10 | |

**Syllabus and Courses of Reading**

**Paper-I (Theory) History and Appreciation of Art** Max. Marks : 30
Time : 3 Hours

**A) History of Art** Marks:18

The Art of the Renaissance-the Art of the Baroque, Rococo and Neo-Classicism Modern Movements, Impressionism, Expressionism, Cubism, Surrealism, Constructivism.

**B) Appreciation of Art** Marks:12

General Principles of Art appreciation-main qualities of Art technical aspects of art, subject matter and expressive content of art-beauty in Art.

Appreciation of some celebrated specimens of Art-

a) Sarnath Budha Image.

b) Padmapani Avalokitesvara of Ajanta.

c) The Mother and Child of Ajanta.

d) Natraj image of Shiva.

e) Death of Inayat Khan (Mughal) Paintings.

f) Ravana shaking Mt. Kailash (Ellora).

g) Krishan and Radha (Krishanagadh Painting)

h) Krishan quelling Serpent Kaliya (Pahari, Kangra Painting)

**Paper-II(Practical) Life Study** Max. Marks : 30
Time : 6 Hours

Life Study Half size:
Knowledge of waste moulding, casting and calaving.

**Paper-III(Practical) Imaginative composition.** Max. Marks : 30
Time : 6 Hours

Clay modelling as medium of imaginative presentation of abstract compositions.

*Note: The thinking of Mahatma Gandhi, Vinobha Bhave and Prohibition Policy be included.*

Sessional Work. 10 Marks

Three each specific model with practical paper IInd and IIIrd.

*Note: The students must submit specimens of his/her work done during the course duly attested by the teacher concerned. The pieces of work include drawings, paintings related to the study executed by the students and also private candidates are required sessional work duly attested by the teacher concerned.*

*Note 1. Each theory paper shall be divided into two sections A & B. Section-A will carry six questions out of which the candidates shall be required to attempt any three. Section B will contain four questions out of which the candidate will be required to attempt any two questions. All the questions shall carry equal marks.*

*2. Questions are to be set so as to test the broad survey of the topics and not minute details.*

## HISTORY OF ART
### Outlines of Test

One paper carrying 100 marks of 3 hours duration.

### Syllabus and Courses of Reading

A brief survey of European painting and sculpture upto 1850 A.D. The Background, Prehistoric and early paintings from the East. Greek Art, Roman Art, Early Christian and Byzantine Art, Romanesque and Gothic.

The Renaissance the succeeding trends : Mannerism Baroque Rococo, Neo-Classicism and Romanticism.

*Note 1. Each theory paper shall be divided into two sections A & B. Section-A will carry six questions out of which the candidates shall be required to attempt any three. Section B will contain four questions out of which the candidate will be required to attempt any two questions. All the questions shall carry equal marks.*

*2. Questions are to be set so as to test the broad survey of the topics and not minute details.*

## SOCIOLOGY

**Optional: Paper-I Marriage and Family in India** Max. Marks : 100
Time : 3 Hours

**I. Conceptual:** Issues Indian social structure: its components and characteristics: Unity and diversity.

II. **Family:** Concept and functions of family; Household dimensions of family; types of family; conjugal, extended and joint family; disintegration of family; its causes; future of family.

III. **Marriage:** Meaning and types of marriages; Rules of Mate Selection stability of Marriage; symmeterical and Asymmetrical exchange; Patterns of marriage among Hindus, Muslims and christians; way of acquiring mates among the tribals.

IV. **Kinship:** Inheritance, succession and descent; North Indian and South Indian Kinship patterns.

V. **Status of Women:** Gender-inequality: Marital-adjustment: working mothers; conjugal Tension and violence.

*Note: Ten questions will be set, two questions from each section. The candidates will be required to attempt five questions in all, selecting one question from each section.*

**References**


| | |
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| Meir Away | Marriage |
| Shah, A.M. | The household dimensions of family in India, Orient Longman, Delhi; 1973. |
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| Bose N.K. | Tribal life in India, National Book Trust, New Delhi, 1971. |
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| Karve, I. | Kinship organizatioin in India, Asia Publishing House, Bombay, 1958. |
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| Bose, N.K. | The Structure of Hindu Society (Tr. by Andra Betwella) Orient Longman, New Delhi, 1975. |
| Mondelbaam D.O. | Society in India, University of California, Berkeley, 1928. |
| Sharma K.L. | Indian Society, NCERT, Delhi, 1987. |
| Dube, Leela | Sociology of Kinship, Popular Prakashan Bombay 1974. |
| Madan T.N. & Majumdar | An Introduction to Social Anthropology. Asia Publishing House, Delhi, 1980. |
| Sharma K.L. | Indian Society, N.C.E.R.T. New Delhi, 1990. |


**Optional Paper-II Social Change :** Max. Marks : 100
Time : 3 Hours

I. **Concept and forms of Social change:** Evolution, progress, revolution, development and social change.

II. **Theories of Social Change:** Linear, Cyclic, fluctuation, conflict.

III. **Factors of Social change:** Demographic, environmental Technological, Economic, Educational, Cultural, Religious, Legislative.

IV. **Processes of Social Change in India:** Sanskritization, Urbanization, Westernization, Secularization, Industrialization, Modernisation, Parochialization & Universalization.

V. **Social Movements in India:**
   (a) Freedom struggle in India and Haryana.
   (b) Peasant Movements, Social Reform Movements and Sarvodaya Movements (Mahatma Gandhi and Vinobha Bhave)

*Note: Ten questions will be set, two questions from each section. The candidates will be required to attempt five questions in all, selecting one question from each section.*

**References**


| | |
|---|---|
| Dube, S.C. | Contemporary India & its Modernization, Delhi Vikas, 1974. |
| La Piere, R.T. | Social Change: Mc Graw Hill Book Co.; New York, 1965. |
| Moore, E.W. | Social Change, Prentice-Hall Book Co.; New Delhi 1965. |
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| Singh, Yogendra | Social Stratification and change, Delhi Manchar Book Service, 1977. |
| Singh, Yogendra | Modernization of India Tradition, Thomson, Delhi 1973. |
| Parson, T. | Societies Evolutionary & Comparative Perspective Prentice Hall, Englewood Cliffs, New Jersay 1966. |
| Hagen, E.E. | On the theory of Social Change, The Dorsey Press Illinois, 1963. |
| Nordskog, J.E. | Social change, Mc. Graw Hill, New York, 1969. |
| Loomis, C.P. | Social-Eco-Change and Religious Factors in India, Affiliated East-West Press New Delhi. |
| Kappuswamy, B. | Social Change in India, Vikas Delhi, 1972. |
| Srinivas, M.N. | Dimensions of Social Change in India, Bombay Allied Publishing House, 1977. |
| Mathur, Hari Singh | Anthropology in the Development Process, Vikas Publishing House, 1977. |
| Bisaria, S. and Dinesh Sharma | Social Change, NCERT, New Delhi. |


**Optional: Paper-III Social Problems** Max. Marks : 100
Time : 3 Hours

I. Conceptual and Theoretical Issues: Nature and meaning of Social Problems; Anomie and Deviance: Differential Association Theory (Sutherland): Labelling Theory (Becker).

II. Ecnomic Problems; Poverty, Beggary Un-employment and bonded labour.

III. Social Problems: Dowry, Prostitution, Youth unrest, regionalism Casteism, communalism, corruption, drug addiction alcoholism and Prohibition, crime, juvenile, delinquency and Acquired Immune Deficiency Syndrom(AIDS).

IV. Problems of Weaker Sections: Descremination and atrocities on Scheduled Caste, Scheduled Tribes, Backward Castes, Other Backward Castes and Women.

V. Social Lagislation: Legal measures to eradicate social problems including 'Consumer Protection Act', Environmental Degradation and Legislation.

*Note : Ten questions will be set, two questions from each section. The candidates will be required to attempt five questions in selecting one question from each unit.*

**References :**


| | |
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| Merton, R.K. & M.A. Hiabe(eds.) | Contemporary Social Problems, Marcourt Brace & World, New York. |
| Delhi School of Social Work | The Begger Problem in Metropolitan Delhi. |
| Chandra Sushil | Sociology of Deviation in India. Allied Publishers Delhi 1971. |
| Mehta Prayag | The Indian Youth Somaiya Publication, Bombay, 1971. |
| Paul M.C. | Dowry and position of women, Inter-India Publication Delhi |
| Jeerdar | Prostitution, D. Publications, New Delhi. |
| Joshi & Joshi | India Social Scene, Deep and Deep Publishers Delhi-1989. |
| Problems of India Society | Published by NCERT, New Delhi. |
| Memoria C.B. | Social Problem and Social Disorganisation in India Kitab Mahal Allahabad, 1981. |
| Nagla B.K. | Youth unrest in contemporary Indian Society in Journal of Higher educatior 1989, Vol 8 No. 3 289-92. |
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| Srinivas, M.N. | Dimensions of Social Change in India, Bombay Allied Publishers, 1977. |
| Mathur, Hari Singh | Anthropology in the Development Process, Vikas Publishing House 1977. |
| Bisaria, S. and Dinesh Sharma | Social Change, NCERT, New Delhi. |


## ANTHROPOLOGY

### Outlines of Test

| | M.M. | Time |
|---|---|---|
| Paper-I (Theory) Human Genetics and Biochemical Anthropology | 50 | 3 Hrs. |
| Paper-II(Theory) Human Ecology | 50 | 3 Hrs. |
| Paper-III(Practical) | 50 | 3 Hrs. |

*N.B. 20% of marks in Practical are reserved for laboratory records and Viva-Voce.*

### Details of Course Content

Paper-I Human Genetics and Biochemical Anthropology

M.M. : 50
Time : 3 Hours

1. Physical basis of inheritance, chemical nature of gene, structure of DNA, Role of DNA and RNA in protien synthesis, genetics code.
2. **Mendalis in Man :** Pedigree analysis, Linkage and crossing over, Sex linkage.
3. **Genetics Markers in blood :** ABO and Rh blood Group system.
4. **Dermatoglyphics :** Dermal ridge configuration on fingers and palms, classification and inheritance.
5. **Population Genetics :** Hardy-weinberg law, Selection, mutation genetics drift, migration, in breeding and outbreeding.
6. **Application of Physical Anthropology :** Human genetics, Forensic Anthropology and Medicine (including growth, nutrition and sports).

**Books Recommended :**


1. Harrison, H(Ed.) Human Biology.
2. Das, B.M. Outlines of Physical Anthropology.
3. Comas, J Manual of Physical Anthropology.

4. Lasker, G.W. Physical Anthropology.
5. Buetner Janusch, J. Origins of Man.
6. Curt Stern Principals of Human Genetics.
7. Winchester, M.A. Genetics.
8. Race, R.R. and Sanger. R. Blood groups in Man.
9. Gates, R. Human Genetics.
10. Frankilin C.A.(Ed.) Modi's Medical jurisprudence and Technology.

## Human Ecology

Paper-II M.M. : 50
Time : 3 Hours

Part-A**Group differentiation and adaptation.**

1. **Human Ecology** : definition, objectives and relationship with other disciplines.
2. **Adaptation and acclimitization** : individual and population adaptation, genetic and non-genetic factors (infectious/non-infectious/genetic diseases or abnormalities).
3. Adaptation to varied ecological conditions : climate high, altitude hot desert, and nutrition.
4. **Human Growth** : Pre-natal and post-natal growth with special reference to pubertal growth spurt. Factors affecting growth : genetic, nutritional and endoctrines.

**Part-B Races**

5. **Race** : Definition and contemporary concept of race-Biologic and cultural.
6. **UNESCO statement on race** : critical appraisal.
7. **Primary Races of Man** : Distribution and Physical characters of three major groups.
8. **Differences in Physical characters : Skin**, eye, hair, nose, head and variations in other bodily proportions of three major races.
9. **Ethnic elements in Indian populations.**
10. Distribution of ABO blood groups in various population groups.

**Book Recommended**

1. Das, D.M. Outlines of Physical Anthropology.

| | | |
|---|---|---|
| 2. | Harrison, G.H. (Ed.) | Human Biology |
| 3. | Hooton, E.A. | From the Age. |
| 4. | Buettner Jaunisch, J | Origins of Man |
| 5. | Buettner Jaunisch, J | Physical Anthropology a Perspective. |
| 6. | Lasker, C.W. | Physical Anthropology |
| 7. | UNESCO | Race question in Modern Science |
| 8. | Victor Barmow | Physical Anthropology and Archaeology |
| 9. | Tanner, J.M. | From Foetus to Man |
| 10. | Falkner, F and Tanner, J.M. | Human Growth |
| 11. | Garn, S.M. et.al. | Races. |


**Paper-III(Practical)** Max. Marks : 50
Time : 3 Hours

1. Sociology: Determination of $A^1$ $A^2$ BO and Rh (Test with anti Rh) blood groups of 15 subjects.
2. Dermatoglyphics: Identification formulation and analysis of finger and plam prints of 15 subjects. Statistical treatment of data collected.
3. Other genetic variables: Colour blindness, PTC testing ability.

## GEOGRAPHY
### Outlines of Test

| | | Max. Marks B.A. | Max. Marks B.Sc. | Time |
|---|---|---|---|---|
| Paper-I | Geography of India | 40 | 60 | 3 Hours |
| Paper-II | Human Geography | 20 | 30 | 3 Hours |
| Paper-III | (Practical) Statistical Method and Surveying | 40 | 60 | 4 Hours |

### Syllabus and Courses of Reading

**Paper-I Geography of India** Max. Marks :
B.A. 40
B.Sc. 60
Time : 3 Hours

1. Structure and relief, climate and climatic regions, the problem, droughts and floods, soils and natural vegitation.

2. Population growth and distribution patterns, Age, Sex, Composition, fertility and mortality and rural/urban migration in India.
3. Nature and trends in urbanization.

Part-II

1. Agriculture land-use patterns, a detailed study of the distrubution and production of wheat, rice sugarcane; cotton, tea, modes of irrigation, regional imbalances in levels of Agricultural development.
2. Natural resources:-Fisheries, Mineral resources, iron ore, manganese, mice and energy resources : their production and future prospects.

Part-III

1. Industries : Sugar, Cotton textiles, paper; iron and steel fertilizers, industrial regions.
2. Regional imbalances in levels of industrial development.
3. Comparative study of different modes of transportation roads, railways and inland waterways.
4. India's foreign trade.

*Note :- There will be 10 questions in all; three questions each on part-I and II and four questions on part-III. Candidates will be required to attempt 5 questions in all. selecting at least one from each part.*

Paper-II Human Geography

| Max. | Marks | Time |
|---|---|---|
| B.A. | B.Sc. | |
| 20 | 30 | 3 Hrs. |

Part-I

1) Nature and scope of settlement Geography.
2) Factors Favouring linear, nucleated and dispersed settlements in India with special reference to south, western and central Haryana.

Part-II

Theories of special organization of settlements--an introduction to Christaller's central placy theory.

Part-III

1) Nature and scope of urban Geography.

2) Patterns and processes of urbanization in developed and developing countries.

Part-IV

1) Origin of cities : The pre-industrial, colonial. Functional classification of town.

2) Urban morphology the concentric, sectoral and multiple nuclie theories. The nature of the C.E.D. in western and non-western countries.

*Note : The question paper shall contain 8 questions in all, two in each part. Candidate shall attempt four questions in all selecting at least one question from each part.*

**Paper-III (Practical) Statistical Methods and Surveying**

| Max. Marks | | Time |
|---|---|---|
| B.A. | B.Sc. | |
| 40 | 60 | 4 Hrs. |

a) Statistical Methods

i) Mean, Median and Mode.

ii) Standard Deviation.

iii) Co-efficient of Variability.

iv) Co-efficient of Correlation.

b) Surveying

Theory and practice of prismatic compass survey, sketch and traverse (Open and close) (four exercises).

Note:-

Practical notebook for exercises on statistics shall prepared (minimum 8 exercises).

**Laboratory Work**

a) Three questions in statistics will be given and candidates will be required to atttempt two questions (15/22½) marks

b) Exercises on surveying with prismatic compass will be given (15/22½) marks

c) Practical record and viva-voce (10/15) marks

## ANCIENT INDIAN HISTORY, CULTURE & ARCHAEOLOGY

**Outlines of Test**

| | | |
|---|---|---|
| Option-I | Indian Thought and Culture | Max. Marks : 100 |
| | (From earliest times to C. 1200 A.D.) | Time : 3 Hrs. |
| Option-II | Indian Archaeology | M.M. : 100<br>Time : 3 Hours |

**Syllabus and Courses of Reading**

| | | |
|---|---|---|
| Option-I | **Indian Thought and Culture** | Max. Marks : 100 |
| | (From earliest times to C. 1200 A.D.) | Time : 3 Hrs. |

Note : i) At least ten questions shall be set in the paper spread over the entire syllabus more or less proportionately, out of which the candidates shall be required to attempt five questions in all. All questions shall carry equal marks.

ii) There shall be one objective type question in the paper. This question will be divided into three sections, Section-I will have snap short type question of 10 marks. Section-II will have multiple choice questions of 5 marks. Section-III will have matching type questions of 5 marks.

The fundamentals of Indian Culture; religious beliefs and practices of the Indus Valley people; Vedic culture, religious and Spiritual thought; The Upanisadic thought. The teachings of Mahavira and Buddha; the main characterstics of Indian Philosophy, Puranic Hinduism : Vaisnavism and Seivism : A survey of India, cultural contacts with outside world.

**Books Recommended**


1. Lunia B.N. : भारतीय कौशल संस्कृति का इतिहास, आगरा, 1927
2. Dinkar, Ramdhari Singh : संस्कृति के चार अध्याय, पटना, 1977
3. Damodaran, K. — Indian Thought, New Delhi, 1967.
4. Chatterji and Datta : — Introduction to Indian Philosophy.
5. Jairazbhoy : — Foreign influence in Ancient India, Bombay 1963.
6. Roy A.K. — A History of Jains, New Delhi, 1984.
7. Kane P.V. — History of Dharamsatra Poona 1969.
8. A.K. Warder — Indian Budhism, Delhi 1870.
9. Wagle, N. — Society at the time of Buddha Bombay, 1966.

10. Banerjee, J.N. Puranic and Tantric religion.

Option-II **Indian Archaeology** Max. Marks : 100

Time : 3 Hrs.

*Note :* 1. *At least ten questions shall be set in the paper spread over the entire syllabus more or less proportionately out of which the candidates shall be required to attempt five questions in all. All questions shall carry equal marks.*

2. *There shall be one objective type question in the paper. This question will be divided into three sections. Section-I will have snap short type questions of 10 marks. Section-II will have multiple choice questions of 5 marks. Section-III will have matching type question of 5 marks.*

**Archaeology** : Its history and importance; relationship with other disciplines; and introduction to site surveying and excavations.

**Epigraphy :** Its Importance as source of Ancient Indian History, nature of subject matter of inscriptions written/engraved on different types of material; origin of Brahmi script.

**Numismatics** : Coins as a source of ancient Indian history; origin, antiquity and early history of coins in India.

**Art & Achitecture :** Aim and functions of Art : Origin and development of image, worship in India, origin and development of architecture temples and staps.

**Books Recommended**


१ रामनिहारजन भारतीय कला का अध्ययन, दिल्ली, १९७१ ।

२ उपाध्याय वासुदेव प्राचीन भारतीय मुद्रायें पटना, १९७१ ।

३ खरे करुणा प्रतिमा विज्ञान, लखनऊ, १९७७ ।

४ मजूमदार प्रभात कुमार भारत के प्राचीन अभिलेख दिल्ली ।

५ उपाध्याय, वासुदेव प्राचीन भारतीय अभिलेख, पटना १९७० ।

६ पुरी बैजनाथ पुरातत्व विज्ञान ।

7. Daniel, Glyn. A short history of Archaeology, London, 1981.

8. Krudson, S.J. Culture in retrospect : An introduction to Archaeology, Chicago 1978.

9. Khanna Amarnath Archaeology of India, Delhi, 1981.

## MATHEMATICS

### Outlines of Test

| | | Max. Marks | | Time |
|---|---|---|---|---|
| | | B.A. | B.Sc. | |
| Paper-I | Real Analysis | 50 | 75 | 3 Hours |
| Paper-II | Vector Calculus Hydrostatics and linear Algebra | 50 | 75 | 3 Hours |

### Syllabus and Courses of Reading

| Part-I | **Real Analysis** | Max. Marks | | Time |
|---|---|---|---|---|
| | | B.A. | B.Sc. | |
| | | 50 | 75 | 3 Hours |

Unit-I

Denumerable and non-denumerable sets. Denumerability of integers and rationals and non denumerability of real numbers. Properties of the real number system as a complete ordered field. The concepts of bounds, neighbourhoods, interior points, isolated points and limit pints in R. Open and closed sets with their properties in R. Bolzano-Weiorstrass theorem. Heine-Borel Theorem.

UNITII

Real sequences and their convergence, Cauchy sequences. Cauchy's general principle of convergence. Superema and infima of bounded sets. Monotonic sequences, limit superior and inferior of bonded sequences. Infinite series of real numbers and their convergence as well as divergence. Comparison, ratio, root, integral Leibnitz's Gauss and Cauchy's condensation tests.

UNI'-III

Absolute convergence and re-arrangement of series, product of two absolutely convergent series. Cauchy product of two series. Convergence of infinite products.

UNI-IV

Properties of Continous functions, definition of uniform continuity. Statement of theorem : A continuous function in closed bounded interval is uniformly conitinuous. Types of discontinuities with examples. Rigorous proofs of Roll's Lagrange's Mean value and Taylor's theorems.

UNIT-V

Definition and existence of Reimann integral of a bounded function, Darboux condition of intergrability, Reimann integrability of continuous function and monotonic functions. Reimann integral of functions with finite number of discontinuities and of limit points. Reimann integral as the limit of a sum. The fundamental theorem of integral calculus.

UNIT-VI

Improper integral, convergence of an improper integral, comparison test. Dirichlet's test. Beta and Gama functions, their properties and relationships. Differentiation under integral sign.

Sequence and series of functions and their pointwise convergence Uniform convergence of sequence and series of functions. Weirstrass M-Test, Statement of theorems on term by term coninuity inteegration and differentiation of seqnences and series of functions. Improper integral, convergence of an improper intergral comparison test. Beta and Gama functions their properties and relationships. Differentiation under integral sign.

*Note : The examiner is requested to set 12 questions in all, two questions from each unit. The candidate will be required to attemyt six questions selecting one from each unit.*

Paper-II **Vector Calculus Hydrostatics and Linear Algebra**

| Max. Marks | | Time |
|---|---|---|
| B.A. | B.Sc | |
| 50 | 75 | 3 Hours |

Unit-I

Vector valued functions, directional derivative of vector vaued functions along co-ordinate axes. Gradient, divergence and oral of vctor valued functions. Gauss, Green and Stoke's Theorems and their simple applications.

Unit-II

Pressure at a point, Conditions of equilibrium, Surfaces of eual pressure and density. Thrust on plane surfaces. Centre of pressure.

Unit-III

Principle of Archimedes. Thrust on curved sufaces. Floating bods. Stability of floating bodies (i.e. Metacentre, formula for Metacenic height etc.)

Unit-IV

Vector spaces, sub spaces. Sum and intersection of sub spaces of a vector space. Linear dependence and independence of vectors. Generators and basis of a vector space. Dimension of a vector space. Quotient space and its dimension.

Unit-V

Linear transformations of vector space. Matrix associated with a linear transformation. Change of basis i.e. the relationship between the matrices of a linear transformation relative to two different bases of the vector space. One to one and on to linear transformations. Isomorphism of vector space (Ist and second isomorphism theorem for vector spaces).

Unit-VI

Quadratic forms and their associated matrices. Congruences of quadratic form and matrices. Congruent reduction of a symetric and skeo symetric matrices. Reduction of a real quadratic form to the canonical form overthe field of real numbers. Rank and index of a quadratic form. Definite, Semidefinite and indefinite real quadratic forms and their characteristic properties. Gram matrices. Hermitian and skew Hermition forms andtheir reduction to canonical form.

*Note : Tie examiner is requested to set 12 questions in all, two questions from each unit. The candidate will be required to attempt six questions selecting one question from each unit.*

## STATISTICS

### Outlines of Test

| | | Max. Marks | | Time |
|---|---|---|---|---|
| | | B.A. | B.Sc. | |
| Paper-I | Applied Statistics and basis of Computer | 35 | 50 | 3 Hours |
| Paper-II | Elementary Sampling theory and Design. of Experiment | 35 | 50 | 3 Hours |
| Paper-II | Practical | 30 | 50 | 3 Hours |

### Syllabus and Courses of Readings

Paper-I Applied Statistics and basis of Computers — Max. Marks: B.Sc. 50, B.A. 35 — Time: 3 Hours

*Note : Paper will comparise of six units, each consisting of two questions. Candidates will be required to attempt six questions, selecting one question from each unit.*

**Statistical Quality Control**

Unit 1 Statistical Quality control and its uses. Product and process control. Control charts for variables, $\bar{x}$, R and $\sigma$ charts. Control charts for attributes, p and c Charts. Acceptance sampling by attributes, A.Q.L., L.T.P.D. Process average fraction defective, Consumer's Risk and Producer's risk.

**Index Numbers**

Unit 2 Problems in the construction of Index Numbers. Calculation of Index numbers. Uses and limitations of Index Numbers.

**Time Series**

Unit 3 Components of Time series, Trend, Seasonal, Cycic and Irregular components, Methods of measurement of trend and seasonal variations.

**Vital Statistics**

Unit-4 Measurements of mortality and Fertility, Gross and Net reproduction rates. Elements of life tables and its uses.

**Basic of Computers**

Unit 5 Introduction, Origin, Development, uses and limitations Types of computers (Micro, Mini and Main-Frame). Computer structure, Input Unit, CPU, output unit, Secondary storag. High level and Low level languages, complier and Interpretor.

Number systems, Binary Octal and haxa-decimal umber systems and their conversions into each other. Binary artilmatics (addition, substraction, multiplication and division)

Unit 6 Floating point representation of numbers, arithmatic opeations with normalized floating point number, pitfalls in conputing Algorithms and Flow charts of Mean, Median, Mode, Sindard Deviation, skewness and kurtosis straight line fitting. Coeficient of Correlation, Simpson's 1/3 and 3/8 rules, Trapexedial ule

**Paper II :Elementary Sampling Theory and Design of Experiments.**

*Note : Paper will comprise of six units, each consisting f two questions. Candidates will be required to attempt six questions, selecting one question, from each unit.*

Max. Marks : B.A./B.Sc. (35/50)
Time : 3 Hours

**Elementary Sampling Theory**

Unit-1 Advantages of sampling, Principal steps involved in a sample survey, bias accuracy and precision sampling and non-sampling errors, use of random number tables.

Unit-2 Simple Random Sampling (with and without replacement), merits and demerits, Estimation of population Mean, population total, populationmean, square. Variance of the estimates of population Mean and total Estimation of sample size. Sampling for proportions.

Unit-3 Stratified random sampling, advantages, estimation of population mean and total Variance of the estimates of population mean and total Proportional and optimum allocation. Systematic sampling (Brief outline without any derivation).

**Desig of Expreiments**

Unit- Experiment, Treatments, Experimental unit, Blocks Experimental Error, Replication, Precision, Efficiency of a design. Basic principles of design, Replication, Randomisation and local control. Size and shape plots and blocks.

Unit5 Analysis of variance, Linear model, Tests of general linear hypothesis, Analysis of one-wary and two wary (with one observation percell) classified data (Fixed effect models only).

Uni6 Completely Randomised Design (CRD), Randomised Block Design (R.B.D.) and Latin Square Design (LSD) with their layout and analysis.

**Practicals**

Paper-III Max. Marks B.A./B.Sc. (30/50)
Time : 3 Hours.

The paper will consists of five questions and the candidates will be asked to attempt three questions. Allotment of marks will be as follows :

i) Three experiments (B.A. : 24 marks, B.Sc. : 40 Marks)

ii) Record of practical work and oral test (B.A. 6 marks, B.Sc. 10 marks). The following topics are prescribed for the practical work:

1. Control charts for Mean and Range, c-chart and p-chart.

2. Calculation of Index numbers of whole sale prices using Laspeyre's Paasche's Edgeworth-Marshall and ideal formulae. Calculation of general index using (i) weighted A.M. (ii) weighted G.M. Cost of living indices.
3. Measurement of trend and seasonal variations in time series.
4. Determination of C.D.R., age specific death rate, C.B.R., G.F.R., age Specific fertility rate and T.F.R., S.D.R.
5. Estimation of mean, variance and its standard error
   i) Simple random ii) stratified samples.
6. Analysis of variance for problems based on agriculture.
   i) One way and two way classifications ii)Randomized complete block designs iii) Latin square design.

The students are allowed to use calculators in the Examination.

## HOME-SCIENCE
### Outlines of Test

| | Subject | No. of Periods | Time | Max. Marks B.A. | Marks B.Sc |
|---|---|---|---|---|---|
| Paper I | Foods & Nutritions | 4 per week | 2 Hrs. | 30 | 45 |
| Paper-II | Child Psychology & Mother Craft | 4 per week | 2 Hrs. | 30 | 45 |
| Paper-III | Practical | 6 per week | 3 Hrs. | 40 | 60 |

### Syllabus and Course of Reading

1. *The examiner will set six questions in all two questions om each unit.*
2. *The candidate shall attempt three questions in all selcting one from each unit.*
3. *All questions carry equal marks.*

**Unit-I** Food-classification & functions of food, food grous.

**Essential food constituents:**

Carbohydrates, Protein, Fats, Water
Vitamins- A, D, E, K, C, B1, B2. Niacin.
Minerals-Calcium, Phosphorus, Iron, Iodine & Sodium

Food source, functions, recommended daily allowances, ffects of deficiency & excess of the above.

**Unit-II** Principles and methods of cooking-Advantages o cooking the food. Effect of cooking on different rients.

**Following methods of cooking, their advantages and disadvantages:**

Moist heat-Boiling, stewing, steaming.
Dry heat-Roasting, grilling, baking.
Frying-Shallow and deep.

### Methods of enhancing nutritive value of food stuffs :

(a) Importance of enhancing nutritive value of food stuffs.
(b) Methods of enhancing nutritive value of food stuff, sprouting, fermentation, combination and supplement.

### Fod preservation :

(a) Importance of food preservation.
(b) Causes of food spoilage.
(c) Principles of food preservation.
(d) Methods of food preservation with special emphasis on Household methods.

**UIT-III**

### Nal Planning :

(a) Concept of Balanced diet.
(b) Principles of Meal planning, factors affecting it.
(c) Planning meals for-
Children - 3 to 5 years old, school going child, Adolescents.
Adults
Pregnant women and lactating mother.

### roduction to the study of Therapeutic Nutrition :

(a) Therapeutic adaption of the normal diet-Normal, soft & Fluid diets.
(b) Planning of diet in following conditions -
1. Typhoid fever.
2. Diarrhoea.
3. Constipation.
4. Diabetes.
5. High Blood Pressure.

## per - II CHILD PSYCHOLOGY AND MOTHERCRAFT

Max. Marks B.A.: 30/B.Sc.: 45
Time : 2 Hours

*ote:*

*The examiner will set six questions in all two questions from each unit.*

*The candidate shall attempt three questions in all selecting one from each unit.*

*All questions carry equal marks.*

UNIT-I

Definition, aims, subject matter, objectives of studying Child Psychology.

## Learning :

(a) What is learning, importance of learning.

(b) Methods of learning.

(c) Factors affecting learning.

(d) Role of reward and punishment in learning.

Intelligence - Definitions, Measurement of intelligence - Gro and individual tests, Intelligence Quotient, Factors affecting intelligence otient.

UNIT-II

Personality Development: Nature of personality, Definitions, Ts of personality factors affecting the development of personality.

**Play :** Definition, features of play, Difference between woand play, Types of play, importance of play in childhood.

Stages of the development of the child, characterstics of : (a) Infan (b) Childhood, (c) Adolescence - problems of an adolescent child, role of nts and teachers in solving them.

UNIT - III

## The Expectant mother :

(a) Signs of pregnancy.

(b) Discomforts of pregnancy.

(c) Care of the Expectant mother in brief.

(d) Ill effects of an early marriage.

## Care of the newborn infant :

Bathing, clothing & hygiene of infancy.

## Feeding of an infant :

(a) Breast feeding, (b) artificial feeding and (c) Weaning.

## Common ailments of childhood :

(a) Cold, cough, fever.

(b) Digestive disturbances-Diarrhoea, Constipation and vomitting.

(c) Skin infections-prickly heat, allergy.

## PRACTICAL
## FOODS & NUTRITION

Max. Marks :B.A. : 40/B.Sc.: 60

Time : 3 Hours

1. Preparation of various dishes under following heads using different methods of cooking :

| | | | |
|---|---|---|---|
| (a) | Beverages | - | hot and cold (2 each). |
| (b) | Soups | - | clear, thick and heavy (3 each) |
| (c) | Desserts | - | 5 |
| (d) | Snacks | - | Using all methods of cooking (2 each) |
| (e) | Salads | - | Indian & continental. |
| (f) | Breakfast dishes | | |
| (g) | Main meal dishes | | |
| (h) | Soft diet | - | 4 |
| (i) | Packed lunch | | |

2. Food preservation - Pickle, Chutney, Jam, Squash, Morrabba, (atleast two each).
3. Planning and preparation of meals for -
   (a) Pre-school going child and school going child
   (b) Adolescents - Boys and Girls.
   (c) Adult - belonging to low, middle and high income group.
   (d) Pregnant and lactating mother.
4 Planning of invalid diets for the patient suffering from:
   (a) Typhoid fever.
   (b) Diarrhoea.
   (c) Constipation.
   (d) Diabetes.
   (e) High Blood Pressure.
5. Special dishes : 2-4 (Novelty dishes)

## PHYSICS

### Outlines of Test

| | | |
|---|---|---|
| Paper-I (Theory) | Max. Marks : 55 | Time : 3 hrs. |
| Paper-II (Theory) | Max. Marks : 55 | Time : 3 hrs. |
| Paper-III (Practical) | Max. Marks : 40 | Time : 3+3 (on 2 days) |

*Note : (Common for both the Theory Papers)*

1. *The syllabus in each theory paper is divided in 5 Units. Only 5 questions are to be set, one from each unit Each question is to be provided with an alternate question also from the same Unit. A student is to attempt 5 question in all, one from each Unit.*
2. *Use of simple (non-programmable) calculator is permissible.*

3. *Each question should contain two or more parts.*

4. *20% numerical problems are to be set.*

**Notes** :(for Practical)

1. The practical examination will be held in two session of 3 hrs. each (first session starting in the evening of first day and the second session in the following morning).

2. Two experiments in all, one from each session, are to be done in the two different sessions of the practical tests.

3. Distribution of marks :

| | | |
|---|---|---|
| Experiments | 12+12 | =24 marks |
| Lab. Record | -- | =6 marks |
| Viva-Voce | 5+5 | =10 marks |
| | Total | =40 marks |

## Syllabus and Courses of Reading

**Paper-I (Theory)** Max. Marks : 55
Time : 3 Hrs.

Unit-I Basic Ideas of Statistical Physics : Scope of Statistical Physics. Basic ideas of probability, distribution of four distinguishable particles in two compartments of equal size, concept of macrostates, microstates, thermodynamic probability, effect of constraints on the system, deviation from the state of maximum probability, equilibrium state of dynamic system, distribution of indistinguishable particles in two compartments of nonequal sizes.

Classical Statistics : Phase space and its division into elementary cells, three kinds of statistics, the basic approach to three statistics, M-B statistics and its application to an ideal gas in equilibrium.

Unit-II Quantum Statistics : Need for quantum statistics, B-E Statistics & derivation of planck's law of radiation, F-D statistics, Fermi energy, comparison of M-B, B-E and F-D statistics.

Statistical interpretation of Entropy : Statistical definition of entropy. change of entropy of a system, additive nature of entropy law of increase of entropy, reversible and irreversible

processes, examples of reversible processes, work done in a reversible process, example of increase of entropy in natural processes, entropy and disorder.

Unit-III Classical Mechanics : Mechanics of a particle, mechanics of system of particles, generalised co-ordinates constraints Hamilton's principle, Derivation of Lagrange's equations from Hamilton's principle, Applications of Lagrange's equation (a) Simple Pendulum (b) Linear Harmonic Oscillator (c) Atwoods Machine (d) Double pendulum.

Unit-IV Wave Mechanics ; Inadequacy of old Quantum theory, wave particle dualism, Davisson and Germer experiment, Compton scattering, wave packets, Development of Schrodinger equation, Significance of uncertainty principle, uncertainty of position and momentum, Energy-time uncertainty, Illustration of uncertainty principle (Diffraction of electrons and Gamma Ray Microscope).

Unit-V Applications of Quantum Mechanics : Applications of Schrodinger equation to one dimensional problems.

i) Particle in a box.

ii) Potential step.

iii) Potential barrier

iv) Simple Harmonic osciallator with special emphasis to the concept of ground state energy, oscillator eigen functions.

v) Rectangular potential well.

**References :**

**Unit I & II :** 1. Statistical Physics and Thermodynamics by V.S. Bhatia, Publication Bureau, Panjab Univ., Chandigarh, 1977.

**Unit-III :** 2. Classical Mechanics by Herbert Goldstein, 2nd edition, Addison-Wesley Publishing Co. 1980.

**Unit-IV & V :** 1. Quantum Mechanics by John L. Powell and Bernd Crasemann, Addison-Wesley Publishing Co. Inc (2nd Ed. 1971).

2. Quantum Mechanics by L.I. Schiff (2nd ed. 1955 McGraw-Hill Book Company, Inc.

**B.Sc. Part-III (Physics)** M. M. : 55
Time : 3Hrs

**Paper-II (Theory)**

Unit-I Vector Model and Spectra of Alkali Metals : Vector atom model (concept of the spinning electron and spatial Quantization, Quantum numbers associated with the vector atom model), penetrating and nonpenetrating orbits, spectral lines in different series of alkali spectra, spin-orbit interaction and double term separation LS or Russel-saunder coupling, JJ coupling, ls coupling, jj coupling Expressions for interaction energies (Factors) for ls and jj coupling required.

Unit-II Atom in an External Force Field : Zeemen effect (Normal and Anomalous and paschen Back effect of one valence electron system using vector atom model, Stark effect of hydrogen atom, Hyperfine structure of spectra and its origin.

Unit-III Solid State Physics : Crystalline state, Bravais lattices in two and three dimensions, Miller idices, X-ray diffraction (Bragg's Law) Reciprocal Lattice, and its physical significance, Reciprocal Lattice Vectors, (Analysis of diffraction conditions in terms of Reciprocal lattice, vectors not required), Reciprocal lattice to a simple cubic lattice specific heat of solids, Einstein's theory of specific heat, Debye model of specific heat of solids.

Unit-IV Elements of Laser : Main features of a Laser, directionality, high intensity, monochromaticity, high degree of coherence. Spatial and Temporal coherence, Einstein coefficients and possibility of amplification, Momentum transfer, life time of a level, Kinetics of optical absorption.

Basic Principles of Lasers : Threshold condition and pumping, He-Ne and RUBY Laser (Principle, Construction and Working), Semiconductor Lasers : Main features and condition of laser action.

Unit-V Nuclear Physics : Energetics of alpha decay, experimental informations on alpha decay, Nuclear stability, Decay mechanism and fine structure. Types of beta decay and energetics, neutrino hypothesis, Enegetic of gamma decay and recoil effects.

Nuclear reactions, conservation laws, Q-value and reaction threshold, Nuclear fission and fusion reactors (Basic principle, construction, working and uses).

**References :**

Unit-I & II : 1. Introduction to Atomic Spectra by H.E. White

2. Atomic Spectra by G.Herzberg.

Unit-III : 1. Introduction to Solid State Physics (5th edn.) by C.Kittal, Wiley Eastern Limited.

Unit-IV : 1. Lasers, Theory and Applications (2nd edn.) Thyagrajan and Ajay Ghatak.

2. Lasers and nonlinear optics by B.B.Laud (2nd ed.).

3. Introduction to optics by Frank L. Pedrotti and Lens S. Pedrotti, Prentice Hall, 1987.

Unit-V : 1. Nuclear Physics by W.E. Burcham.

2. Nuclear Physics by D.C. Tayal, Umesh Prakashan 125, Govind Dev. Khurja, UP.

**Paper-III (Practical)** M.M. : 40
Time : 3+3 Hours
(on two days)

*Note : At least six of the eleven experiments from each section are to be completed.*

**Section-A**

1. e/m by Thomson method.
2. Transistor as Voltage amplifier in common base configuration.
3. Transistor as Voltage amplifier in common emitter configuration.
4. Study of B.H. curve by oscilloscope.
5. Study of series and Prallel resonance circuits
6. Half life period of a radio active source by G.M. Counter.
7. Electronic Voltmeter measurement of peak, average & R.M.S. Value of a signal.
8. Study of voltage doubler and tripler circuits.
9. Study of Haratly oscillator (calibration of gang condenser).
10. Radio receiver experiments (to study sensitivity and selectivity)
11. To draw characteristics curves of a silicon controlled rectifier.

Section-B

1. Rydberg constant by $H_2$ gas spectrum.
2. Wavelength of Na light by Fresnel biprism.
3. Velocity of Ultrasonic waves by grating formation in C cly.

4. Diameter of Lycopodium powder particles by Carona rings.
5. To study double slit interference by He-Ne laser.
6. Young's modulus by Newtons rings method.
7. Diameter of a wire by diffraction.
8. Resolving power of a prism.
9. Thickness of a thin plate or a thin paper by using air wedge.
10. Companision of illuminating power by a photometer.
11. To study the characteristics of a solar cell.

## CHEMISTRY

| Outlines of the Test | Max. Marks | Time |
|---|---|---|
| Paper I (Theory) Inorganic Chemistry | 37 | 3 hrs |
| Paper II (Theory) Physical Chemistry | 37 | 3 hrs |
| Paper III (Theory) Organic Chemistry | 36 | 3 hrs |
| Paper IV (Practicals) | 40 | 8 hrs |
| | 150 | |

*N.B. 20% marks are reserved for laboratory record and viva-voce.*

Paper-I Theory **Inorganic Chemistry** Max. Marks : 37
Time : 3 hrs.

*Note: Ten questions will be set, two questions from each section.The candidate will be required to attempt five questions in all selecting one question from each section. As far as possible questions will be short answer type and not essay type.*

Section-I

**(a) d-Block-elements**

General trend in groups, electronic configuration, ionic., covalent and atomic radi, electronegativity, electron affinity, ionisation potential, colour, magnetic properties, oxidation states, interstitial compounds and complex formation.

**(b) The f-block elements**

(i) Lanthanides, Electronic configuration and position in the periodic table, oxidation states, colour and magnetic properties, lanthanide, contraction and its consequences, occurrence and separation of lanthanide elements.

(ii) Actinides : Electronic configuration and position in the periodic table, comparison with lanthanides, oxidation states, Chemistry and extraction of uranium from its ores. Mention of transuranic elements and their production.

(8 hrs)

Section-II

**(a) Oxidation-Reduction**

Oxidation-reduction as an electron transfer process, standard electrode potential and electrochemical series, sign convention, electrode systems involving two ions, Applications of oxidation potentials (FEASIBILITY of reactions and determination of equilibrium constants from half-cell potentials). Comparative mention of $MnO_4^-/Mn^{++}$ (acidic medium) $Cr_2O_7^{--}/Cr^{+++}$ (acidic medium), $Cl_2/Cl^-$, $Fe^{+++}/Fe^{++}$, $Sn^{++++}/Sn^{++}$ and $Hg^{++}/Hg_2^{++}$ systems. Limitations of the standard electrode potential data.

**(i) Cement Industry :**

Portland Cement, Raw materials, manufacturing processes and setting of cement (Chemistry only).

### (ii) Fertilizers :

Brief description of Nitrogen, phosphate and potash fertilizers. Constituents and brief outlines of methods of preparation anmd percentage availability of N P or K. (Examples of CAN $Ca(CN)_2$ and superphosphate.

(8 hrs)

Section III

**(a) Noble cases and their Compounds :**

Separation of noble gases, preparation, properties and structures of xenon fluorides, nature of bonding (valence bond treatment.)

**(b) Corrdination Compounds :**

Isomerism in coordination compounds, idea of valence bond & crystal field theories to explain bonding, geometry, magnetism and colour of coordination compounds (octahedral, tetrahedral, Square planar, high spin & low spin) comparison of C.F.S.E. of high spin tetrahedral and octahedral complexes with different number of 'd' electrons (other things being equal). Stability of complexes (methods of determination excluded). Effect of central ion on stability (ionic size, ionic charge, electronegativity), effect of ligand on stability (size and charge of ligand, basic character, steric effects, chelation & size of the chelate ring).

(8 hrs)

Section - IV

**(a) Environmental Chemistry:**

An elemantary study of air and water pollution, Defining-TLV, pollution, contamination, COD, BOD and their relevance to pollution, greenhouse effect and its implications. Air quality standards, sources and sinks of primary air pollutants (suspended particulates, sulphur dioxide, nitrogen oxides, carbon oxides),water quality parameters and standards, primary water pollutants, pesticides, detergents, radioactive wastes.

**(b) Non-Aqueous Solvents:**

Auto ionization and coordination models (examples of $FeCl_3$ in $PoCl_3$ and $PO(OET)_3$. Study of liquid ammonia and liquid sulphur dioxide as solvents : Effect of polarity, dielectric constant, chemical nature (acidity-basicity), solvation energy of the solvent (solubility of metals and non-metals), acid-base reactions, redox reactions, precipitation reactions; solvolysis reactions, amphoteric reactions and complex reactions.

(8 Hrs)

Section -V

**(a) Qualititative Inorganic Analysis:**

Chemistry of analysis of various groups of basic and acid radicals, chemistry of identification of acid radicals in typical cobinations (Examples- $Co_3^{2-}/C_2O_4^{2-}$,$CO_3^{2-}/SO_3^{2-}$,$NO_3^{1-}/NO_2^{1-}$,$Cl^{1-}/Br^{1-}/I^{1-}$,$S^{2-}/SO_3^{2-}/S_2O_3^{2-}/SO_4^{2-}$,$F^{1-}/C_2O_4^{2-}$).

## (b)Quantitative Inorganic Analysis

Theory of precipitation, completness of precipitation, types of precipitates and conditions required to ensure purity in various types of precipitates, co-precipitation, post-precipitation, factors affecting completness of precipitation (solubility product, pH, temperature and excess of precipitant, common ion effect and salt effect), selective precipitation by complex formation (masking and demasking).

## (c) Elementary ideas of separation of inorganic compounds by:

(i) Solvent extraction,
(ii) Ion exchange chromatography

(8 hrs)

Paper-II (Theory) **Physical Chemistry**

Max. Marks : 37
Time : 3 Hrs

*Note: Ten questions will be set, two questions from each sections. The candidate will be required to attempt five questions in all, selecting one question from each section. As far as possible, questions will be short answer type and not essay type. SI units should be used. Use of non-programmable calculator is allowed.*

Section-I

## Quantum Mechanics:

Black body radiation, Kirchoff's law, spectral distribution of black body radiation, Planck's radiation law.

Postulates of quantum mechanics, discussion of operators, Schrodinger wave equation (time independent only), Eigen values and Eigen functions, Use of wave function to evaluate $\bar{u}$ $\bar{p}_x \Delta\bar{x}$ and $\bar{p}_x$

**Statistical Thermodynamics:**

Importance of Statistical Thermodynamics, ensemble approach, Microcanonical ensemble, cononical ensemble, macrocanonical ensemble macrostate and microstates, configuration and probability, thermodynamic probability and its relation with entropy, molecular basis of residual entropy, Boltzmann distribution law.

(8 hrs)

Section -II

**Distribution Law**

Definition, conditions for its validity, thermodynamic derivation, modification in the distribution law when the solute undergoes association, dissociation in one of the solvents or combination with one of the solvents, applications of the distribution law with special reference to the study of complex ions, process of extraction and determination of degree of hydrolysis.

(8 hrs)

Section-III

## Phase Rule

Definition, explanation of the terms involved i.e. phases, components and degrees of freedom, thermodynamic derivation of phase rule, one component systems-water system and sulphur system, interpretation of phase diagrams of two components systems, lead-silver system, FeCl3-H2O system, Na2So4-H2O system, experimental determination of the phase diagram of two component systems, General qualitative discussion of the phase diagram of two component systems (solids) that are miscible in the liquid phase.

(8 Hrs)

Sections IV

## Crystalline State

Crystalline and amorphous solids, classifications of crystalline solids, law of constancy of angles, elements of symmetry, law of rational indices, Miller indices, crystal classes and crystal systems, space lattice, unit cells, Bravais lattices, Bragg's equation, Bragg's X-ray spectrometer application of Bragg's equation in deciding Bravais lattice, liquid crystals (elementary idea).

(8 hrs)

Sections -V

## Physical Properties and Molecular Structure :

(i) Optical rotation, dipole moment, magnetic susceptibility and its applications.

(ii)(a) NMR spectroscopy (Principle and technique only without mathematical details ides of chemical shift taking example of ethyl alcohol only).

(b) Molecular spectra-molecular energy levels, rotational spectrum (calculation of moment of inertia and bond distance) vibration-rotational spectrum (Calculation of moment of inertia, bond distance, bond dissociation energy (Mathematical) details excluded), concept of zero point energy.

(c) Raman Spectra, Raman effect and its mechanism (study of bond distance and bond angles.

(8 hrs)

Paper - III (Theory) **Organic Chemistry**

Max. Marks : 36
Time : 3 hrs

*Note: Ten questions will be set, two questions from each section. The candidate will be required to attempt five questions in all, selecting one question from each section. As far as possible, questions will be short answer type and not essay type.*

Section I

## PMR:

Principle of nuclear magnetic resonance, the PMR spectrum, number of signals, peak areas, equivalent and non-equivalent protons, positions of signals and chemical shift, shielding and deshielding of protons, proton counting, splitting of signals and coupling constants, magnetic equivalence of protons. Discussion of PMR spectra of the following molecules, ethyl bromide, n-propyl bromide, isopropyl bromide, 1,1-dibromoethane, 1,1,2-tribromoethane, ethanol, acetaldehyde, toluene, benzaldehyde, acetophenone, p-anisidine and p-nitrotoluene. Simple problems on PMR spectroscopy for structure determination of organic compounds.

(8 hrs)

Section-II

## Cycloalkanes:

Synthesis of cycloalkanes and their derivatives-addition of carbenes to olefins, Simmons-Smith reaction, photo-chemical (2+2)-cycloaddition reactions, Diels-Alder reaction, dehalogenation of W dihalides, Dieckmann cyclization, pyrolysis of calcium or barium salts of dicarbozylic acids, Blanc's rule, Thorpe-Ziegler reactions, Demjanov rearrangement, and by the use of malonic ester and acetoacetic ester, Relative stability of combustion of cycloalkanes, Sachse-Mohr theory of strainless rings, difficulities encountered in the synthesis of large-membered rings. Orbital picture of angle strain.

(4 hrs)

## Conformations:

Concept of conformational isomers and conformers, difference between conformation and configuration, factors affecting the relative stability of conformations- angle strain, torsional strain, steric strain and dipole-dipole interactions. Change of dipole moment of 1,2-dibromoethane with temperature, preferred conformations of chlorohydrin, ethylene glycol and stilbene dichloride (meso and dl-forms). Conformations of n-butane-staggered, gauche eclipsed and their relative stability, 2,3,-dimethylbutane, 2,2,3-trimethylbutane and their conformation enantiomers, conformations of cyclohezane-chair, boat, half chair, twist boat and their relative stabilities, Axial and equatorial bonds in cyclohexane, 1,3,-diaxial interactions.

(4 hrs)

Sections-III

## Carbohydrates:

Classification of carbohydrates, reducing and non-reducing saccharides, Determination of open chain and cyclic structure including configuration of glucose and fructose, clycosides, Haworth projection formulae and conformational formulae of glucose, fructose and their methyle glycosides. Mutarotation, killiani-Fischer synthesis, Ruff and wohl degradation. Conversion of glucose into fructose and vice-versa. Lobry de Bruyn-van Eikenstein rearrangment. Disaccharides-only structure (Fischer and Haworth projection formulae) of sucrose, maltose and lectose.A general introduction to polysaccharides-point of difference in the structure of starch and cellulose.

(8 hrs)

Sections-IV

## Polycyclic Aromatic hydrocarbons:

Reactions of naphthaline, anthracene and phenanthrene, Haworth synthesis of naphthalene and phenathrene, Pschorr synthesis of phenanthrene, sythesis of anthrancene involving Friedel-Crafts acylation of benzene with pathalic anhydride and Diels-Alder reaction between 1,3,-butadiene and 1,4-naphthoquinone, Relative reactivities at different position and mechanism of electrophilic substiution reactions in naphthalene, anthracene

and phenanthrene. Orientation of substitution in naphthalene derivatives/mono-and di-substitution. Mechanism of addition reactions of phenanthrene.

## Heterocyclic Compounds:

Preparation of furan derivatives by dehydration of 1,4-dicarbonyl compounds and Fierst-Benary synthesis; synthesis of thiophenses from 1,4-dicarbonyl compounds and synthesis of pyrrole and its derivatives by Paal-Knorr synthesis, Knorr pyrrole synthesis, Molecular orbital structures of furan, thiophene and pyrrole and their relative aromatic character. Machanism of electrophilic substitution reactions of furan, thiophene and pyrzble. Basicity of pyrrole and its resemblance with phenols and aromatic amines, addition of dichlorocarbene to pyrrole. Hantzsch synthesis of pyridine derivatives, structure of pyridine and its basicity, machanism of electrophilic, free radical and nucleophilic reactions in pyridien and chichibabin reaction.

(4 hrs)

Section-V

## Aminoacids and proteins:

Dipolar structure of a-aminoacids, iso-electric point. Synthesis of a-aminoacids by direct amination of a-haloacids, cabriel-phthalimide synthesis, phthalimidomalonic ester synthesis, Strecker synthesis and Erlenmyer azlactone synthesis. Reactions of a-amiono acids.

(3 hrs)

Structure of peptides and their synthesis. Classification and biological importance of proteins. Determination of primary structure of proteins. Elementary idea about secondary, tertiary and quaternary structures of proteins.

(2 hrs)

## Synthetic Drugs:

## Synthesis and uses of the following drugs:

Aspirin, phenalcetin, paracetamol, sulphanilamide, sulphaguanidine, chloroquine and chloroamphenicaol.

## Insecticides and Pesticides:

Methods of preparation and uses of the following: DDT, BHC, Melathion and Parathion.

(1 hr.)

Paper IV (**Practicals**)

Max. Marks: 40
Time : 8 hrs
(Spread over two days)

Section-I (**Inorganic**)

1. Qualitative analysis of mixture containing not more than four radical (including interferring and excluding insolubles)

$Pb^{2+}$, $Hg_2^{2+}$, $Hg^{+}$ (ous), $Ag^{+}$ $Bi^{3+}$, $Cu^{2+}$, $Cd^{2+}$, $As^{3+}$, $Sb^{3+}$, $Sn^{2+}$, $Fe^{3+}$, $Cr^{3+}$, $Al^{3+}$, $Co^{2+}$, $Ni^{2+}$, $Mn^{2+}$, $Zn^{2+}$, $Ba^{2+}$, $Sr^{2+}$, $Ca^{2+}$, $Mg^{2+}$, $NH_4^{+}$, $CO_3^{2-}$, $S^{2-}$, $SO_3^{2-}$, $S_2O_3^{2-}$, $NO_2^{-}$, $CH_3COO^{-}$, $Cl^{-}$, $Br^{-}$, $I^{-}$, $NO_3^{-}$, $SO_4^{2-}$, $C_2O_4^{2-}$, $PO_4^{3-}$, $BO_3^{3-}$.

2. Complexometric titrations : determination of $Zn^{2+}$, $Mg^{2+}$, $Ca^{2+}$ and hardness of water using EDTA.

Section-II **(Physical)**

1. To determine the molecular weight of a volatile liquid by victor Mayer's method.
2. To determine the partition co-efficient of iodine between $CCl_4$ and water.
3. To determine the molecular weight of a compound by Rast's Mehtod.
4. To determine the standard electrode potential of $Zn^{2+}/Zn$ and $Cu^{2+}/Cu$ electrodes using calomel electrode by potentiometric method.
5. To determine the strength of HCl by NaOH using pH meter.

Section -III **(Organic)**

Systematic identification (detection of extra elements, functional groups, determination of melting point or boiling point, and preparation of atleast one solid derivative) of the following simple mono and bifunctional organic compounds: Naphthalene, anthracene, acenaphthene, benzyl chloride, m-dinitrobenzene, p-nitrotoluene, resorcinol, benzophenone, ethyl methyl, ketone, a-naphthol, b-naphthol, benzophenone, ethyl methyl, ketone, benzamide, vanillin, oxalic acid, succinic acid, benzoic acid, salicylic acid, cinnamic acid benzamide, urea, acetanlide, benzanilide, aniline hydrochloride, p-toluidine, phenyl salicylate (salol), glucose, fructose, sucrose, o- m and p-nitroanilines, thiourea.

## Distribution of Marks

1. Section-I (6+3) 9 marks
2. Section-II (One experiment only) 9 marks
3. Section-III (One experiment only) 9 marks
4. Viva-Voce 5 marks
5. Lab. Record 8 marks

## BOTANY

| | | Max. Marks | Time |
|---|---|---|---|
| Paper-I(Theory)- | Cytogenetics & Biostatistics | 55 | 3 hrs. |
| Paper-II(Theory)- | Angiosperms and Ecology | 55 | 3 hrs. |
| Paper-III(Practicals) | | 40 | 6 hrs. |

(in two sessions of 3 hrs. each)

Paper-I (Theory) **Cytogenetics and Biostatistics**

Unit-I

1. Structure of prokaryotic and eukaryotic cells.
2. Organization and function of cell and its components; Cell wall, memberance, endoplasmic reticulum, Golgi apparatus, lysosomes, mitochondria, chloroplast, cun nucleus chromosmes.
3. Elements of heredity and variation : Medal and his experiments, principles of segregation and independent assortment, test cross and back cross.
4. Chromosomes and heredity, physical and chemical structure of chromosomes, chromosomal determination of sex. Morgan's cross

UNIT-II

5. Cell cycle, mitosis, meiosis.
6. Non-mendelian inheritance : maternal influence, shell coiling in snails; chloroplasts, mitochondria, Kappa particles, criteria for extra-chromosomal inheritance.
7. Gene interactions and modified dihybrid ratios : duplicate recessive interaction, recessive interaction, duplicate dominant interaction, dominant interaction.
8. Multiple alleles : blood groups in human ABO and Rh, eye colour in *Drosophila*, coat colour in mammals, self-sterility alleles in plants.

UNIT-III

9. Linkage and recombination : experiments with *Drosophila*, sturtevant map, crossing over and recombination, two point and three point test cross, interference and coefficient of coincidence.
10. Mutations: spontaneous, induced and paramutations, point mutation; chromosomal mutations : deletions, duplications, inversions, translocations; role of induced mutations in crop improvement.
11. Variations in chromosome number : haploids, Polyploidy-autopolypoids, allopolyploids.

UNIT-IV

12. Structure and function of nucleic acids : RNA; DNA - double helix, evidences of DNA as genetical material; transformation transduction; biosynthesis of DNA, RNA.
13. Transposable elements, gene action, gene regulation, genetic code, protein synthesis; modern concept of gene.

UNIT-V

14. Collection of data, sampling - theory and methods; Mean, Mode Median; Standard Deviation, Standard Error, Coefficient of Variation; Correlation and Regression.
15. Probability, addition and multiplication laws; normal, binomial and poisson distribution; t-test; chisquare analysis.

Paper-II (Theory) **Angiosperms and Ecology**

UNIT-I

1. Herbarium - important herbaria of India (national, regional, local); gardens - important gardens;
2. Comparative study of the classificatory systems by Linnaeus, Bentham & Hooker, Engler & Prantl.
3. Principles of systematics : classical and modern taxonomy; concept of species, genus and family, keys important rules of nomenclature (validity, effectivity and priority).

4. Taxonomic studies of the following families (Bentham and Hooker's system): Ranunculaceae, Brassicaceae, Capparidaceae Malvaceae, Rutaceae, Leguminosae, Myrtaceae, Apiaceae, Rubiaceae, Asteraceae, Asclepiadaceae, Convelveulaceae, Solanaceae, Acanthaceae, Lamiaceae, Ameranthaceae, Euphoribiaceae, Arecaceae, Liliaceae Poaceae.

## ANATOMY

UNIT-II

1. Scope and importance of the study of plant Anatomy.
2. Cell structure-cell wall, cell inclusions.
3. Tissues-structure, function and distribution of simple and complex tissues.
4. Anatomy of Primery monocot.and dicot roots; secondary growth in dicot roots.
5. Anatomy of typical stems of monocots, dicots, secondary growth in stems. Anomaleous secondary growth in Draceana, Boerrhavia.
6. Anatomy of monocot and dicot leaves; stomatal types.
7. Basic anatomical differences among hydrophytes, Mesophytes, xerophytes, and mangroves.

UNIT-III

1. A brief historical account.
2. Development and structure of anther and pollen.
3. Curvature of ovule leading to different types : Megasporogenesis, structure of mature embryosac.
4. Agencies of pollination; pollen pistil interaction; compatibility and incompatibility; growth of pollen tube into entry in embryo sac; syngamy and triple fusion.
5. Development, structure and function of endosperms; endosperm and embryo relationship.
6. Development of mono - and dicot embryo; polyembrayony.
7. Structure of mature seed.
8. Role of comparative embryology in taxonomy.
9. A brief account of experimental embryology, *in vitro* culture of anther, ovule and embryo; somatic embryogenesis.

## ECOLOGY

UNIT-IV

1. Definition, scope, levels of organization, relationship with other Sciences.
2. Concept and components of environment, holocoenotic environment, factors affecting plant growth and their distribution : edaphic, topographic, climatic and biotic.

3. Response of plants to stress conditions : hydrophytes, xerophytes and halophytes.
4. Concept and characters of Plant community.
5. Concept and structure of ecosystem, trophic levels, food chains, food web, ecological pyramids; basic idea about ecosystem functioning; energy flow, organic production, biogeochemical cycling of water.

**MAN AND ENVIRONMENT :**

UNIT-V

6. Air, water and land polution and their control.
7. Renewable and non-renewable resources.
8. Protection, conservation and management.
9. Problem of depletion of natural vegatation, endangered plants and animals IUCN, Red Data book; National Parks and Sanctuaries, Chipko Movement,

**PALYNOLOGY :**

1. Historical perspectives; Pollen production and dispersion in space and time.
2. Pollen/spare morphology.
3. A brief account of Aeropalynology : methods of aerospora surveys and analysis: Pollen allergy.
4. Pollen analysis of honey bee pollen loads; role of apiaries in crop production.

| **Paper-III (Practical)** | Max. Marks | Time |
|---|---|---|
| Cytogenetics, Angiosperms, Ecology. | 40 | 6 hrs. |
| | (in two session of 3 hrs. each) | |

**Scheme of Examination :**

1. Experiment in the form of a numerical regarding gene interaction or regarding mendelian laws of inheritance. 6
2. Cut a T.S. of given material A. Prepare a double stained Permanent mount of it. Identify giving reasons. 6
3. Describe/compare the given specimens 'A' and 'B' (out of the flowers in Syllabus) in semitechnical language giving floral diagrams. V.S. of flowers, T.S. ovaries and also the flora formulae. Identify, giving reasons. 8

4. Ecological experiments (as per given list of Ecology experiments) to be performed.
5. Dissect out heart-shaped embryo from the given material.
6. Note book and Collection of plants.
7. Viva-voce.

Practical Course :

**CYTOGENETICS**

1. Study of [illegible] karyotypes from [illegible] micro-photographs etc.
2. Stages of mitosis and meiosis in plants.
3. Special chromosomes - polytony from slide.
4. Experiments on mono-hybrid and di-hybrid ratios.
5. Gene interaction and [illegible] di-hybrid ratios.
6. Problems on [illegible] mapping, interference and [illegible] coincidence.
7. Life cycles of [illegible] pollinated crops such as rice, [illegible] maize (from charts, etc.).

**Biostatistics :**

Demonstration of problems in the following :

1. Mean, mode, median, standard deviation, standard error.
2. Determination of [illegible] correlation and regression in experimental data.
3. Simple problems in probability.
4. Binomial and chi-square analysis.

**Angiosperms :**

1. Description of following representative species from each of the families mentioned below :

| | | |
|---|---|---|
| Ranunculaceae | - | **Ranunculus Delphinium** |
| Brassicaceae | - | **Brassica, Raphanus** |
| Capparidaceae | - | **Capparis, Cleome or gynandropsis** |
| Malvaceae | - | **Hibiscus, Althea** |
| Rutaceae | - | **Citrus, Murraya** |
| Leguminosae | - | **Lathyrus, Cassia, Acacia** |
| Myrtaceae | - | **Eucalyptus, Syzygium** |
| Apiaceae | - | **Coriandum, Anethum** |
| Rubiaceae | - | **Quisqualis, Ixora** |
| Asteraceae | - | **Helianthus, Sonchus** |

| | | |
|---|---|---|
| Asclepediaceae | - | **Calotropis** |
| Convolvulaceae | - | **Convolvuls, Ipomaea** |
| Solanaceae | - | **Solanum, Petunia** |
| Acanthaceae | - | **Adhatoda, Justicia** |
| Lamiaceae | - | **Ocimum, Salvia** |
| Amaranthaceae | - | **Amaranthus Achyranthes** |
| Euphorbiaceae | - | **Ricinus, Phyllanthus, Euphorbia** |
| Arecaceae | - | |
| Liliaceae | - | **Allium, Asphodelus** |
| Poaceae | - | **Triticum Avena** |

2. Indentification and preparation of field notes of 50 plant specimens in the field and submission of harbarium.

**ANATOMY :**

1. Study of gross anatomical details of cells, tissues and various other organs of plants using hand sections (temporary mounts), cleared wholemounts, macerations, peel mounts.
2. Laboratory work based on topics mentioned under theory.

**Embryology**

3. Examination of cleared and dissected wholemounts; permanent preparation of various structures mentioned above.
4. Making of squash stained preparations of pollen mother cells, pollen grains and dissection of endosperm and embryo.
5. Germination of pollen grains and examination of percent germination and rate of pollen tube growth.
6. Dissection of pollinated stigma and style to trace pollen tubes.
7. Study of structure of seed; examination of reserve food materials in endosperm and embryo.

**ECOLOGY :**

1. Study of soil profile of an area.
2. Chemical analysis of soil for Ca, K, N by rapid test methods through soil testing Kit.
3. Determination of pH of soil and water samples.
4. Study of community structure by quadrat, line and belt transects.
5. Study of comunity structure by determination of abundance and frequency of species by quadrat method.
6. Determination of toal biomass produced by a plant (above ground, underground).

7. Correlation of morphological and anatomical features of hydrophytes, xerophytes, halophytes and parasites with their habitats.
8. Study of food chain in an aquatic or a terrestrial ecosystem.
9. Determination of dissolved oxygen and biological oxygen demand in unpolluted and polluted waters.
10. Visit to habitations and recording of types of wastes.

**Practicals :**

1. Preparation of permanent slides using Microtome/Hand sectioning.
2. Description and illustration of six selected pollen/spore types.
3. Method of collection of aerospora.
4. Method of preparation of honey samples for microscopic examination of pollen.

**Books Recommended :**

**Paper-I : Cytogenetics and Biostatistics**

| | | |
|---|---|---|
| 1. | Cytogenetics, Plant muding and evolution | Sinha U & Sinha S. |
| 2. | Genetics | Sinnot etal |
| 3. | Genetics | Gardner |
| 4. | Genetics | P.K. Gupta |
| 5. | Genetics | Alhuwalia |
| 6. | Genetics | Burns |
| 7. | Bio Statistics | Mishra |

**Paper-II : Angiosperm & Ecology**

| | | |
|---|---|---|
| 1. | Principles of Taxonomy | Sivarajan |
| 2. | Angiosperm Taxonomy | Singh V & C Werker |
| 3. | -do- | P.C. Vashista |
| 4. | -do- | G.L. Chopra |
| 5. | -do- | R.C. Mathur |
| 6. | Anatomy | |
| | Plant Anatomy | K.Esau |
| | Plant Anatomy | A.Falin |
| | Plant Anatomy | P.C. Vashishta |
| 7. | Emlmyology | |
| | Affio Emlmyology | Bhojwani & Bhatnagar |
| | Affio Emlmyology | B. M. Joshi (edited) |
| | Experimental Arya | -do- |
| 8. | Ecology | Odum, P |
| | Concept in Ecology | Kermondy |
| | Ecology & Enviroment | Brij Gopal |
| | Ecology | |

# ZOOLOGY

## Scheme of Examination

*Note : There will be two theory papers of 55 marks each and one practical paper of 40 marks. The duration of each theory and practical pepers will be of 3 hours.*

**Theory Paper-I**

Section-A (Biochemistry)

Section-B (Developmental Biology and Histology)

**Theory Paper-II**

Section-A (Evolution and Ecology)

Section-B (Applied Zoology)

**Practical Paper-III**

Theory Paper-I — Max. Marks : 55
Time : 3 hours

### Section-A (Bio-Chemistry)

**Biochemistry**

i) Proteins : An introduction; general chemical structure; physical configuration; primary, secondary, teriary and quarteruary; physical and chemical properties of proteins; classification based on shape, composition and solubility; chemical bonds involved in the protein structure; biological role of proteins.

ii) Carbohydrates; An introduction; classification of carbohydrate; monosaccharides, Oligosaccharides (including disaccharides), polysaccharides; general chemical properites of monosaccharides involving active group i.e. glycosidic oH, alcoholic oH and -CHQ (cr-CO): chemical structure of oligosaccharides- sucrose, maltose, lactose, cellobiose, raffinose, stachyose; Chemical structure of polysaccharides- starch, amylopectin, glycogen cellulose, pectin, chitin; biological role of carbohydrates.

jii) Lipids: an introduction; classification of lipids on the basis of their chemical composition; Simple lipids-fats and oils, their chemistry, cellular location and functions; compound lipids- phosphogly cerides (leathin and ceplialin), phosphoinositidates, (insctol) phosphosphingosides and glycolipids. their chemistry cellular location and function Derived lipi-steroids i.e sterols ($C_3O$, $C_{28}$, $C_{27}$) bile acids ($C_{24}$) and hormones ($C_{18}$, $C_{19}$, $C_{21}$); chemical properties of fats and oils.

iv) Nucleic Acids; An introduction; general chemical structure; physical configuration of DNA- primary strucute, base composition of DNA; double helical structure- a three dimensional tertiary structure; Basis for the three dimensional model of DNA by Watson and Crick; salient features of Watson-Crick model; Denaturation and renaturation of DNA helix; Brief account of single strand DNA, circular DNA, Z-DNA, B-DNA, A-DNA, C-DNA, D-DNA and palindromic DNA; Ribonucleic acids (RNA), types of RNA;s RNA, RNA, M mRNA and hu RNA, their chemical structure properties and functions, primary and tertiary structure of tRNA; biological functions of nucleic acids.

**Enzymes** : An introduction; classification of enzymes based on the chemical reaction catalyzed as per IUB system-inclusive of EC number, chemical nature; physical characteristics, mechanism of enzyme action-activation energy, Michaelis- menten hypothesis; mechanism of enzyme action- lock and key model and induced fit model; Factors affecting enzyme activity-sulistrate conventration, enzyme concentration, $p^{n}$ions concentration, temperature; regulations of enzyme activity- denaturation, competitive inhibition, non-competitive inhibition and allosteric modulatin or feed back inhibition.

**Section-B (Development Biology Histology)**

**Developmental Biology :**

Generalized structure of mammalin ovum and sperm; spermatogenesis and orgenesis; fertilization; parthenogenesis; different types of eggs and pattern of cleavage, the germinal layers and their fate. Concept of differentiation. Basic concepts of organizers and Inductors. Development of Herdmania, Amphioxus, Frog and Chick (Excepting organogenesis). Metamorphosis in Herdmania, Amphioxus, frog and insects. Fate Maps of frog and cheick; foetal membranes; their formation and role; Mammalian Placenta, its formation, types and function.

**Histology** : Principle and theory of :

i) Fixation

ii) Tissue procession

a) Washing

b) Dehydration

c) Clearing

d) Embedding

e) Block making

iii) Microtomy

iv) Haemotoxylin and Eosin staining

v) Study of the stained tissue.

**INSTRUCTIONS** :Nine questions are to be set in all. The candidate is required to attempt five questions, including the compulsory question.

1. Question 1 is compulsory and should cover the entire syllabus. It will have 10 parts, each of 1½ marks. Answer should not exceed 20 words.
2. Remaining eight questions are to be set from both the sections A & B, four from each section. The Candidate is required to attempt four questions, 2 from each section.

Theory Paper-II — Max. Marks 55
Time : 3 hrs.

**Section-A (Evolution & Ecology)**

**Evolution**

i) Origin of organic componds, co-acervates and formation of primitive biomolecules. Formation of prokaryote Eukaryotic cells.

ii) Means of evolution (isolation, dispersal, natural selection). Blastogenic and Somatogenic variations;

Continuous and Discontinuous variations.

iii) Theories of organic evolution, i.e. lamarckism, Neo-Lamarckism, Drawinism Neo-Drawinism and Mutation theory of Hugo De Vries. Evidence (Anatomical, Embryologycal, Plaentological and Biochemical).

iv) Modern concept of evolution and speciation :

v) Distribution of animals in space and time : Zoogeographical realms and their mammalian fauna, Geological time scale and their predominant animal forms.

Concept of ecosystem: Biospheres; Biomes; Ecological niche, ecotone & edge effect. Food chains and Food webs, Tropic structure and ecological pyramids. (co-existence, predation, competition, parasitism, symbiotic relationship and proto co-operation); physical factors of the environment and their impact on living organisms. Biogeochemical cycles of carbon, oxygen, nitrogen and phosphorus. Source of pollution of air, soil and water; their preventive measures : Radiation & Chemical hazards and protection there form.

## Section-B (Applied Zoology)

**Applied Zoology :** Introduction to parasitology (pertaining to various terminologies in.....)

1. Brief account of Arthropod vectors of human diseases such as malaria (**Anopheles Stephensi, A. culicifacies**), filaria (**Culex fatigans, Mansoma'** sp), Japanege Encephalitis (**C. tritinorhynchus**), Dengue (**Aedes aqqypti, A. sulipictus**). Epidemic typhus (**Pediculus**).

2. Brief account of communicable diseases such as :- Tuberculosis, AIDS, Leprosy & Jundice.

3. i) Study of important insect pets of crops and vegetables:-

**Sugarcane**

a. Sugarcane leaf-hopper (**Pyrilla perpusilla**)
b. Sugarcane whitefly (**Aleurolobus barodensis**)
c. Sugarcane top borer (**Scirpohpaga nivella**)
d. Sugarcane root borer (**Emmalocera depressella**)
e. Gurdaspur borer (**Bissetia steniella**)

with their systematic position, habits and nature of damage caused. Life cycle and control of **Pyrilla perpusilla** only

**Cotton**

a. Pink Bolloworm (**Platydera quossypiella**)
b. Red cotton Bug (**Dysdercus ciniqulatus**)
c. Cotton Grey Weevil (**Myllocerus maculosus**)
d. Surface grasshopper (**Chrotogonus trachypterus**)
e. Cotton jassid (**Empoasca devastans**)

With their systematic position, habits and nature of damage caused. Life cycle and control of **Platydera gossypiella.**

**Wheat**

a. Wheat stem borer (**Sesamia inferens**)

with its systematic position, habits, nature of damage caused, life cycle and control.

**Paddy**

a. Gundhi Bug (**Leptocorisa varicornis**)
b. Rice Grasshopper (**Hieroglyphus banian**)
c. Rice stem borer (**Schanobius incertellus**)

d. Rice Hispa (**Hispa armigera**)

with their systematic positions, habits and nature of damage caused. Life cycle and control of Leptocorisa varicornis.

**Vegetables**-A list of common pests of Cucurbitae and Cruciferae plants i.e.

a. **Aulacephera faveicollis** - The Red pumpkin beetle

b. Dacus cucurbitae - The pumpkin fruit fly.

c. **Tetranychus tecarius** -The vegetable mite.

d. **Epilachna** - The Hadda beetle.

Their systematic position, habits and nature of damage caused. Life cycle and control of **Aulacophera foveicollis.**

Pests of stored grains - A list of common pests of stored cereals and legums, i.e.

a. Pulse beetle (**Collosobruchus maculatus**)

b. Rice Weevil (**Sitophilus oryzae**)

c. Wheat Weevil (**Troqoderma qranarium**)

d. Grain & Flour moth (**Sitotroga cerealela**)

e. Rust Red Flour moth (**Sitotroga cerealella**)

f. Rust Red Flour beetle (**Tribolium castaneum**)

g. Lesser grain borer (**Rhizopertha dominica**)

4. Detailed study of sericulture, apiculture, lac culture Pisciculture (Fresh water fishes) Poultry, piggery.

5. Insect control : Biological control; its history, requirement and precautions, and feasibility of biological agents for control.

6. Chemical control : History, categories of pesticides. Important pesticides from each category to pests against which they can be used. Insect repellants and attractants.

7. Integrated pest management.

**INSTRUCTIONS :** Nine questions are to be set in all. The candidate is required to attempt five questions in all, including the compulsory questions.

1. Question 1 is compulsory and should cover the entire syllabus. It will have 10 parts, each of marks. Answer should not exceed 20 words.

2. Remaining eitht questions are to be set from both the section A & B, (two from section A and six from section B). The candidate is required to attempt one question from section A and three from section B.

## PRACTICAL

Max. Marks : 40
Time : 3 hours.

**Biochemistry**

a. Qualitiative tests for **proteins, Carbohydrates** and **fats.**

b. Identification of food stuffs, starch, gluocose, proteings and fats in solution.

c. Demonstratin of osmosis and diffusion.

d. Determination of coagulation and bleeding time of blood of man, rat, pigeon.

e. Determination of blood groups A-O & RI-D of human blood sample.

f. Analysis of urine for urea, chloride, glucose and uric acid.

**Embryology**

a. Study of prepared slides of Destrous cycle of rat.

Ecology

a. Determination of $p^H$ of a given sample of soil and water.

b. To investigate the chloride contents of water sample (i.e. rough estimate of estamate of salinity).

**Applied Zoology**

a. Study of permanent preparation of blood smear showing different stages of **Plasmodium.**

b. Blood : Erythrocyte sedimentation rat (ESR)

c. Colorimetric estimation of haemoglobin.

d. R.B.C., W.B.C. counts using haemocytometer.

e. Preparation of mouth parts of **honey bee, butterfly, red cotton bud and housefly.**

f. Eternal morphology, identification mark, nature of damage and host of the following pests.

**Sugarcane:** Sugarcane leaf-hopper, Sugarcane whitefly, Sugarcane top borer, Sugarcane root borer, Gurdaspur borer.

**Cotton:** pink bolloworm, Red cotton bug, Cotton grey weevil, Surgace grasshopper, Cotton jussid.

**Wheat:** What stem borer.

**Paddy :** Gundhibug Rice grasshopper, Rice stem borer, Rice hispa.

**Vegetables : Aulocophora, faveicollis, Dacus cucurbitae, Tetranychus tetarius, Epilachna.**

**Pests of stored grains :** Pulse beetle, Rice Weevil, Grain & Flour moth, Rust Red flour beetle, Lesser grain borer.

g. Life stage of silk moth and honey bee.

**Histology**

Students will be given practice in preparing permanent stained histological slides of mammalian tissues (as per theory syllabus) embedded in paraffin wax. Ten selected stained slides will be submitted to the examiners at the time of practical examinations and evaluated alongwith the practical note book. Five blocks and 10 slides with stretched ribbons mounted on them will be submitted by each candidate for use in the practical examination.

**Pisciculture**

a. Identification of riverine and pond fishes **Catla, Labeo Rohita, L. calobasu, Cirrhina mrigala, Barbus sarana, Ophiocephalus punctatus, O. marulius, O. starriatus, Trichogaster fasciata, Mystus seenghala M. cavasicus, M. tengara, callichrous pebola, C. Bimaculatus, Wallago attu, using keys,** based on morphometric and meristic data.

b. Study of some aspects of the life history of cultivable species e.g. food and Fecundity of **Catla/Rohu/Cirrhina.**

c. A study of slides showing different stages in the growth of ova and changes in pituitary.

d. Chemical analysis of pond water and soil for $p^H$, oxygen nitrates, phosphates and chlorides.

e. A study of the slides of fish parasites (parasites to be added).

f. A study of the different types of nets, e.g. cast net, gil net, drift net and drag net.

g. A. visit to lake/reservoir/fish breeding centre.

**Embryology**

Permanent slides. Sections of early development stages of frog upto tadpole, early development stages of chick upto 24 hours, Gametogenesis, structure of egg and sperm.

## GEOLOGY

### Outlines of Test

| | | Max. Marks | Time |
|---|---|---|---|
| Paper-I | (Theory) Structural Geology and Stratigraphy | 45 | 3 hours |
| Paper-II | (Theory) Economics Geology & Indian minerals | 45 | 3 hours |
| Paper-III | (Practical) | 60 | 3 hours |

## Syllabus and Courses of Reading

| Paper-I (Theory) Structural Geology and Startigraphy | Max. Marks 45 | Time 3 hours |
|---|---|---|

*Note :- Nine questions may be set and the candidates will be required to answer five questions in all.*
*A systematic study of rock structure, their origin and significance, Elementary Geology of Dams and Tunnels.*

**Test**

Billings. M.P. : Structural Geology
Stratigraphic correlation, study of various strartigraphic formation of India.

**Text Book**

| | |
|---|---|
| Wadia, D.N. | Geology of India (Macmillan). |
| Krishanan, M.S. | Geology of India and Burma. |

| Paper-II (Theory) Economic Geology and Indian Minerals | Max. Marks 45 | Time 3 hours |
|---|---|---|

*Note : Nine questions may be set and candidate will be required to answer five questions in all.*

**Indian Minerals**

Classification and origin of one deposits. Study of India occurance of mineral fuel and common metallic and non-metallic economic minerals of India.

**Text Books**

| | |
|---|---|
| Bateman, A | Economic Mineral Deposits |
| Brown Coggin | Mineral Deposits of India, |
| Dey. A.K. | Burma and Pakistan. |
| Sharma L.N. and Ram K.S.V. | Introduction of Indian's Economic minerals |

| Paper-III (Practical) | Max. Marks 60 | Time 3 Hours |
|---|---|---|

*Note:- Emphasis may be laid on field work which should be compulsory for all candidates.*
*Map reading, study of geological maps, interpretation of their sections and drawing of section, simple dip and strike problems, study of important Indian Economic Minerals, their identification and geographical distribution.*

## Applied Art (Commercial Art, Designing and Painting)

### Outlines of Test

| | | Max. Marks | Time |
|---|---|---|---|
| Paper-I | (Theory) | 25 | 3 Hours |
| Paper-II | (Practical (Lettering and Layout) | 20 | 5 Hours |
| Paper-III | Practical (Poster/Book Illustration) | 20 | 5 Hours |
| Paper-IV | Practical (Photography or Interior Decoration) | 20 | 5 Hours |
| | Sessional work | 15 | |

### Syllabus and Courses of Reading

Paper-I (Theory) M.M. : 25
Time : 3 Hours

*Note : Candidate are required to attempt five questions in all.*

Commercial Art-its meaning and scope; Aims and objects, need and importance; Impact of photography on Commercial Art. A brief knowledge of the following terms and their techniques Inter-Decoration, holdings, slides, typography and silk screen printing and block-making.

Paper-II Practical (Lettering and layout M. M. : 20

Time : 5 hours

Prepare placards in the following; lettering : Roman; Block, Script Lettering and Free Brush Lettering. Make for layouts of Suitable size; i.e. Press Layout Magazine Layout. Book Cover Design and Greeting Cards.

Size of the placards : 11"X15"

Medium : Ink and Poster Colour

**Paper-III Practical (Poster/Book Illustration)** M.M. : 20
Time : 5 Hours

The students will prepare the following Poster/Book Illustration during the session.

1.Family Planning 2. Educational 3. Green Revolution 4. Indian Handicrafts

Maximum Colours Three (including back-ground)

**For Book illustration two in colour and two in black, white in suitable size.**

Paper-IV Practical **(Photography or Interior Decoration)**

M.M. : 20
Time : 5 Hours

Handling of the Camera, Film developing and enlarging, retouching, Photographs should include Figurative Composition, Portrait Landscape. The student will prepare two photographs each subject in cabinet size.

OR

For Interiour-Decoration :

It should cover the following topics

1. Drawing Room 2. Bed Room 3. Principal's Office 4. A Room in the Hostel

Size : 9"X12"

Medium: Poster Colour/Wax Colour

| Sessional Work | | M. Marks 15 |
|---|---|---|
| 1. | Collection of Reference Album (Press layouts Magazine Layouts Poster, Folders (Newspaper and Magazines) | 100 cuttings |
| 2. | Lay out and Placards | Three each |
| 3. | Poster/Book Illustration | Three each |
| 4. | Photographs/Interior Decoration | Three each |

(To be assessed by the external examiner))
*(File duly signed by the class teacher to be maintained by the students.*

**Books Suggested :**

1. Fundamental of layout : F.H. Wills.
2. Photography : Neblette.
3. Commercial Art : Curt. Peter.

## ELECTRONICS

There will be two theory paper of 45 marks each and a Project examination of 60 marks. The paper- wise instructions shall be as follows :

Paper-I (Theory) M.M. : 45
Time : 3 Hours

*Note : Set Nine questions. Five questions to be attempted, atleast one from each Sectioin*

| Section-A | Section-B | Section-C | Section-D | Section-E |
|---|---|---|---|---|
| Two questions (9 marks each) | Two questions (9 marks each) | Two questions (9 marks each) | Two questions (9 marks each) | One conceptual question on sections A,B, C & D consisting of 5-10 short parts where answer should not be in Yes/No (9 marks) |

Paper-II M.M. : 45
Time : 3 Hours

*Note :-Set nine questions. Five questions to be attempted, atleast one from each Section.*

| Section-A | Section-B | Section-C | Section-D |
|---|---|---|---|
| Two questions (9 marks each) | Three questions (9 marks each) | Three questions (9 marks each) | One conceptual question on Section A, B & C consisting of 5-10 short part where answer should not be in Yes/No (9 marks) |

Paper-III (Practical) M.M. : 50
Project : 30
Experiments : 20
Time : 3+3 Hrs.

**Project :** 30 marks

(A) Laboratory Record and Demonstration 20 marks

(B) Viva-Voce examination (Time : 15 minutes on each project for each candidate) 10 marks

Experiments : 30 marks

## Syllbus and Courses of Reading

Paper-I M.M. : 45
Time : 3 Hours

A. Principles of Analog Computation

Introduction, Solution of linear differential equations with constant coefficients using a combination of op-emps, analog computer symbols, modes of operation in analog computers, repetitive operations of computers, time scaling, amplitude scaling estimation of the maximum values.

B Combinational Circuits Commonly used in Digital Systems : Half-adder, full-adder, code converter, multiplexer, demultiplexer.

C. Sequential Switching Circuits :

A basic sequential circuit, asynchronous sequential circuits, synchronous sequential circuits; flip-flops RS flip-flop. JK flip flop, sequential circuits with master slave memories, master slave J K. flip flop binary counters synchronous binary counter shift registers, some applications of shift registers, synchronization.

D Digital Systems :

Digital to analog converter, analog to digitals, convert memory unit random access memory (RAM), read only memory (ROM) the central processing unit (CPU), input/output units, input-output interfacing, microcomputers.

Paper-II

M.M. : 45
Time : 3 Hours

A Principles of modulation amplitude modulation, frequency modulation and phase and modulation, demodulation, Basic circuit for generation AM/FM Signals :

B. Tevevision :

Basic television system aspect ratio, vertical resolution, kell factor, horizontal resolution and video bandwidth interlaced scanning composite video signal, video modulation and vestigial side-band transmission, television camera tubes, the image orthicon, the vidicon. Frequency band and resolution. Television transmitters. Television receiver. Receiver sweep circuits and their synchronization, colour television, fundamental concepts of a three colour systems, colour television transmitter colour television fundamental concepts of a three colour systems, colour television transmitter colour television receiver.

Televisioin antennas, Hartzian dipole, folded dipole, Yagiantenna Colour television camera, the Liminance and colour difference signals shadow mask colour picture tube, PAL-D colour television system, block diagram of PAL-D encoder, block diagram of PAL-D colour television receiver.

C. Detail Design Principles of the following :

i) Digital Frequency Meter.

ii) Super-heterodyne Receiver using I.C.

iii) Time Base Generator for C.R.O.

iv) Stabilised power supply, usual output- to==15V. 1A , using IC regulators.

v) Multipurpose transformerless public address system.

vi) Digitial voltmeter

vii) Digital clock

viii) Stereo amplifier

ix) Inverter, output 40 watt at 220/230 votts a.c.

Paper-III Practicals

Max. Marks : 60
Projects : 30
Experiments : 30
Time : 3+3 Hours

Section (A) Projects

At least one project out of the list mentioned under *C be completed by each student in the third year of B.Sc.

To this list, it would be possible to add many more useful design jobs subject to the approval of Board of Studies.

i) I (one) project to be completed by each student laboratory record and demonstration 20 Marks
Viva-Voce (10-15 minutes)
as per details given below: 10 Marks

a) Lab record (project report) given relevant experimental data on the project completed. A copy of the project report duly certified by the teacher incharge and Principal of the College should be sent to the external examiner at least two weeks before project examination. 5 marks

b) Demonstraation of the working of the project Examiner may examine the project work by asking the student to measure and show the voltage/wave forms etc. at various points or units of the systtem and then demonstrate the working of complete system. 15 marks

c) Viva-Voce question of functioning of each unit/component, technical details/data of the system. 10 marks

ii) The marks will be awarded only by the external examiner.

iii) Normally not more than 6 students be examined in one session of 3 hours duration.

iv) The project evaluation will be done before the theory examination and by the External Examiner only.

Section-B Experiments

At least 6 experiments out of the list mentioned below be completed by each student in third year of B.Sc.

List of Experiments

1. To study the operation of (a)a. J.K. Flip-flop
   (b)a. D-type Flip-flop
2. To construct a four bit ripple counter and study its operation.
3. To study the operation and characteristics of a four bit BCD Counter.
4. To study the operation and characteristics of a shift register.
5. To construct a 3 input multiplexer and study its operation.
6. To construct a full adder using NAND gats and study its operation.
7. To study the operation of C-Mos decade counter/7 Segment decoder.
8. To identify the various stage of a monochrome TV receiver and to study the waveforms of vertical output and horizontal oscillators out put.
9. To study the operation of D/A converter.
10. To study the operation of A/D converter.

i) Each student will be examined in one experiment which should be alloted by lottery system.

a) Lab record giving relevant experimental data on the experiment performed. 5 marks

b) Performance of the experiment alloted and measurement of relevant data. 15 marks

c) Viva-Voce questions on experiments. 10 marks

ii) i)The marks will be awarded only by the external examiner.

ii) Normally not more than 6 students be examined in one session of 3 hours duration.

iii) Each student will be examined in both project and experiments.

iv) The practical examination will be conducted before the theory examination.

**Guidelines Notes**

i) Components, test equipments and other accessories for the projects in each class will be provided by the college concerned.

ii) Since this course is of practical nature, the number of students in a practical group should not exceed 10.

**References**


1. Electronics for Scientists and Engineers by Viswanathan Mehta and Rajaraman.
2. Electronics Devices and Circuits-Discret and Integrated by Y.N Bapat.
3. Electronics Devices & Circuits by Mattershead.
4. Monochrome and colour television by R.R.Gulati.
5. Digital Electronics Practice by using ICs by MMS Anand and R.P. Jain (Tata Mc Graw Hill).
6. Electronics for Scientists and Engineer, Malmstant and Enks.
7. Electronics Fundamentals and Applications (Vth Edition) by John D. Ryder.


## B.Sc. (COMPUTER SCIENCE)

## B.A.(COMPUTER APPLICATIONS)

### Outline of Series

| | | Max. Marks | Time |
|---|---|---|---|
| Paper-I | Business Data Processing-II | 45 | 3 hours |
| Paper-II | PC Software & C Language | 45 | 3 hours |
| Paper-III | Project work & Viva-Voce. | 60 | |

Paper-I Business Data Processing -II

Max.Marrks :45
Time : 3 hours

*Note:Twelve questions will be set in the paper with two questions from each Unit. Candidates shall be required to attempt in all six questions selecting one from each unit. All questions shall carry equal marks.*

Objectives of the Course

(i)To introduce logical & physical database design.

**Course Contents**

UNIT-1

Logical Database Design Concept of database, objectives of database organization, advantages & disadvantages of database Entites and attributes, Data Models: Relational, Hierarchical & Network Entity relationship diagram.

UNIT-2

Functions of DBMS. Data definition & data manipulation language. Relational database design, normalizations, Database administration.

UNIT-3

Physical Databse Design: Criteria affecting physical organisation, addressing techniques, indexed sequential organisation, Hashing pointers, chains ring structures.

UNIT-4

Multiple key retrieval, Indexed organisation, inverted files, data compaction.

UNIT-5

Data Structures: Basic concept of data & their representation, Sequential & linked representations. Arrays, Stocks and Gueues, Chains, Circular lists and Doubly linked lists.

UNIT-6

Dynamic Storage managements, Garbage collection and storage compaction, strings, binary trees & trees. Tree traversal Algorithms, Graphs.

**Suggested Books**


| | | |
|---|---|---|
| 1. | Martin,J. | Computer Data-Base organization (PHI). |
| 2. | Desai, B.S. | Introduction to Database Systems (Galgotia Publications Pvt. Ltd.). |
| 3. | Date, C.J. | Introduction to Database Systems. (Narosa Publishing House, New Delhi). |

| | | |
|---|---|---|
| 4. | Tremblay, J.P. and Soronson, P.G. | Introduction to Data Structures with Applications (McGraw Hill).S |
| 5. | Saymour, Lipschutz | Theory and Problems of Data Structures. (McGraw Hill Book Company). |


Paper-II: PC Software and C language: Max. Marks:45
Time: 3 hours

*Note: Twelve questions will be set in the paper with two questions from each UNIT. Candidates will be required to attempt in all six questions. selecting one quesition from each UNIT. All questions shall carry equal marks.*

UNIT-1

DOS Commands:DOS Commands for file and process management. Introduction to UNIX; Brief discussion of UNIX in general and details about a few important commands (viz; date, cal, cls grep, l, 's' who, chmod, rm, cp, mv, mkdir, rmdir & cat). Comparison of DOS with UNIX Operating System.

UNIT-2

Word Processing (Word Star) : Creation, Editing, Formatting of documents, Global Search & Replacement of Text, Special Print Features, Mail Merge, Spelling checker.

UNIT-3

LOTUS1-2-3-: Spreadsheet, Building a Computer Spread-Sheet, Application using formule, Conditional calculations, functions like NPV and IRR, Writing macros and Spreadsheet Menus to build a user interface to the spreadsheet applications. Using the graph plotting capabilities of the spreadsheet package. Interfacing the spreadsheet with Data Base System.

UNIT-4

Data Base Management System (DBASE IV); Creating and editing data base files, Report Generation, Label Generation, Building Menu-based Applications.

UNIT-5

Brief history of development of C; Why this name? Operating system with which it runs; importance of C; basic structure of a C Program Programming style of C; Steps involved in executing a C Program constants, variables and data types.

Operators and expressions, Managing input and output operations; decision making, branching and looping.

Arrays: Handling of character strings; User-Defined functions; Development of C Programms.

**Suggested Books:**


1. Manuals of PC Software.
2. Held G:IBM PC & PCXT User's Reference Manuals and Edd Publications 1987.
3. Coffron, J.W. The PC Connection. BB Publications 1987.
4. Russell A Stultz: The Illustrated D Base IV.
5. Parmod Koparkar : UNIX for you (Tata Mcgraw Hill).
6. Brian W. Kirnighan & Dennis M. Ritchie : The C Programming Language (PHI).
7. E Balagurusamy : Programming in ANSI C (Tata Mc Graw Hill).
8. Ralph Myllus: The Illustrated Lotus 1-2-3 (BPB Pub)
9. Hayens WORDSTAR (Jayco Pub./BPb)
10. TAXALI: lotus 1-2-3
11. REE CAANDIGARH D BASE IV
12. -do- WORD STAR
13. -do- LOTUS 1-2-3


Paper-III: Project Work and Viva- voce (To be submitted by 31 March). Max Marks : 60

Distribution of marks:

| | |
|---|---|
| Project Report Evaluation | : 30 marks |
| Viva-voce & Demonstration | : 30 marks. |

Project Work:

Each student shall be required to undertak a real life project problem during the final year under the supervision of a faculty member in computer science of college concened. The project work may be development of a software embodying novel ideas or it may be commercial/industry software development assignment in a real environment.

*Note: (1) Three copies of nicely bound project reports should be submitted by each student.*

*(2) A student can do his project work in any of the following programming languages/software packages*

FORTRAN, COBOL, PASCAL, C, dBase pacage.

Report of project work will consists of the following:

1. Index
2. A duly signed certificate from supervisor certifying that the candidate has done the project under his supervision and the work done in the project is the result of candiate's own effort.
3. A certificate from college Principal certifying that the candidate is the student of this college and he has attended the college computer centre for required no. of days.
4. Acknowledgement duly signed by student.
5. Introduction of topic.
6. Objective of the project.
7. Definition of the problem.
8. Input design, output design,file design.
9. System documentation and flow chart.
10 Listing of the software developed alongwith sample inputs and outputs.
11. Conclusions.
12. Advantages and disadvantages of the software developed.
13. Further scope of the project.
14. References.

**HEALTH & PHYSICAL EDUCATION**

Theory — Max marks : 60
Time : 3 Hours

*Note:The syllabus has been divided into two parts. Ten questions will be set, at least five from each part, concerning all the syllabus and five questions will have to be attempted by the examinees selecting not more than three from each part.*

Part-I

1. Health and Health set up in the country, Organisational set up and functions.
2. Posture-concept of posture, values of posture, causes of poor posture types of postural deformities, thier causes and precautions.

3. Functions of various systems and effects of exercise on the systems:
   (a) Respiratory system
   (b) Circulatory system
   (c) Excretary system
   (d) Digestive system

4. Blood composition and function. Blood pressure and its measurement. Effects of exercise on the blood pressure.

5. Fatique-meaning, types of fatique, symptoms of fatique and the causes of fatique and work.

6. Prevention of sports injury and rehabilitation :
   (a) T Sports injury and various factors causing injury.
   (b) Principles of prevention of sports injury.
   (c) Meaning and scope of rehabilitation.
   (d) Services available for rehabilitation and role of teachers in rehabilitation.

Part-II

7. Psychological aspect of Physical Education :
   (a) The psycho-physical unity of human organism.
   (b) Laws of learning, their application to situations on play grounds.
   (c) Theories of play.
   (d) Individual differences.
   (e) Adjustment.
   (f) Motivation.

8. Sociological aspect of physical education :
   (a) Social nature and learning of man
   (b) Traditions and their influence on behaviour patterns (Social Inheritance)
   (c) Physical Education as a socialising agency.
   (d) Socio-economic status and sports.
   (e) Spectators and Crowd behaviour.

9. Leisure and recreation-Types of Recreation Indoor, Outdoor, active and passive, commercial recreation; agencies promoting recreational activities Hobbies as leisure time activities and their education values.

10. Ergonic aids in work and sports : Alcholol, Nicotine, Cocaine, Fruit Juices, Dopping.
11. Conditioning-Need and Importance, Methods of conditioning.
12. Concepts of Health and Diseases in Yoga : various Yogic practices for maintaining good health in yogic literature.

**Practical** Max. Marks : 40

Part-A : The student is required to select three athletic events one out of the following three groups

1. Track events
2. Jumping events
3. Throwing events 5+5+5+5 viva for three event

Part-B : The student is required to select one game, each of the following groups :

| (B-i) | (B-ii) |
|---|---|
| 1. Hockey | 1. Badminton |
| 2. Football | 2. Table-Tennis |
| 3. Cricket | 3. Lawn-Tennis |
| 4. Basket ball | 4. Yoga |
| 5. Volley-ball | 5. Kabadi |
| 6. Wrestling | 6. Kho-Kho |

*Note : The assessment will be based on the basis of their perfomance. (Individual skill test and game situation) Yoga; performance in 10 asanas and one kriya will be assessed.*

**Books Recommended :**


| | | |
|---|---|---|
| 1. | Charles, A. Bucher | Foundations of Physical Education. The C.V. Nos by company, 1961 S.T. Louis. |
| 2. | Steinhaus A.H. | Towards Understanding of Health and Physical Education, W.M.C. Brown Co. 1963. |
| 3. | Parrot, J. | Anatomy and Physiology for Physical Education Teachers, London Edward. |
| 4. | Kilander, H.F. | Arnold School Health Ed. Macmillan. |
| 5. | Bograt, L.J. | Company Nutrition and Phycical Fitness. |
| 6. | Verma K.K. | Health and Physical Education, Prakash Publications Jalandhar. |
| 7. | Kamlesh, M.L. | Principles and History of Physical Edu. (Parkash Brothers, 1978). |

| | | |
|---|---|---|
| 8. | Aykrold, W.R. | The nutritive Value of Indian Foods and Planning of satisfactory diet, New Delhi, Indian Council of Medical Res., 196. |
| 9. | Butter. G.D. | Introduction to Community Recreation, New York Mc Graw Hill Co. |
| 10. | Swami Kuvalaynanda | Asanas. |
| 11. | Swami Kuvalayananda & S.L. Vinekar. | Logic Theraphy. |
| 12. | Swami Digambar ji and Pt. R.G. Koka ji (Edited) | Hathapradipika of Sareatmarama, Kevalayadhama, S.W.M. Samiti Lonavala-410403. |
| 13. | Gore, M.M. | Anatomy and Physiology of Yogic practices Kanchan Prakashan Lonavala 410403 |
| 14. | Gharote, M.L. | Guidelines for Yogic Practices, Medha Pub. Kevalayadhama, Lonavala. |
| 15. | Joshi, K.S. | Yoga and Personality, Udayana, Pub. Allahabad. |
| 16. | Gadre, R.K. | Biodynamics of Shadanga Yoga & Principles and Practice of Yog Theraphy D.B. Traproveala Sons and Co. Pvt. Ltd. 210, Dr. Nauroji Road, Bombay. |


## FRUIT AND VEGETABLE PRESERVATION, APPLIED NUTRITION, BAKERY, TAILORING AND HOSIERY

### Cutting & Tailoring

Paper-I (Theory)

Max. Marks
B.Sc. B.A.
45 30
Time : 3 Hours

### Syllabus and Courses of Reading

(A) Different kinds of materials generally uned in various types of dress, Methods of trimming suitable for specific materials and styles.

(B) Calculation of quantity of material of different with required for different types of garments and its approximate costs.

(C) Method of taking measurements from body and from tailored garments. Applications of measurements in drafting and developing patterns. Alteration of patterns prepared for different types of figures.

(D) Construction of style and cut in relation to figure of a person Planning, cutting, fitting, correcting and making of garments Pressing and finishing garments.

(E) Technical terms peculiar to dress making. Different parts of a sewing machine and their functions. Special attachment and their uses Types of sewing threads in number used for different materials and sewing needles.

(F) Normal and abnormal human figures, erect body, stooping, semi-corpulent, corpulent, hunch-back, prominent chest square shoulder and stopping shoulders.

**Hosiery**

| | | Max. Marks | |
|---|---|---|---|
| Paper-II (Theory) | (Knitting with hand and machine) | B.Sc. | B.A. |
| | | 45 | 30 |

Time : 3 Hours

**Syllabus and Courses of Reading**

1. Knitting yarns, their classifications, description, properties and uses. Counts and size of yarn. Conditioning of yarn, their strength, twist and elasticity. Principal source of supply. Testing of yarn for count, uniformity and colour fastness.
2. Knitting machines, their nomenclature and uses, mechanism and adaptability for various purposes. Components, their names and descriptions; functions and adjustment. Care and maintenance. Hand knitting needles, their types and uses. Sketching of chief functional parts of knitting machinery.
3. Machine gauge and its estimation Methods of selection of yarn of right count for different gauges of kniting machines.
4. Bleaching, dyeing and finishing of knitting yarns and knitted fabrics. Carbonising and bleaching processes, variety of bleaches, unshrinkable processes Dyes their classification and uses. Application of acid dyes on wool and silk, basic and direct colours on cotton, wool and artificial silk etc. Acid mordant colours on wool sulphur colours on cotton and silk, aniline black on cotton, Colour matching. Correcting of dyeing faults. Identification of dyes on the fibre.
5. Systems of manufacture; full fashioned circular and seamless. Methods of yarn, a feed and wing up tackle. Stitches employed in knitting, their description and application Cutting and sewing, drawing, and clocking. Trimming and making up Choice of materials.
6. Knitted fabrics, their trade name and description, styles and standard specifications, Tuck, lace and embroidered fabrics. Imperfections and their remedies.

7. Colour and designs, theory and colour, blending of colours. Principles of colour harmony and contrast, lace tuck, vertical trimming and pearl stitch designs of classes.
8. Scouring, milling, calendering and pressing of knitting fabrics, labelling and packing methods.
9. Calculations, measurements, and their systems. Yarn numbering system. Determinatin of counts of folded yarn; average counts in knitted fabrics: weight percentages of mixture articles, speed of frames and production.
10. Costing of raw materials and yarn. Costing of Hosiery products for the trade, Marketing of finished products.
11. Practical training.

## PRACTICAL

(4 periods per week spread over 2 days)

Max. Marks
B.Sc. 45 B.A. 30
Time : 3 hours

### Practical Exercises

Students are required to provide themselves with material to be used in the laboratory work.

The following exercises will be carried out by individual trainees under the guidance of the instructor to avoid any wastage of raw material and will be confined as far as possible to the production of such articles as are required for use at the Institute/Centre or for which there is a ready demand in the locality, in order to eliminate accumulation of stocks :

**(A) Children Garments :**

Baby's, frocks, boy's suit or jeans suits with different types of collors, sleeves.

**(B) Ladies Garments :**

Blouse, petticot, kurtas and salwars, suit, night suit or nightie, house coat or gown.

**(C) Gents Garments :**

Shirt or T-Shirt, pant or bellbottoms, pajama and kurtas.

**(D) Knitting dyeing, embroidery etc.**

1. Bleaching and dyeing of knitting yarns and knitted fabrics Souring of woollen yarns.

2. Knitting of cotton and silk is arbends, cottons and woolen vests of styles, plain and artistic socks and stockings of cottons silk and wool.
3. Knitting of mufflers, pullovers, slipovers, etc. of sizes and stales.
4. Knitting designs on the plain and fancy machine and on house tops.
5. Knitting of embroidered hosiery.
6. Testing of yarn and analysis of fabrics.

## RURAL INDUSTRIALIZATION

**Rural Industrialization in Haryana : Practice, Policies and prospect** — Max. Marks : 50, Time : 3 Hours

Rural Industrialization Development Strategy with special reference to Haryana.

1. Resource availability in rural areas of Haryana for rural industrialization : Raw materials, power, technical guidance, financial agencies, labour.
2. Problems of choice of techniques for rural industrialization, Labour versus Capital Intensive techniques.
3 Gandhian Philosophy of rural industrialization.
4. Modernisation of the vocational facilities of village artisans and their training.
5. Major rural Industries in Haryana : Traditional sector, modern sector.
6. Govt. Policy towards rural industrialization in Haryana.
7. Integrated Rural Development programme with special reference to rural industries under the Five Year Plans.

Project Report — Max. Marks : 50

Project report be submitted by students by 15th of March. The Vive-Chancellor may extend the date for submission of report in exceptional circumstances.

## LOCAL SELF-GOVERNMENT

Comparative Local Government — Max. Marks : 100, Time : 3 Hours

This paper will include Local Government system of England and France.

## OFFICE MANAGEMENT

**Business Communication and Typing.** Max. Marks : 100
Time : 3 Hours

*Note : 1. The paper will consist of two parts, i.e. Part-A and Part-B. For Part-A six questions will be set by the paper-setter out of which the candidates will be required to attempt three questions.*

*2. Separate question papers for both Part-A and Part-B will be set For Part-A the paper will be set in English with Hindi Version. For Part-B 'Typewriting' two separate question-papers are to be go set, one for English Typewriting and the other for Hindi Typewriting.*

**Part-A Business Communication** Max. Marks : 40
Time : 2 Hours

Importance of correspondence in business house and Governments offices. Essentials of good business and official correspondence; various forms of correspondence.

Maintenance of Secrecy and keeping records of income and outgoing correspondene.

Drafting and Noting, Techniques of Drafting and Noting, Precis Writing.

**Part-B Typing** Max. Marks : 60
Time : 1 Hour

| | | |
|---|---|---|
| 1. | Typing of a Passage | 20 marks |
| 2. | Typing of a letter | 20 marks |
| 3. | Typing of a table | 20 marks |

(Maximum speed 20 words per minute)

## LABOUR WELFARE

**Labour Legislation In India** Max. Marks : 100
Time : 3 Hours

1. Labour Legislation; Needs and Evolution of Labour Legislation in india and U.K.
2. Social Security in Indian Industries.
3. Employees State Insurance Scheme, 1948.
4. Elements of Industrial Disputes Act, 1957.
5. Elements of Factories Act, 1947.

6. Women Compensation Act.
7. Trade Unionism in India.
8. Collective Bargaining in India.
9. Worker's Participation in Management with special reference to India.

## MARKETING

**Advertising and Sales Management**

Max. Marks : 100
Time : 3 Hours

*Note:-- At least ten question shall be set in the question-paper. The paper shall be divided into five units containing two questions from each unit. The candidates shall be required to attempt five questions in all, selecting atleast one question from each unit.*

Unit-I **Advertising :** Meaning and definition, Characteristics, types functions and importance, Difference among advertising, publicity, Sales promotion and personal selling. Pull vs. Push strategy Objectives of advertising, Objections, against advertising, advertising agency, its functions, selecting advertising, agency.

Unit-II **Message Decisions :** Concept of a advertising copy, types of copies salient features of a good copy selection of appeals, copy writing,, layout.

Unit-III **Media Decisions :** Concept of media, Types of media and their characteristics, factors considered in media selection.

Unit-IV **Sales Management :** Concept, the job of a sales manager, essential qualities, types duties, responsibilities and functions of sales manager, fixation of sales territories.

Unit-V **Sales Organisation :** Meaning, need, importance, principle, forms, functions and limitations of sales organisation; steps in setting a sales organisation, fixation of sales quotas.

## TOURISM

**Paper-I**

Max. Marks : 100
Time : 3 Hours

*Note:- At least ten questions shall be set in this paper with two questions each from Section 1 and 2 and three questions each from Section 3 and 4. The candidates shall be required to attempt any five of the questions. All the questions shall carry equal marks.*

*The questions set in the paper shall be of an elementary nature, not requiring any advanced or specialised knowledge of the topics prescribed. The students shall be required to visit some of the important monuments prescribed in the course..*

**Syllabus and Courses of Reading**

1. Meaning, scope and importance of Tourism. A brief history of Tourism in India.
2. Tourism as an Industry. Tourist services and Hotel Industry, Tourism and Planning Management.
3. Study of the following ancient monuments in historical and cultural perspective :

   Sachi, Somnath, Ajanta, Mahabalipuram, Khajuraho, Chittorgarh, Fatehpur Sikri, Taj Mahal, Pinjore, Deegh Palaces.
4. Study of the following palaces of Tourist interest :

   Delhi, Bombay, Maysore and Srinagar.

**Books Recommended**


1. Bhatia, A K. — Tourism Development-Principles and Practices (New Delhi : Sterling, 1981).
2. Bhatia, A.K. — Tourism in India-History and Development (New Delhi : Sterling, 1978)
3. Anand, M.M. — Tourism and Hotel Indistry in India (New Delhi : Prentice Hall of India. 1976).
4. Seth, P.N. — Successful Tourism Planning and Management (New Delhi : Cross Sector Publications, 1978).
5. Marshall, J. — A Guide to Sanchi.
6. Brown Percy. — Indian Painting.
7. अजय मित्र शास्त्री : अजन्ता ।
8. कन्हैया लाल अग्रवाल: खजुराहो ।
9. Debela Mitre, A.S.I. — Ajanta.

10. Maulvi Ahmed Mohmudin The Taj and its Environment (2nd Ed.) (Printed by R.G. Bansal & Co., 3399 Kasairat Bazar, Agra).

## ACTURIAL SCIENCE

Max. Marks : 100
Time : 3 hrs.

*Note :- Atleast ten questions shall be set in the question paper. The paper shall be divided into five units containing two questions from each unit. The candidate shall be required to attempt five questions in all selecting atleast one question from each unit.*

**Unit-I** **Compound Interest :** Cumulative sinking funds, (Simple problems only). The effect of tax. The determination of the rate of interest in a transaction. Construction of tables. Use the technique of Discounted Cash Flow for investment appraisal.

**Unit-II** **Life Contingencies :** Construction of life tables (including select and ultimate tables) from graduate series of mortality rates; determination and use of functions based thereon. Premium for and values of annuties and assurance on a single life. Alteration of policies, including paid up policies, Surrender values Law of mortality, Statistical applications of mortality tables.

**Unit-III** **Life and Other Contigencies :** Construction of mortality sickness, multiple decrement and other similar tables from graduate data. Determination and use of the functions based thereon. Values of premiums for annuties and assurance on one or more lives. Values and contributions for sickness benefit, pension benefits, disability benefits and widow's and orphans, benefits.

**Unit-IV** **Further Probability and Statistics :** Further probability addition axiom for general events and Warnglas theorem compound distribution and branching process. Elementary stochastic process. Chi-square tests, maximum likelihood estimation. Decision theory, Time series.

**Unit-V** **Mortality and other Acturial Statistics :** Concepts of rates and other indices. Analysis of experience data and derivation of exposed to risk formulae. The calculation on mortality sickness and other decremental rates (including multipe-decrement rates). Graduation methods and their applicaiton,. including curve fitting by methods of least square; tests of graduation. Sources and collection of data for the continuous Mortality Investigation. Features of principal tables in common use. National vital statistics. Population projection methods.

## COMMERCE

**Principles of Management**

Max. Marks : 100
Time : 3 Hours

1. Introduction : Concept and Significance of Management, Functions of Management, Evolution of Industrial Management, Contribution of Taylor, Fayol, and Mayo to the Science of Management.
2. The Management Process, Planning, Organising, Motivating. Controlling and Co-ordination.
3. Authority and Responsibility, Delegation of Authority.
4. Planninig : Planning promises. Kinds of Plans the Process of Decision-making.
5. Organising : Principles of Organisation, Organisational structure, Departmentation, Organisation Charts.
6. Motivation and Leadership Styles.
7. Control : Concept of Management control. Process of control, Principles of control, Control Aids.

## B.A. (Computer Applications) - Vocational Course

## SCHEME OF EXAMINATION

The existing scheme of Examination applicable to B.A. (Part-I,II and III) will continue to be operative. A new subject Computer Applications will be added to the existing list of elective subjects. The students desiring to offer Computer Applications as a subject will be required to take one more elective subject from the existing list of elective subjects. The details about the papers in Computer Applications in Parts-I, II and III B.A. Examinations are as under:-

| Examination | Title of Paper | | Max. Marks B.A. | Max. Marks B.Sc. | Time |
|---|---|---|---|---|---|
| B.A./B.Sc.(Part-I) | CA.I | Computer Fundamentals & Introduction to IBM PC | 35 | 45 | 3 hrs. |
| | CA.II | Operating Systems and Business Data Processing | 35 | 45 | 3 hrs. |
| Practical Examination | | Ist Sitting | 7.5 | 15 | 4 hrs. |
| | | IInd Sitting | 7.5 | 15 | 4 hrs. |
| REPORT ON : | On-The-Job Training of 4 weeks duration during autumn & winter breaks | | 15 | 30 | |
| B.A./B.Sc.(Part-II) | A.III | Data Base Management Systems. | 35 | 45 | 3 hrs. |
| | CA.IV | Structured Programming and Computer graphics | 35 | 45 | 3 hrs. |
| Practical Examination | Ist Sitting | | 7.5 | 15 | 4 hrs. |
| | IInd Sitting | | 7.5 | 15 | 4 hrs. |
| REPORT ON : | On-The-Job Training of 4 weeks duration during autumn & winter breaks | | 15 | 30 | |
| B.A. (Part-III) | CA. V | Computer Aided Drafting & Advanced topics in Computer | 35 | 45 | 3 hrs. |
| Practical Examination | | | 15 | 30 | 4 hrs. |
| | CA. VI | Project Report | 50 | 75 | |

(Last date for submission of Project Report will be 31st March of the Academic Year concerned).

The duration of this Vocational Course shall be three Academic Years and the candidates shall be issued the Degree of B.A. (Pass) (Vocational) with Computer Applications. The degree will be considered at par with B.A. (Pass) degree for the purpose of admission to Master Degree Course.

**Details about Practical Examination**

The practical examination will be given jointly by two examiners, one internal and one external to be appointed by the University.

A common typed/printed question paper will be provided to each student of the class (or group in case it is not possible to conduct practical examination for all the students of a class together due to non-availability of adequate number of computers). The question paper will contain questions, test-data, if required, format in which results are to be produced by the students and the documents the examiners are expected to submit.

An answer-books will also be provided to each student.

The students will be permitted to do their theoretical work, if any, in the examination hall before they move to computer lab for working on the computers.

Each student will be provided a computer to work on it independetly. The students will submit their results in the form detailed in the question paper. The two examiners will jointly evaluate it. They may, if they so desire, descuss the results produced by a student with him while evaluating the paper.

The evaluation will be completed on the day of examination and will be sent to the University in the award list prescribed by the University.

The University will plan for the practical examination to be conducted in each college offering this course, after collecting details from the college well in advance. The details will be communicated to practical examiners well in advance to enable them to plan for the examination. The external examiner may have to go to the Centre/College of examination to get the paper prepared/typed in consultation with internal examiner, a day before the date of examination.

**B.A./B.Com (Computer Applications) Part-III**
**(Vocational Course)**

| | | Max. Marks . |
|---|---|---|
| Paper-CA-V | Computer Aided Drafting | (B.Com.) 70 |
| | & | (B.A.) 35 |
| | Advanced Topics in Computers | **B.Sc. 45** |
| | | Time : 3 Hrs. |

*Note : Examiner should set five questions from each section, making a total of ten questions covering the entire syllabus. Candidates are required to attempt any five questions selecting two questions from each section.*

Section : A

Introduction of AUTOCAD (Release 12). Advanced features of this package. Drawing the plan of a building using AUTOCAD. Analysis features of Autocad.

Section : B

Computer animation. Artificial intelligence. Dedicated computers. ATMS. Data encryption. Data communication and net-working.

*Note : Course to be modified every year to take care of the latest developments. Visits to computer industry.*

Paper-CA-VI Project Report** Max. Marks :
(B.Com.) 100
(B.A.) 50
(Last date for submission will be Ist March of the year concerned) B.Sc. 75

| **Practical Examination** | **Max. Marks** | **Time** |
|---|---|---|
| Design of layout of a building. Design of interior of its rooms. Printing and plotting the prepared drawings | 30 (B.Com.)<br>15 (B.A.)<br>30 (B.Sc.) | 4 hrs. |

***Notes : (i) Each student will be required to undertake real life project problem related to the development of software embodying novel idea or it may be form the part of Commercial/Industrial software development assignment. The project report will be evaluated jointly by two examiners (One External & one Internal). In case of difference of opinion among them, average of the marks awarded by both examiners will be taken.*

*(ii) Theoretical and practical work of Paper CA-V will be completed in the first half of the session. The second half of the session will be utilised by the students solely for project work.*

| | | |
|---|---|---|
| | Variation of cost with capacity, Break-even point. Optimum batch sizes, production scheduling, etc. | 5L |
| | Some aspects of marketing. Pricing Policy. | 4L |
| | Profitability criteria, Economics of selecting alternatives. | 3L |

**Books**

1. Economics of Chemical Industry, Hempel, E.H.

Unit-2 **Industrial Organisation**

| | | |
|---|---|---|
| IC 302 | Concept of Scientific Management in Industry : | 4L |
| | Functions of management, decision making, planning, organising, directing and control; | 9L |
| | Location of Industry | 3L |
| | Materials Management | 5L |
| | Inventory Control | 4L |
| | Management of human resources-selection, incentives Welfare and Safety | 5L |

**Books**

1. Industrial Organisation and Management, Bethel, L.L.

Unit-3 **Industrial Chemical Analysis**

**Industrial Analysis**

| | | |
|---|---|---|
| | Sampling procedures, Sampling of Bulks materials | 3L |
| | Techniques of sampling solids, liquids and gases collecting and processing of data | 2L |
| | Chromatography, paper chromatography | 4L |
| | TLC, GLC, HPLC | |
| | Particle size determination | 2L |
| | Rheological properties of liquids, plastics and their analysis | 3L |
| | Modern Instrumental Methods of Analysis | 3L |
| | UV-visible spectrosophy | 3L |
| | IR-Spectroscopy and non-dispersive IR | 3L |

| | |
|---|---|
| NMR-Spectroscopy | 3L |
| Atomic Absorption, Flame photometry | 1L |
| Neutron diffraction | 1L |
| Ion-Selective electrodes | 1L |
| Ion-Chromatography | 1L |
| X-ray fluorescence | |

**Books**


1. Instrumental methods of chemical analysis, Willard, Merrit, Dean Settel.
2. Introduction to instrumental analysis-Braun R.D. McGraw, Hill Publishing Co.
3. Rheology Theory and Application., Vol. 5, Elrich, R.F.
4. Analytical Chemistry, J.G.Dick, McGraw Hill Publishing Co.
5. Quantitative Inorganic Analysis, A vogal Longman Publication.
6. Instrumental Methods of Analysis, Skoog and West.


**Elective Subjects**

Paper-II **Pharmaceuticals** Max. Marks : 55

Unit-1 Time : 3 Hrs.

| | |
|---|---|
| Historical background and development of pharmaceutical Industry in India in brief. | 2L |
| Pharmacopoeias-Development of Indian pharmacopoeia and introduction to B.P.,U.S.P., E.P., N.E. and other important pharmacopoeias. | 2L |
| Introduction to various types of formulations and roots of Administration. | 2L |
| Aseptic conditions, need for sterlisation, various methods of sterilisation. | 2L |
| Various types of pharmaceutical excipients-their chemistry, process of manufacture and quality specifications-Glidants, lubricants, diluents, preservatives, antioxidants, emulsifying agents, coating agents binders, colouring agents, flavouring agents gelatin and other additives, sorbitol, mannitol, viscosity builders, etc. | 12L |
| Surgical dressings, sutures, ligatures-with respect to the process, equipments used for manufacture, method of sterlization and quality control. | 5L |

Pharmaceutical packaging-Introduction, package selection, packaging materials, ancillary materials packaging machinery, quality control of packaging materials. 5L

Unit-2

FDA, Important schedules and some legal aspects of drugs. Phytochemicals-Introduction to plant classification and crude drugs, cultivation, collection, preparation for the market and storage of medicinal plants. 3L

Evaluation of crude drugs-Moisture content, Extractive value, volatile oil content, foreign organic matter. Quantitative microscopic exeecercises, including of starch, leaf content (Palisade ratio, stomatal number, and Index vein islet number and vein termination number) crude fibre content. introduction to chromatographic method of identification of crude drugs. 6L

Chemical constitution of plants-including carbohydrates, amino acids, proteins, fats, waxes volatile oils, terpenoids, steriods, saponins flavonoids, tannins, glycosides, alkaloids. 9L

Various isolation procedures for active ingradients with example for alkaloid, e.g. vincaalkaloids, reserpine; one for steroids-sapogenin, disgenin, diagroh. 3L

Pharmaceutical quality control (other than the analytical methods covered under core subject)-sterility testing, pyrogenic testing, glass testing, bulk density of powders, etc.

Unit-3

Classification of various types of drugs with examples. 15L

Raw materials, process of manufacture, effluent handling, etc. of the following bulk drugs.

i) Sulpha drugs-Sulphaguandine, sulphamethoxazole

ii) Antimicrobial-chloramphenicol, furazolidine, mercurochrome, isoniazid, Na-PAS.

iii) Antagesis- antiniflammatory-salicylic acid and its derivatives, iuprofen, mefenamic acid.

iv) Steridal hormones-Progesterone, testosterone, methyl testosterore.

v) Vitamins-Vit. A, Vit. B6, Vit. C.

vi) Bramiturates-Pentobarbital

vii)Blockers-Propranolol, atenolol.

viii Cardiovascular agent-Methul dopa

ix) Antihistamines-chloropheneramine maleate.

Product based on fermentation processes 15L

Brief idea of microorganisms, their structure, growth and usefulness Enzyme, systems useful for transformation, microbial products.

General principle of fermentation process and product processing.

Manufacture of antibiotics-pencilin G and semisythetic pencillins, Rifamycin, tetracyclins, Vit. B 12.

Biotransfrmation processes-for prednisolone-11-hydroxylation in steroids.

Enzyme catalyzed transformation, manufacture of epidrine.

**Practicals** Max. Marks : 40

Time : 6 Hrs.

1. Industrial Analysis-Analysis of common raw materials as per the industrial specifications, such as phenol, aniline, formaldehyd, hydrogen, peroxide acetone, epoxide, olefins, oils, etc. 10 expts
2. Synthesis of common industrial compounds involving two steps reactions-for example 4-Bromoaniline 4-Nitrobenzoic Acid, Dihalobenzenes 3 miroaniline, sulpharimide, 4 Ammolegoric acid 20 expts
3. Demonstration of various pharmaceutical packaging materials, Quality control tests of some materials-Aluminium Strips, cartons, glass bottles. 4exts
4. Limit test for chlorine, heavy metals, arsenic etc. of two representative bulk drugs. 3 expt.
5. Demonstration of various pharmeceutical products 7 expts.

Active ingredient analysis of few types of formalations representing different methods of analysis-acidimetery, alkalimetry, nonaqueous complexometry, potentiometry etc.

Determination of sulphate ash, loss on drying, and other tests of bulk drugs, complete I.P. monograph of three drugs representing variety of testing methods. 5 expts

Evaluation of crude drugs-Microscopic examination Determination and identification of starch grannules, calcium oxalate. 7 expts

Palisade ratio, stomatal index determination. Identification of few drugs TLC method for identification.

Microbiological testing-Determining of MIC of some antibacterial drugs by zone/cup plate method. 4 expts

6. Demonstration of various Pharmeceutical packing materials quality control test of some matrials-Aluminium strips 3 cartons glass bottles 4 exts

7. Limit tests for chlorine, heavy metals, organic etc. of two representative bulk drugs. 3 expts

Books

1. Practical Pharmacognosy by T.B. Wilis, Practical Pharmacognosy, by T.N. Vassudevan,

2. Modern Pharmacognosy, by Ramstad., Mc Graw Hill.

3. Indian Pharmacopoea 1985

4. British Pharmacopoea 1990
Hand Book of Drugs and Cosmetic Acts
by Mehrotra

5. Pharmaceutical Excipients.

6. Pharmaceutical Dosage Forms.

7. Principles of Medicinal Chemistry, W.D. Foye : Lea and Febigen, Publication, philadephia.

8. Text book of Organic Medicinal and Pharmaceutical Chemistry Wilson, Gisvold, Derge, Lippinett-Toppen.

Essentials of Medicinal Chemistry-Korolkovas and Burkhatter, Wiley Interscience

Organic Chemistry of Drug Synthesis, Daniel Lednice & L.A. Mitscher, Wiley Interscience.

11. An introduction to synthetic Drugs, P.P. Singh and D.W. Rangnekar. Himalaya Publication, Bombay.

**Paper-II Heavy and Fine Chemicals** Max Marks : 75

Time : 3 Hrs.

**Unit-I Heavy Inorganic Chemicals**

Manufacture of the following with reference to (i) Consumption pattern (ii) Raw materials (iii) Production Process (iv) Major Engineering Aspects (v) Material of Constructions (vi) Quality Control (vii) Hazards and safety (viii) Effluent Management.

| | |
|---|---|
| Synthetic nitrogen products-ammonia, nitric acid, ammonium nitrate and ammonium sulphate. | |
| Chlor-alkali industrial products-caustic soda chlorine | 3L |
| Phosphorus chemicals-Phosphorus, Phosphoric Acid, Ammonium Phosphote, Superphosphate, Triple Superphosphate. | 3L |
| Industrial Carbon-Carbon blacks, manufacture of graphite, and carbon, | 2L |
| Lime gypsom | 2L |
| Silicon, calcium Carbide, Silicon Carbide | 2L |
| Fluorine, Bromine, Iodine, Hydrobromic acid, interhalogen compounds | 4L |
| Sodium chloride, sodium sulphate, sodium sulphite, sodium thio-sulphate, borax, boric acid | 5L |
| Industrial Catalysts-Ranney Nickel, other forms of nickel, palladium and supported palladium copper chromate, Vanadium, and Platinum based catalyst. | 3L |
| Aluminium alkoxides, titanium terachloride, and titanates, titanium dioxide. | 2L |

**Unit 2 Heavy Organic Chemicals**

Manufacture of the following with reference to (i) Raw materials (ii) Flow Chart (iii) Effluent Management (iv) Kinetics (v) Uses-

| | |
|---|---|
| Fischer-Tropsch Synthesis-Examples | 2L |

| | |
|---|---|
| Applications and uses of zeolites as Catalyst. Their use in isomerization and dehydration/dehydroxyllation. | 2L |
| Chemicals derived from acetylene-acetylene, Propargy alcohol, 1,4 butene diol, acrylates, vinyl esters, vinyl chloride. | 4L |
| Pyridine, picolines, phenol, acetone, resorcinol, phthalic anhydride. | 3L |
| Glycerol, sorbitol, melamine, formaldehyde, formic acid. | 3L |
| Triphenyl phosphine, alkyl phosphate chlorination of methane-<br>to methyl chloride, dichoromethane, chloroform, carbon tetrachloride | 2L |
| Ethanolmines-Mono-,di-tri-ethanolamines, Dialkyl) amino ethoinals (dimethyl, diethyl) | 3L |
| Alkyamines-Methylamine, ethylamine, di-,tri-alklyamines (methyl, ethyl, butyal amines, prophl amines) | 3L |
| Eletene, ethyl and methyl acetoacetates. | 1L |
| Accetaldehyde, paradehyde | 1L |
| Speciality industrial solvents-DMF, DMSO, sulpholane, alkylpyrrolidone, THF, dibuty (ether, diethyl ether, diglyme, dimethoxy ethane, dioxane. | 1L |

**Unit-3 Fine and Speciality Chemicals**

| | |
|---|---|
| **Reagents**-Laboratory chemicals from heavy chemical industry in required purity-acids, alkalis, carbonates, drying agents; Analytical reagents sodium carbonate, sodium bicarbonate, potassium dichromate, Oxalic acid, perchloric acid, common solutions-Fehling solution, karlfisher reagent. | 2L |
| Chromatographic materials and HPLC solvents-coating material, precoating of plates, Spectroscopy grade chemicals-Methanol, ethanol, potassium bromide, carbon tetrachloride, nujol, chloroform. | 3L |
| Biochemical reagents-Ninhydrin, tetrazolium blue, naphtha-quinone-4-sulphonate. | 1L |

Manufacture of following fine chemicals with reference to (i) Raw Material of Common industrial compound involving two step rections- for

examle 4-Bromoaniline, 3-nitroaniline, sulphteral (ii) production process (iii) Special material of construction (iv) Hazard and Safety (v) Effluent management (vi) Quality control (vii Specifications.

Sodium borohyrate, lithium aluminium hydride sodium amide, sodium ethoxide, sodium methoxide,

Paracetamol,

Indigo, Vat dyes, Reactive dyes

Essential oils - general, organic flavour, comphor, citral, citronellol, menthol

Surfacants and emulsifying agents - PEG, Tweeps, Spans.

Colouring agents - manufacture of some natural colours and

synthetic colours

Flavouring agents - Fragrances and Food additives.

Natural tetraic acid, (+) tataric acid Resolution of trataric acid Citric acid

Chemicals required for electronic industry.

**Practicals :**

Industrial Analysis-Analysis of common raw material as per the industrial specifications, such as phenol, aniline, formadehyde, hydrogen peroxide, acetone, epoxide, olefins, oils, etc.

Synthesis of Common industrial compounds involving two step reactions-for example 4-Bromoaniline, 3-nitroaniline, sulphanilamide, 4-Aminobenzoic acid, 4-Nitrobenzoic acid, Dihalobenzenes, Nitrohalobenenes.

| | |
|---|---|
| Preparation of Reney-nickel from Ni-Al Alloys and testing its properties. | 1 |
| Any one reaction using the above Catalyst. | 1 |
| Preparation of synthetic Zeolites | 2 |
| Reactions using zeolites | 2 |
| Preparation of aluminium isoprooxide and reactions using the same | 4 |
| Synthesis of trimethyl phosphate and related reagents | 4 |
| Applications of this for O-alkylation and N-alkylation. | |
| Preparation of reagent grade chemicals-sodium carbonate sulphuric acid, etc., solvents, etc. | |
| Synthesis of few fine chemicals For example, amyl acetate flavour chemicals, Paracetamol, sulphanilamide. | |

... lemon grass oil to obtain citral.

... of tartaric acid and phenyl ethyl amine. 6

Isolation of some natural products, like tartartic acid, ... acid, etc.

BOOKS


1. ... Process Industries, Shreve R.N., Mc Graw Hill Book Co., New York.
2. ... Chemistry, Kilner E. and Samuel, D.M. Mc Donald & ... Sulpha Methozazol Antimicrobial - chloramphenicol., furazolidine, isoniazid, Na - PAS n, 1960.
3. Introduction to Material Science and Engineering, K.M., Relis, T. ... J. Wulff, Wiley Eastern Pvt. Ltd. New Delhi.
4. Unit Process in Organic Synthesis, P.H.Groggins, Mc Graw-Hill Kogakusha Ltd
5. Outline of Chemical Technology, C.E.Drygen East West Press, New Delhi.
6. Industrial Chemical, Faith et. al. Wiley Interscience, New York.
7. Heavy Organic Chemicals, A.J.Gaite, Pargmon Press, U.K.
8. Chemicals from Petroleum, Waddams, ELBS and Johan Marray, 1970.
9. ... Inorganic Chemicals, R. Thomson Royal Society of ... Burlington, U.K.


Paper II Petrochemicals Max. Marks : 55

Time : 3 Hours

**Unit : I**

| | |
|---|---|
| Introduction to crude oil, exploratory methods, oil reservoirs, transportation of crude oil, constitution of crude oil.<br>Natural Gas-Constituents. | 6L |
| Distillation of crude oil, Separation of natural gas and different fractions based on relative volatilities. Compositions of different distillates | 3L |
| Meaning of terms such as - Pour point depressants, drag reducers, viscocity reducers, ignition point, flash point, octane number, doctor solution. | 4L |
| Types of hydrocarbon fuels and their characteristics | 2L |

Detailed discussion of the following operations with respect to process, machanism, catalysts used and applications; Cracking - Catalytic cracking, Hydrocracking, Reforming, Isomerization, Alkylation.

**Unit:2**

Sulphur, hydrogen, petroleum coke and nitrogen compounds from petroleum. 4L

General discussion of the following reactions with respect to machanism and applications-Oxidation, ammonidation, hydro formylation, hydration. 4L

Manufacture of the following compounds: methane, ethylene, acetylene, prophylene,C-4 hydorcarbons, higher olefins. 6L

Preparation of the following from mathane-methanol, carbon black, hydrogen cynide, chlorinated methanes carbon disulphidez. 7L

Preparation of the following from ethylene-Ethyl chloride, ethanol, ethylene oxide, ethylene glycol, acetaldehyde, acetic, styrene, vinyal acetate. acid, ethanolamines, vinyl chloride, acrylonitrile. 9L

## Unit:3

Manufacture of the following from propylene: Isopropanol, cumene, glycerine, acrylonitrile. 3L

Manufacture of the following from acetylene : 3L

Vinyl chloride, chloroprene, acrylonitrile. acetaldehyde, 7L

manufacture of the following from hydrocarbons Benzene, tolune, xylenes, naphthalene, liner alkyl benzenes, and their sulphonates, detergents.

Various catalysts used in petrochemical Industry, Preparation, structure, applications and selectivity. 6L

Improtance of petroleum and petroleum Industry in the context of Indian Economy. 4L

Indian petrochemical Industry- Indian reserves, quality and petroleum distribution. Future. 4L

**BOOKS**

1. Handbook of petroleum refining process. R.A. Meyers, Mcgraw Hill Book Comp. New York.

2. From Hydrocarbons to Petrochemicals, L.F.Hatch and S.Master, Gulf Publishing Company, Houston.

3. Petrochemicals - The vise of an industry, Spitz, Wiley.

4. Introduction to Petroleum Chemicals, H.Steiner, Pergaman Press.

5. Catalysts in Petrochemical refining, Trimm.

**Practicals:** Max. Mam.: 40
Time : 6 Hrs.

| | |
|---|---|
| **Industrial Analysis**-Analysis of common raw materials as per the industrial specifications, such as phenol, aniline, formaldehyde, hydrogen, peroxide, acetone, epoxide, olefins, oils, etc. | 10 expt. |
| Synthesis of common industrial compunds involving two step reactions-for example 4-Bromoaniline, 3-nitroaniline, sulphanilamide 4-Aminobenzoic acid, 4-Nitrobenzoic acid, Dihalobenzenes, Nitrohalobenzenes. | 20 expts. |
| Viscocity - Viscocity of hydrocarbons and hydrocarbon mixture, Effect of viscocity reducers | |
| Surface tension-Surface tension of different liquids, effect of surfactants. | |
| Flow measurement in pipes of different materials-effects of drug reducers. | |
| Measurement of flash point, ignition, point, pour point-effect of pour point depressants. | |
| Determination of Calorific value of fuels. | |
| Preparation of a few catalysts used in petrochemicals industry, like doped silica gel, aluminas, treatment of silica gel and alumina with acids, | |
| Characterization of Coke | |
| Characterization of Bitumen | |
| Characterization of petrol, kerosen, diesel, furnace oil, with respect to flash point, viscocity, surface tension, composition, distillation fractions, Hydration of olefins-styrene Dehydration of alcohols-tert butanol Sulphonation of aromatics and preparation of the sodium salt of the sulphonic acid as a detergent. | |

Papar -II **Waste Recycling** Max. Marks : 40

Time: 3 Hours

**Unit-I**

Need for waste recycle: Limitations of raw material resources, waste elimination conversion of waste into useful product. 4L

Identification and qualification of industrial, domestic and agro waste. 4L

Feasibility of recycle, Separation of waste solids, liquids, gaseous.

Solid Wastes: Removal of solid contaminants from water by coagulation, sedimentation, floucculation, solid waste, disposal, incineration fuel palletization, soil conditioning. 10L

Water management : Waste water treatment. Biological physical and chemical treatments. Treatment of water and its re-use in industries, agriculture, oil refineries, thermal power station and domestic uses, Re-use of cooling water. 12L

**Unit:2**

**Physical and Chemical Processes used for the recovery of important compounds from wastes** 16L

Activated carbon absorption, ion exchange process, evaporation, extraction, distillation, contrifugation, filtration, configuration membrane process-osmosis, reverse oxmosis, electrodialysis, prevaporation, freezing processes.

Biological processes for the treatment of waste water: 4L

Trickle filters, activated sludge process, microbial degradation.

Geseous Wastes: Adsorption, catalytic/non-catalytic convrsion, recovry of important gases, CO2, So2, No. etc. Electrostatic precipitation, bag filters, wet/dry grid arrestors. 10L

**Unit :3**

Characterization of wastes, their management and recovery of important compounds from the wastes from the following industries 28L

Dyestuff, Fertilizers, Textile, Oil, Fats and soap, Iron and Steel plants, Tanneries, Slaughter Houses, Rubber, Sugar heavy chemicals, Fermentation, Thermal power stations, Electroplanting, Paper, Paint. 2L

Economics of recycling of waste.

**Books**

To be suggested

**Practicals:** Max. Marks : 40
Time : 6 Hours

Industrial Analysis of common raw materials as per the industrial specifications, such as phenol, aniline, formaldehyde, hydrogen peroxide, acetone, epoxide olefins, oils, etc. 10 expts.

Synthesis of common industrial compounds involving two step reactions - for example 4-Bromoaniline, 3-nitroaniline, Sulphanilamide 4-Aminobenzoic acid, 4-Nitrobenzoic acid, Dihalobenzenes, Nitrohalobenzenes.

Estimation of SO2, NH3, NOx

Estimation of hardness, acidity, alkalinity and pH of water.

Estimation of BOC, COD content of effluent water from different industries.

Analysis of the solid contents from the liquid effluent form different industries, separation of the constituents, chromatographic separation TLC, paper chromatography.

Ion exchangers: Ion exchange capacity of resins, softening of hard water, separation of important metals, Fe, Ni, Cr from the effluents and their estimations.

Activated carbon-Efficiency of carbon, Adsorption isotherms, separation of some important chemicals by adsorption of carbon.

Fuel pallets from garbage and solid wastes.
Calorific value.

The students are expected to collect solid and liquid wastes from nearby industries and analyse with respect to constituents, recovery of important constituents and disposal methods.

Paper-II **Agrochemicals** Max. Marks : 55

Time : 3 Hrs.

**Unit-1**

Pests and Pest control: Types of pests, Types of Chemicals used to control pests, 4L

Types of pesticides; Stomach poison, contact poisons systemic poisons, fumigants.

Insecticides: Inorganic insecticides - Arsenic insecticides. paris green, fluoro insecticides 3L

Insecticides of planto rigin - Nicotine, nornicotine, pyrethoride, rotenoids, anabasin, allethrin. 4L

Chlorinated hydrocarbons - DDT,DDD, nestran, dilan, peprthane, dimite, chlorobenzilate, sulphenex, ovotran, aramite, DFDT, SAR in the class and mode of action. 10L

BHC, chlordane, heptachlor, aldrin, dieldrin, endrin. faodrin, endosulfan, SAR in the class and mode of action. 9L

**Unit-2**

Organophosphorus insecticides:

Inrtoduction, phosphoric acid derivatives-Dimercron, dichlorovos, naled, phosphinon, etc. SAR in the class. 4L

Dithiophosphonic acid derivatives - Melathion,dimethoate, thiocron, formothion, mecarbam, etc. 6L

Thiophosphoric acid - Parathion, methyl parathion, thiophos, demetron, chlorthion, paraoxon, etc. 4L

Pyrophosphoric acid derivatives - TEPP, sulfotepp, schradan

Other organophosphorus, insecticides - Isoppestox, trichlorofon, IPN. 4L

Carbamata insecticides-Carbaryl, isolan, mesurol, zectran, demetram, pyrolan, baygon, mode of action. 6L

**Unit:3**

Fungicides-General introduction 1L

Inorganic fungicides - Sulphur, Lime sulphur, copper sulphate, Bordeaux mixture, Bordeau paste, Boardeaux paint, Burgundy mixture, copper oxychloride, cuprous oxide, mercurous chloride. 4L

Organomercuric compounds - Ethyl mercuric chloride. Ceresan M-Panagen, agalol, uspulan, puratized germisan, Mode of action, agrosan GN 2L

Dithiocarbamates - Ziram, ferbam thiram, nabam, zineb, maneb captan, hinosan, vapam, etc. Mode of action. 5L

Miscellaneous fungicides- Diphanon, dichlone, captan, polpet, difolatan, mesulfan, brestan, dodine, glyodin, methyrimol, terrazole. 3L

Herbicides - Introduction; 2, 4-D; 2,4-DB. 2,4-DES: MCPB; 2,3,5,-T, Monujron, Fenuron, TCA, paraquat. 3L

Fumigants - HCN, CS2 ethylene halides, durofume, methyl halides. 2L

Rodenticides - Zice phosphide, warfarin 3L

Namaticides - DD mixture, aldicarb, fensulfothion.

Plant growth regulators; Introduction, gibberilic acids, indole acetic and butyric acids 4L
Naphathalene acetic acid, cycocil, Mode of Action.

Formulations of pesticides - Dry formulations- Dusts, organnules, wettable powders, seed disinfectants, liquide formulations - Emulsions, suspensions, etc. Aerosols and sprays.

**Practicals:** Max. Marks 40

Time : 6 Hours

Industrial Analysis of common raw materials as per the industrial specifications, such as phenol, aniline, formadehyde, hydrogen peroxide, acetone, epoxide olefins, oils, etc. 10 expts.

Synthesis of common industrial compounds involving two step reacttions - for example 4-Bromoaniline, 3-nitroaniline, Sulphanilamide 4-Aminobenzoic acid, 4-Nitrobenzoic acid, Dihalobenzenes, Nitrohalobensenes. 20 expts

Isolation of nicotine from tobacco leaves/waste.

Preparation of copper sulphate, Estim ion of copper in copper sulphate formulations, Formulations of copper sulphate.

Estimation of arsenic in aresenic insecticides.

Isolation and estimation of active ingradients of commerically available insecticide formulations.

The form of dusts, emulsions, sprays/

Preparation of selected pesticides formulation in Estimation of pesticide residues in food articles.

Study of degradation of pesticides in soil in the presence of sunlight and moisture. determination of pesticides contents in the soil.

Effect of plant growth regulators on the development of plants and fruits.

Industrial visits to agrochemical industry and submission of reports.

**BOOKS**

1. Pesticides-Colour Publications, P.L. Bombay.
2. Elements of plant Protection - L.L. Pyenson, John Wiley & Sons.
3. Insecticides : Action and Metabolism - O. Brien R.D. Academic Press, New York.
4. Fungicides in plant desease control, Y.L.Nene, Oxfford and IBH Publishing Co. New Delhi.
5. Chemistry of Pesticides, N.N.Melnikoy, Springer-Verlag, New York.
6. Chemistry of Insecticis and fungicis U.S. Sree Ramulu, Oxford and IBH Publishing Co., New Delhi.

Paper II **Dyes** Max marks: 55
Time : 3 Hrs.

**Unit:I**

**Chemistry of Intermediates**

Introduction to the History of Dyes. Natural to Synthetic dyes. Important Landmarks in the historical development.

Benzene intermediates - Chloronitrobenzenes, Nitroanilines, Bromonitroanilines, Nitroanisoles, Toluene and xylene Intermediates, Xylidines, Dimionbenzenes, etc.

Naphthalene intermediates - H- and J-acid R-acid, N-W-acid, Chicago acid, Schaffer R and G acid, Napthol sulponic acids, Naphthylamine sulhphonic acids.

Anthraguinone intermediates and miscellaneous intermediates

1-Amino and 2-amino anthraquinones, Bromamine acid, Quinizarin, methyl and methylamino anthraquinones, Disperse dye intermediate, Acid-fyr intermediate.

Unit 2 :

**Chemistry of Dyes**

Introduction, classification of dyes on the basis of structure and the mode of application to the fibre. Relation between chemical constitution of dyes. Chemistry of the following dyes with respect to general structure features, chemistry mode of application to fibre, colour shades, synthesis of typical 4-5 dyes, uses.

Azodyes-Acid, acid mordant, direct, milling and stiblene azo dyes.

**Basic dyes**

Anthraquinone (vat) dyes.

Indigoid dyes

Reactive dyes

Disperse dyes

Optical Whitness Cyanuric chloride based optical whiteners.

**Unit : 3**

**Analysis and Application of Dyes and Dye intermediate**

Analysis of intermediate-different methods used in the analysis, Nitrite value determination, coupling value, titanous chloride reduction, chromatography, halogen content determination, set point, iodimetry, metal estimations Cu, Ni, Cr. etc.

Dyeing General introduction to dyeing methods. Dyeing methods for the following dyes - Direct, acid, reactive, disperse, vat,. Cationic, sulphur, indigo, azoics.

Quality control and factory layout for dyestuf industry.

Effluent treatment and pollution control in dye stuff industry.

**Practicals:** Max. Marks 40
Time : 6 Hours

Industrial Analysis - Analysis of common raw materials as per the industrial specifications, such as phenol, aniline, formadehyde, hydrogen peroxide, acetone, epoxide olefins, oils, etc.

Synthesis of common industrial compunds involving two step reactions - for example 4-Bromoaniline, 3-nitroaniline, Sulphanilamide 4-Aminobenzoic acid, 4-Nitrobenzoic acid, Dihalobenzenes, Nitrohalobenenes.

Analysis of intermediates - Nitrite titrations, diazocoupling, titanous chloride titration, estimations of Cu, Ni, Cr, etc. TLC of intermediate paper chromatography dyes.

Dyeing - Dyening of the following dyes on cotton - Direct, azoics, Acid on wool and silk, TPM - on silm, Vat., Reactive, Sulphur.

Evaluation of the fastness properties of dyes with respect to light washing and sublimation,

Preparation of Methyl orange, Methyl red, Orange II, Flourescein, Anthraquinone.

**BOOKS**

1. LUBS Chemistry of Synthetic Dyes and Pigments, R.E. Krieger Publishing Company.
2. Chemistry of Dyes and Intermediates, Cain, Thrope and Linstead, 1960.
3. Dyeing and Chemical Technology of Textile Fibres, E.R. Trotman.
4. Development in the Chemistry and Technology of Organic Dyes, J. Griffths, Society of Chemical Industry, Blackwell Scientific Publications.
5. The Cehmistry of Synthetic Dyes, K. Venkatraman, Academic press, Vol.1-VIII.
6. The Analytical Chemistry of Synthetic Dyes, K. Benkatraman, John Wiley, New York.
7. A Laboratory Course in Dyesing, C.H. Gites, The Society of Dyes and Colouristis.
8. The Dyeing of ynthetic Polymers and Acetate Fibres. D.M. Nunn, Dyers Company Publishing Trust.
9. Dyes and Their Intermediates, H.A. Abrahart, Pergaman Press.
10. An Introduction to Synthetic Dyes. D.W. Rangnekar and P.P.Singh, Himalaya Publishing, Bombay.

Paper-II **Polymers** Max. marks : 55

Time : 3 hrs.

**Unit-1**

Breif history of macromolecular science. Geneal characteristic of polymers in comparison with common organic compunds. Nomenclature. Distinction between plastics, elastomers and fibers.

**Natural polymers:**

Cellulose, Silk, Gums, Rosin and shellac

- Types of polymers- Thermoplastics and thermosettings,
- Functionality concept

Concept of crosslinking-Linear, branched and crosslinked polymers.

**Types of polymerization** - Addition, condensation, ionic, coordination, addition - polymerisation mechanism; initation, propagation and termination processes initiator, inhibitors, Mechanism of ionic polymerisation.

Methods of polymerization - Bulk, suspension emulsion, solution.

Necessity of co-polymers and co-polymerisation, Blocks and graft copolymers.

Detailed study of the following thermosetting polymers with respect to synthesis, chemistry, properties and applications.

i) Phenolformaldehyde resins.

ii) Amino-resins-Urea-formaldehyde and melamine formaldehyde resins.

iii) Polyurethanes-

iv) Epoxy resins-Grades of epoxy resins, curing process and its importance with mechanism.

v) Polycarbonates, silicones.

Elastomers - Polysoprene, polybutadine, Neosprene.

**Unit-2**

Detail study of the following thermoplastic polymers with respect to synthesis, chemistry properties and applications.

Polyolefins - Polyethylenes - HDP, LDP, LLDP, polypropylene, Ethylene-propylene copolymers.

Polyvinyl chloride - Grades of PVC, Teflon

Polystryene - Homopolymers, copolymers such as SBR ,ABS, SAN.

Vinyl polymers - polyvinyl accetate and its modification like PAV,

PVB and polyacetals.

Polyamines - Nylon-6 Nylon-66 and other Nylons.

Polythers and polysters - Terephthalates.

Celluloses: Such as esters, ethers, acetaters, butyrate, nitrate, CMC Regenrated celluloses.

**Unit:3**

Molecular weight and molecular weight distribution, Number, weight and viscocity average molecular weights of polymers, Methods of determining molecular weight, practical significance of molecular weight distribution. Size of polymers.

Introductory concepts of kinetics of polymerization and Carother's relation.

Glassy state, glass transition temperature, TGA, Factors effecting GTT, Crystallinity in polymers.

Viscocity, solubility, optical, properties, electrical properties, thermal properties, mechanical properties of polymers.

Degration of polymers by thermal, oxidative, machanical and chemical methods.

Polymer processing - Compression moulding, casting, extrusion, fibre spinning, injection moulding, thermoforming, vulcanization of elastomers, polymer industry in India.

**Practicals:** Max. Marks : 40

Time . 6 Hours

Industrial analysis - Analysis of common raw materials as per the industrial specifications, such as phenol, aniline, formadehyde, hydrogen peroxide, acetone, epoxide olefins, oils, etc.

Synthesis of common industrial compounds involving two step reactions - for example 4-Bromoaniline, 3-nitroaniline, Sulphanilamide 4-Aminobenzoic acid, 4-Nitrobenzoic acid, Dihalobenzenes, Nitrohalobenenes. 20 expts

Determination of (i) Acid value-Rosin ester gum, Plasticizers, polyster resin, alkyl resin (ii) Iodine number - Linseed oil, castor oil (ii) Specification value-coconut oil, polyster (iv) Melting point and softening point - Epoxy resin, ester gum, nylon - 6, (v) Viscosity-Nitrocellulose - polystryene, PV acetate (vi) Hydroxl value-

2. Preparation of representative polymers : Bulk polymerization-polysthyrene polyvinyl acetate, polyacrylamide.

polyacrylic acid.
Soluton polymerization; Phenol-formaldehyde, urea-formaldehyde, alkyd resin.

Preparation and analysis of the above (viscocity,m.p.mol.wt. determination)

3. Identification of simple polymers by simple Physical and Chemical tests.
4. Analysis of raw materials-phenols, formaldehyde, urea malamine, epichlorohlydrin.

**BOOKS**

1. Billmeyer, Test book of Polymer Science, John "Wiley & sons.
2. V.D.Deshpande, Physical Chemistry of Macromolecules, Vishal Publishing, New Delhi, 1985.
3. Polymer Science, V.R.Gowarikar, N.V.Vishvananthan and J. Sreedhan,"Wiley Eastern Ltd., 1986.

## TOURISM AND TRAVEL MANAGEMENT

### (Vocational Course)

### Arts Group

A student opting for the above said course will be required to take two Theory Papers each in B.A.I, B.A.II and B.A. III respectively. The allocation of marks and Scheme of examination will be as under :-

| B.A. I | Name of Paper | Time | Max. Marks | |
|---|---|---|---|---|
| Theory Paper-I | Tourism Business (Group discussion and assignment) | 3 hrs. | 35 } } 15 } | 50 |
| Theory Paper-II | Tourism Products (Group discussion and assignment) | 3 hrs. | 35 } } 15 } | 50 |
| **B.A. II** | | | | |
| Theory Paper-III | Tourism Marketing | 3 hrs | 35 | |
| Theory Paper-IV | Travel Agency Tour Business and Accommodation (Field Trips Report) | 3 hrs. | 35<br>30 | |

**B.A. III**

| | | | |
|---|---|---|---|
| Theory Paper-V | Emerging concepts for Effective Tourism Development | 3 hrs | 35 |
| Theory Paper-VI | Information, Communication and Automation | 3 hrs. | 35 |
| | (Training / Project Report) | | 30 |

The students shall be sent for field Trips and Training at the end of B.A.-I and B.A. II examination for a period of 4 weeks and 6 weeks respectively. However, the students will have to submit field trip and training/project report atleast one month before the commencement of B.A. II and B.A. III examination respectively.

Field Trips and Training/Project Reports shall be evaluated by both Internal and External examiners appointed by Under graduate Board of Studies.

The students opting for this Course will be awarded B.A. degree with Tourism & Travel Management and they are eligible to seek admission in Post graduate classes just like other Arts graduates.

*Note : The paper setter should set 10 questions. The examinee should be required to attempt any five questions.*

Paper-V **EMERGING CONCEPTS FOR EFFECTIVE TOURISM DEVELOPMENT**

Max. Marks : 35
Time : 3 Hours

*Note : The Paper Setter should set ten questions. The examiner should be required to attempt any five questions.*

1. Relevant concepts and Preaches for effective Tourism Development.
   - National Development Council Report on Tourism Development.
   - National Action Plan, 1992.
   - New Policies on Tourism and Civil Aviation.
   - Tourist Traffic and its Improvision.
   - Destination Development
   - Substainable Development.

2. Man-Power Development Needs.
3. Management Strategies.
4. Tourism Policy Analysis.
5. Tourism Legislation-A Necessity.

**Suggested Readings**

1. National Development Council Report.
2. National Action Plan, 1992.
3. Reports of World Tourism Organisation.
4. Report-Workshop on Tourism Legislation-August 10-11,1987 IITTM, New Delhi.
5. Report-Workshop on Tourism Legislation-February, 22-23, 1988 IITTM, New Delhi.

Paper-VI **INFORMATION-COMMUNICATION AUTOMATION**

Max. Marks : 35
Time : 3 Hrs.

**Introduction**

*Note : The Paper Setter should set ten questions. The examinee should be required to attempt any five questions.*

The course cover Techniques of communication. Presentation & collection information Data. It also includes Basic knowledge of computers in travel Fields. The attitude and behaviour. The Pattern W.R.T. Customer Services and their Expectation Profile of Visitors from various Destinations is part of the Study.

- Consumer Expectation and Services & Legislation
- National Tourism Civil Aviation & Policy
- Information Technology
- Market Research

  Data Collection
- Consortiums of Airlines Hotel & Wholesalers.

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