

M.Sc. Botany
(Semester-II)

MBOTCC-6: Taxonomy, Anatomy & Embryology (5 Credits)

Time: 2hrs

Marks: 70

The question paper will consist of 7 questions divided into 3 sections.

Section A: Question No.1 will be compulsory comprising ten objective type questions (five from each Unit) each carrying two marks (10x2=20 marks).

Section B: Question No. 2 will also be compulsory and comprise five short answer type questions (two from each Unit) and students will have to attempt only four questions (4 x 5=20marks).

Section C: Five long answer type questions are to be set (one from each Unit) of which any three questions are to be answered (3 x 10=30 marks).

Unit-I

Classification: A historical account of Pre-Linnaean, Linnaean, Post-Linnaean and Pre-Darwinian Natural Systems and Post-Darwinian Phylogenetic Systems
Contemporary Systems: Arthur Cronquist, Armen Takhtajan, Robert F. Thorne and Rolf M.T. Dahlgren.

Unit II

Concept of taxa: Species, sub-species, variety and form, genus, family and higher categories
Concept of characters: 'Good' and 'Bad' characters, correlation of characters, character weighting
And variation
Botanical nomenclature: Binomial system and International Code of Botanical Nomenclature (ICBN)

Unit III

Post Mendelian approaches: An introduction to Genealogy, Experimental taxonomy, Cytotaxonomy, Biocytochemistry, Palynotaxonomy, Chemotaxonomy, Numerical Taxonomy/Taxometrics & Molecular Systematics

Unit IV

Differentiation, polarity, asymmetry, factors affecting differentiation and morphogenesis
Mastocline Types
Organization of Shoot Apical Meristem (SAM)
Organization of Root Apical Meristem (RAM)
Differentiation of epidermis with special reference to stomata
Anomalous secondary growth
Node, Floral and Seed Anatomy - A phylogenetic consideration
Anatomy in relation to taxonomy

Unit V

Development of ovule, megasporogenesis and organization of female gametophytes (embryo sacs)
Pollen-Pistil interaction
Double fertilization and post fertilization changes leading to formation of seed, development of embryo, endosperm and seed coat
Polyembryony and Apomixis
Role of embryology in Taxonomy

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M.Sc. Botany
(Semester-II)

BIOTCC-7: Physiology & Biochemistry (5 Credits)

Time: 3hrs

Marks: 70

The question paper will consist of 7 questions divided into 3 sections.

Section A: Question No.1 will be compulsory comprising ten objective type questions (ten from each Unit) each carrying two marks (10x2=20 marks).

Section B: Question No. 2 will also be compulsory and comprise five short-answer type questions (one from each Unit) and students will have to attempt only four questions (4 x 5=20marks).

Section C: Five long answer type questions are to be set (one from each Unit) of which any three questions are to be answered (3 x 10=30 marks).

Unit-I

Osmotic relations; Transport phenomena in plants; Transport of water and organic solutes, mechanism of xylem transport, mechanism of phloem transport, phloem loading and unloading

Unit-II

Energy transduction mechanism in plants; Photosynthesis; Difference between two pigment systems, Light reaction and dark reaction, water oxidizing complex, carbon fixation in C_3 and C_4 plants
 N_2 fixation: Non-symbiotic and Symbiotic

Unit-III

Plant growth and development; Growth hormones and growth regulators, mode of action of auxin, transport of auxin, physiological role of auxin
Gibberellins: Mode of action and physiological role
Cytokinin: Physiological role and mode of action

Unit-IV

Enzymology: Enzymes: structure and classification, cofactors, coenzymes, prosthetic groups, isoenzymes, allosteric enzymes, multienzymes, mechanism of enzyme action, properties of enzymes

Unit-V

Biochemical Energetics: Glycolysis, TCA cycle, ETS, oxidative phosphorylation, photophosphorylation; Difference between oxidative phosphorylation and photophosphorylation

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M.Sc. Botany
(Semester-II)

MIOTCC-8: Plant tissue culture, ethanobotany, biodiversity & biometry (5 Credit)

Time: 3hrs

Marks: 70

The question paper will consist of 7 questions divided into 3 sections.
 Section A: Question No.1 will be compulsory comprising ten objective type questions (two from each Unit) each carrying two marks (10x2=20 marks).
 Section B: Question No. 2 will also be compulsory and comprise five short answer type questions (one from each Unit) and students will have to attempt only four questions (4 x 5=20marks).
 Section C: Five long answer type questions are to be set (one from each Unit) of which any three questions are to be answered (3 x 10=30 marks).

Unit I

Cell and Tissue culture: Laboratory equipments, General techniques of aseptic manipulation, Composition of culture media and its preparation. Callus culture, suspension culture and single cell culture
 Organ culture: *In vitro* culture of vegetative and reproductive parts Clonal propagation
 Plant protoplasts: Isolation, culture methods and plant regeneration
 Role of tissue culture in crop improvement

Unit II

Traditional ethnomedicinal knowledge base: Traditional knowledge base of Indian ethnic and local communities and their practices
 Ethnopharmacology, Medical and paramedical use of plants in aboriginal of primitive societies in the world
 Ethnobotany: Use of local biodiversity by aboriginal people for sustenance

Unit III

Biodiversity concept: Origin of the term, themes of biodiversity concept
 Benefits of Biodiversity: Direct economic benefits to mankind, genetic resources, essential ecosystem services
 Types of Biodiversity: Genetic, species and ecosystem diversity, distribution at global and national level, Assessment and inventory based on recommendation of IUCN, Biodiversity conventions and Biodiversity Act 2002
 Patterns of loss of Biodiversity: Red lists, Red Data Book and Green Book
 Red Data Categories: Extinct, endangered, vulnerable and threatened species.
 Causes of biodiversity loss and extinction: Natural, genetic and ecological causes; human impacts including development pressure; Habitat loss, encroachments and overexploitation of resources
 Representations of loss biodiversity including future climate change

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Unit-IV

Conservation of Biodiversity (Phyto diversity)

Distinctions between preservation and conservation, Conservation potential index, Protocols for conservations, Traditional conservation practices

In situ and *ex situ* conservation

Patenting, Intellectual property right, Biosafety protocols

People's movements for biodiversity conservation

Unit-V

Biometry

Distribution and measurement of variation, Mean, Median, Mode, Standard deviation, standard error, coefficient of variability, test of significance- t test, F- test (analysis of variance); Measurement of correlation coefficient, Application of chi-square test for testing hypothesis

MIBOTCC-9: Practical 2 (Based on MIBOTCC 5, 6, 7, 8 & 9) (5 Credits)

Time: 3 hrs

Marks: 70

1. Preparation of culture media for growth of *Rhizobium*, *Azotobacter* and *Nostoc*.
2. Production microbial Biofertilizers: *Rhizobium*, *Azotobacter* and *Nostoc*.
3. Family description of some locally available Plants.
4. Anatomical secondary growth of some common plants (*Tinospora*, *Eurhachnia*, *Nyctanthes*, *Artibeus*, *Artocarpus*).
5. Staining of Xylem and Phloem elements.
6. Study of stigma by squash method
7. Study of pollen germination
8. Mounting and study of embryo and endosperm.
9. Separation of chlorophyll pigment by paper chromatography.
10. Determination of water potential using plasmolytic method.
11. Estimation of protein by Lowry method.
12. Study of alpha-amylase in germinating seedlings.
13. Separation of amino acids by TLC.
14. Preparation of MS media for plant tissue culture.
15. Ex-plant culture and callus initiation.
16. Taxonomy and significance of some important medicinal plant.

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