Paper-2001: Bryophytes, Pteridophytes and Gymnosperm

Unit-I Bryophytes

1. General characters of Bryophytes
2. Origin of Bryophytes
3. Classification of Bryophytes
4. Thallus structure and reproduction of Bryophytes
5. Affinities of Bryophytes
6. Evolution sporophytes in Bryophytes
7. Alternation of generation in Bryophytes
8. Comparison of Liverworts and Mosses
9. Economic importance of Bryophytes
10. Principal characters of following classes
    (a)Hepaticopsida (b) Anthocerotopsida (c) Bryopsida

Unit-II Pteridophytes

1. General characters of Pteridophytes
2. Classification of Pteridophytes
3. Affinities of Pteridophytes
4. Principal characters of following subdivision
   (a) Psilophytopsida (b) Psilotopsida (c) Lycopsida (d) Sphenopsida (e)Pteropsida
5. Heterospory and seed Habit
6. Telome theory
7. Stelar system and evolution of stele in Pteridophytes
8. Apospory and Apogamy

Unit-III Gymnosperm

1. General characters of Gymnosperms
2. Classification of Gymnosperms
3. Evolutionary trends and origin of Gymnosperms
4. Affinities and relationship of Gymnosperms
5. Important characters of various orders of Gymnosperms
   (a) Cyacadofilicales (b) Cycadeoideales (c) Cycadales (d) Cordaitales (e) Coniferales
6. Economic importance of Gymnosperms

Unit-IV

1. Study of life history of the following types
   (a) Bryophytes
   - Pellia
   - Plagiochasna
   - Pogonatum

(b) Pteridophytes
- Lycopodium
- Isoetes
- Angiopteris

(c) Gymnosperms
- Cupressus
- Taxus
- Ginkgo

Reference Books:

1. Brayophyta and Pteridophyta by Proff. R.C. Mathur; Vardhman Pustak Bhandar
2. Bryophyta, A treatiese by O.P. Sharma and S.A. Siddiqui; K.K. Mittal for Pragati Prakashan
3. A text book of Bryophyta by G.N. Chaudhuri; Vivekanand Kuity for the student friends and co.
4. A class book of Bryophyta by G.L. Chopra; Hari Singh and Bros.
5. Bryophyta – A broad prespective by Dr. (Mrs.) Prem Puri; Atma Ram and Sons
6. The structure and life of Bryophytes by E.V. Watson; Hutchinson and co.
7. Botany [for degree students] Bryophyta by B.R. vashishta; S.Chand and Co.
8. Introduction to Bryophyta by P.D. Sharma; Ramesh book depot
9. Biology and morphology of Pteridophyta by N. S. Parihar; Central book depot
10. Botany for degree students: Pteridophyta by P. C. Vasishta; S. Chand and Co (Pvt.) Ltd.
11. The morphology of pteridophytes by K. R. Sporne; Hutchinson and Co (Publisher) Ltd.
12. Botany for degree students: Pteridophyta by B. R. Vasishta; S. Chand and company Ltd.
13. Gymnosperms Structure and Evolution by Charls joseph Chamberlain; Dover publications
14. Gymnosperms by G.L. Chopra; S. Nagin and Co.
15. The Gymnosperms by M. N. Gupta; Shivalal Agrawala and Co.
16. Botany for degree students: Gymnosperms by P. C. Vasishta; S. Chand Publication
17. Gymnosperms and Palaeobotany by S. K Singh; Campus books
18. Pteridophytes, Gymnosperms and Palaeobotany by Kumarsan and Annie; Saras Publication

Paper-2002: Cell Biology

Unit-I Cell Organization

1. Introduction
2. General account of cell
3. Cell theory
4. Types of cell
5. Comparison between prokaryotic and Eukaryotic cell
6. Comparison between plant and animal cell

Unit-II

1. Plasma membrane
   (a) Molecular organization, current model and functions
   (b) Cell wall architecture
   (c) Biosynthesis
   (d) Growth and cell expansion
2. Nucleus
   (a) Nuclear Envelope
   (b) Nucleolus
   (c) Function

Unit-III

1. Ultra structure and function of following organelles
   (a) Endoplasmic reticulum
   (b) Mitochondria
   (c) Golgicomplex
   (d) Ribosome
   (e) Peroxisomes
   (f) Lysosome
   (g) Chloroplast
   (h) Centrioles

Unit-IV

1. Chromosome :
   (a) Structure
   (b) Types of chromosome
   (c) Packing of DNA
   (d) Molecular organization of Centromere and Telomere
   (e) Giant chromosome
2. Cell Cycle
   (a) Introduction
   (b) Phase G_1, S and G_2
3. Cell division
   (a) Mitosis and control of cell division

(b) Meiosis

Reference Books:

1. Cell Biology by C. B. Powar; Himalaya publication house
2. Cell Biology by Vishwanath ; S. Chand and company
3. Cell Biology by S. P. Singh and B. S. Tomar; Rastogi Publications
4. Cell Biology- Fundamentals and applications by M. L. Jangir; Student edition
5. Cell Biology- organelle structure and function by Devid ; Jones and Bartlett publishers
6. Cell Biology by Anju Bhasin; Discovery Publishing house
7. Fundamental concept of Cell Biology by K. G. Purohit; Pragati Prakashan
8. Cell Biology by R. M. Shulka; Dominant Publishers and distributors
9. Cell Biology by Neal O. Thorpe; John Willey and sons publication

Paper-2003: Biostatistics, Botanical technique and computer application

Unit- I Biostatistics –I

1. Principle, scope and definitions of Biostatistics
2. Data types, Collection of data, Processing of data and Presentation of data
3. Measures of central tendency
   (a) Mean
   (b) Median
   (c) Mode
4. Measures of dispersion
   (a) Standard Deviation
   (b) Standard Error

Unit- II Biostatistics –II

1. Test of statistical significance
   (a) Chi-Square test
   (b) T-test
2. Probability:
   Definition, Basic concepts and Theorems of probability
3. Correlation analysis:
   Definition, Types of correlation, Degree of correlation and uses, methods of studying and calculation of Co-efficient of correlation
4. Regression analysis:
   Definition, Types and uses of regression analysis and methods of studying
5. Comparison of correlation and regression

Unit- III Botanical technique

1. Anatomical Technique
   (a) Microtome sectioning
   Fixation, Dehydration, Infiltration, Embedding, Sectioning and Staining
   (b) Camera Lucida
2. Ecological technique
   (a) Methods of floristic survey
   (b) Quadrates and transect methods
3. Physiological technique
   (a) Spectrophotometry and colorimetry
   (b) Paper Chromatography
   (c) Centrifugation
   (d) Electrophoresis

Unit-IV Computer Application

1. Introduction to computer
    (a) History of computer
    (b) Characteristics of computer
    (c) Use of computer
2. Generation of computer
3. Classification of computer
4. Processor
5. Part of computer
6. Hardware and software of computer
7. Internet
    (a) Introduction
    (b) Types of network
    (c) Resources for internet
    (d) World Wide Web (www.)

Reference Books:

1. Biostatistics in theory and practice by T. K. Saha, Emkat publications, Delhi
2. Biostatistics by P. Ramakrishnan, Saras publication, Kanyakumari
3. Biostatistics by P. N. Arora and P. K. Malhan, Himalaya Publishing House, Mumbai
4. Botanical micro technique by J. E. Sass
5. Plant micro technique by Johansen D. A.
6. Basic Statistics: A Primer for the Biomedical Sciences by Dunn and Clark., 3rd Ed. John Wiley & Sons, Inc, New York

Paper-2004: Taxonomy of Angiosperm

Unit I:

1. Objective and principles of plant taxonomy
2. Salient and characteristics features of Angiosperms
3. Classification of Angiosperms
   (a) Objective and types of classification
   (b) Engler and prantl's system
   © Hutchinson's system
   (d) Takhtajan's system
   (e) Ahur cronquist's system
4. Comparison between Bentham and Hooker, Engler and Prantl and Hutchinson's classification
5. Plant collection and preparation of herbarium
6. Botanical survey of India

Unit II:

1. Taxonomy in India
2. Origin and evolution of Angiosperms
3. Botanical museum
4. Taxonomic literature
5. Fossil Angiosperms

Unit III:

1. Phylogeny and floral variation of the following:
   (a) Parietals
   (b) Rosales
   (c) Geraminales
   (d) Myrtales

Unit IV

1. Study of the following families giving importance to morphological peculiarities if any, and economic importance, interrelationship and evolutionary lines.
   a. Dilleniaceae
   b. Guttiferae
   c. Malpigniaceae
   d. Oxalidaceae
   e. Balnitaceae
   f. Celastraceae
   g. Turneraceae
   h. Cactaceae
   i. Plumbaginaceae
   j. Santalaceae
   k. Orchidaceae
   l. Commelinaceae

Reference Books:

1. Manual of Cultivated plants by Bailey, L. H; The Macmillan Comp.
2. Plant Classification by Benson, L. B; D. C. Health Comp.
3. Plant Taxonomy by Benson L. B. ; Ronald Press
4. Plant taxonomy by Core E. L.; Prentice-hall Engle-wood Cliff .
5. Evolution and classification of Flowering plants by Cronquist A.; Nelson New York
6. Principles of Angiosperm Taxonomy by Devis P. H. And V. M. Heywood; Oliver and Boyd, Edinburgh
7. Families of flowering plants by Gunderson A.; ELBS series
8. The families of flowering plants Vol-I Dicotyledon and Vol-II Monocotyledon by Hutchinson J, Oxford University Press
9. College Botany Vol-III by Mukerjee S.K. ; New central Book Agency
10. Morphology of Angiosperm by Coutter J. M. And Chamberlin;

Practical: BOT-2005

(Bryophytes, Pteridophytes, Gymnosperms, Cell Biology and techniques)

- The candidates should study the typical vegetation in natural condition and should record their observation in journals. Excursion should be arranged during the year to local places.
- Every candidate shall complete laboratory course in accordance with the regulations issued from time to time by Academic Council on the recommendation of the Board of Studies.
- Every candidate shall record observation directly in the laboratory journal. Every journal shall be signed periodically. At the end of the semester candidate shall produce certified journal during the practical examination.

- Study of morphology and anatomy of vegetative and reproductive organs using clear whole mounts/sections of the following genera:

1. Bryophytes
   a. Marchentia
   b. Pellia
   c. Lunularia
   d. Targionia
   e. Notothylas
   f. Pogonatum
   g. Funaria
2. Pteridophytes
   a. Azolla
   b. Salvinia
   c. Lycopodium
   d. Isoetes
   e. Botrychium
   f. Gleichenia
   g. Pteris
   i. Lygodium
3. Gymnosperms
   a. Thuja
   b. Podocarpus
   c. Zamia
   d. Taxus
   e. Zinkgo
   f. Cupressus

- To study different stages of Mitosis from onion root tip
- To study different stages of Meiosis from flower buds
- Determine the frequency, density and abundance of the different species by quadrate methods

Practical: BOT-2006
(Taxonomy; Biostatistics and Computer application)

- Statistical Problems (Probability, Chi-Square test and Correlation analysis)
- To study different parts of computer and there functions (CPU, Monitor, Key board, Mouse, Pen drive, CD, DVD, Printer, RAM, Card Reader and different types of cable)
- To study placentation from given material (Marginal, Free central, Axile, Parietal, Super ficial and Basal)
- Study Camera Lucida
- Classification, general and distinguishing characters of the families and examples. Classification according to Bantham and Hooker system (Family as per theory paper)
  1. Dilleniaceae
  2. Guttiferae
  3. Malpigniaceae
  4. Oxalidaceae
  5. Balanitaceae
  6. Celastraceae
  7. Turneraceae
  8. Cactaceae
  9. Plumbaginaceae
  10. Santalaceae
  11. Orchidaceae
  12. Commelinaceae