

Model Question Paper  
**M.Sc. Botany – Semester II**  
**Core paper 201: GENETICS**  
(With effect from 2021 - 2022 admitted batches)

**Time: 3 hours**

**Max. Marks: 80 marks**

(16 X 5 = 80)

Answer **one** question from **each Unit**

All questions carry equal marks

**Unit – I**

1. a. Write about Mendel's experiments and theories and the applications of probability laws to Mendelian principles.  
b. Explain about the concepts of Penetrance, expressivity, pleiotropism, complete and incomplete dominance.

**OR**

2. a. Explain about the Concept of genetic markers and their types.  
b. Write in detail about Multiple allelism and the interactions among multiple alleles.

**Unit-II**

3. a. Write in detail about linkage and crossing over.  
b. Write an essay on Tetrad analysis.

**OR**

4. a. Explain about the various methods of recombination in prokaryotes.  
b. Write about the fine structure analysis of gene and methods of gene mapping in bacteria.

**Unit – III**

5. a. Write an essay on the chromosomal and genetic basis of sex determination.  
b. Explain in detail about sex-linked, sex- influenced and sex-limited characters and their inheritance.

**OR**

6. a. Write an essay on polygenic inheritance and add a brief note on QTL mapping.  
b. Write an essay on extra chromosomal inheritance and male sterility.

**Unit – IV**

7. a. Write an essay on the eukaryotic gene and its various functional parts.  
b. Explain about the organization and significance of multigene families.

**OR**

8. a. Write an essay on Transposable elements, their types, mechanisms of transposition and their significance.  
b. Explain about the variant forms of the eukaryotic genes like nested genes, overlapping genes, assembled and assorted genes.

**Unit – V**

9. a. Write an essay on Mutations- its types, causes and detection.  
b. Explain about the molecular basis of mutations and add a brief note on mutagens.

**OR**

10. a. Explain in detail about the molecular mechanism of recombination.  
b. Write an essay on the various theories or models of recombination.

Model Question Paper  
**M.Sc. Botany - Semester II**  
**Core Paper 202: MOLECULAR BIOLOGY OF PLANTS**  
(With effect from **2021 - 2022** admitted batches)

**Time: 3 hours**

**Max. Marks: 80 marks**  
(16 X 5 = 80)

Answer **one** question from **each Unit**.  
All questions carry equal marks

**Unit:1**

- 1    A    Write a note Carbohydrates
- B    Describe the Protein trafficking through GERL system

**OR**

- 2    A    Describe the Ca-calmodulin pathway.
- B    Explain the DNA structure, A, B and Z forms of DNA

**Unit: II**

- 3    A    Explain the process of protein synthesis
- B    Write a note Genetic code

**OR**

- 4    A    Explain the Ribosome as a translation factory
- B    Explain the structure and functions of tRNA

**Unit: III**

- 5    A    Describe the Types of small RNAs
- B    Write a note spliceosome,

**OR**

- 6    A    Describe the Transcription factors.
- B    Explain the capping and tailing

**Unit: IV**

- 7    A    Write the differences between uni and bi directional mode of DNA replication
- B    Explain the theta mode of DNA replication,

**OR**

- 8    A    Write a note on DNA damage and repair.
- B    Explain the rolling circle mode of DNA replication

**Unit: V**

- 9    A    Explain the Lac operons
- B    Describe the zinc fingers and leucine zippers

**OR**

- 10   A    Explain the Tryptophan operons,
- B    Describe the DNA methylation and gene imprinting

Model Question Paper  
**M.Sc. Botany - Semester II**

**Core Paper 203: BIOLOGY AND DIVERSITY OF PTERIDOPHYTES AND GYMNOSPERMS**

(With effect from 2021 - 2022 admitted batches)

**Time: 3 hours**

**Max. Marks: 80 marks**

(16 X 5 = 80)

Answer **one** question from **each Unit**.

All questions carry equal marks

**Unit – I**

1. a. Distinguish the characteristics of Pteridophytes when compare to bryophytes and Gymnosperms.  
b. Examine the stellar Evolution in Pteridophytes

**OR**

2. a. Give an account on Classification of Pteridophytes  
b. Discuss the Economic importance of Pteridophytes in different aspects

**Unit – II**

3. a. Enumerate the Morphology, anatomy and reproduction of *Selaginella*, *Isoetes*.  
b. Explain the morphology and reproduction of Equisetum.

**OR**

4. a. How Marselia sporophyte is advanced over other pteridophytes. Discuss its advanced features.  
b. Critically explain the fossil Pteridophytes.

**Unit – III**

5. a. Analyse the Heterospory and explain the origin of seed habit.  
b. Examine the evolutionary time scale Gymnosperms.

**OR**

6. a. General account of fossils. Types of fossil formations.  
b. Analyse Gymnosperms in comparison to ferns and seed plants.

**Unit – IV**

7. a. Enumerate Classification of Gymnosperms and their distribution in India.  
b. Elaborate fossil gymnosperms and general account on pteridospermales.

**OR**

8. a. Critically Analyse the Bennettitales.  
b. Enumerate the Cordaitales.

**Unit – V**

9. a. Economic importance of Gymnosperms.  
b. Structure and reproduction in living Gymnosperms of Cycadopsida,

**OR**

10. a. Write an account of structure and development of male and female strobili of Coniferales.  
b. Discuss the structure and reproduction of Gnetum

Model Question Paper  
**M.Sc. Botany - Semester II**  
**Core Paper 204: PLANT CELL, TISSUE AND ORGAN CULTURE**  
(With effect from **2021 - 2022** admitted batches)

**Time: 3 hours**

**Max. Marks: 80 marks**

(16 X 5 = 80)

Answer **one** question from **each Unit**.  
All questions carry equal marks

**Unit – I**

1. a. Define tissue culture and describe the basic concepts and methods of tissue culture  
b. What is Totipotency and explain about concept of cellular differentiation.

**OR**

2. a. Explain about different sterilization methods used in tissue culture.  
b. Write an essay on different types of cultures.

**Unit – II**

3. a. Explain about Bio chemical and molecular aspects of tissue culture cycle.  
b. Write about techniques and applications of cryopreservation and germplasm storage.

**OR**

4. a. What is organogenesis and give a general account of organogenesis.  
b. What is somatic embryogenesis. Describe the principle and protocol to induce somatic embryogenesis.

**Unit – III**

5. a. Describe the methods for development of androgenic and gynogenic haploid production.  
b. What are dihaploids. Explain about production and importance of dihaploids in agriculture.

**OR**

6. a. What is embryo rescue? Explain about principle and applications of embryo culture.  
b. Write a brief account on induction and selection of mutants.

**Unit – IV**

7. a. Explain about types of cell cultures and production of secondary metabolites through cell culture techniques.  
b. What is somatic hybridization and discuss its importance.

**OR**

8. a. Give a general account on protoplast culture and its merits and demerits.  
b. Discuss the role of protoplasts in genetic transformation.

**Unit – V**

9. a. Write an essay on tissue culture applications in plants.  
b. What are artificial seeds explain its production and applications.

**OR**

10. a. Discuss about soma clonal variations and its applications.  
b. Explain about different techniques of plant tissue culture in forestry.

Model Question Paper  
**M.Sc. Botany - Semester II**  
**Core Paper 301: TITLE TAXONOMY OF ANGIOSPERMS AND PLANT RESOURCES**  
**UTILIZATION AND CONSERVATION**

(With effect from **2021 - 2022** admitted batches)

**Time: 3 hours**

**Max. Marks: 80 marks**

(16 X 5 = 80)

Answer **one** question from **each Unit**.

All questions carry equal marks

**Unit – I**

1. a. Write an essay on the origin and evolution of angiosperms and add a brief note on fossil angiosperms.  
b. Explain the concepts of taxonomy, systematics, and taxonomic hierarchy.

**OR**

2. a. Explain in detail about plant identification and the principles used in assessing relationship and delimitation of taxa.  
b. Write an essay on the concepts of Plant nomenclature

**Unit – II**

3. a. Write a detailed account of the salient features and evolutionary tendencies in Glumiferae.  
b. Explain the role of Embryology in Taxonomy.

**OR**

4. a. Explain the use of biochemical and molecular markers in Taxonomy. Add a note on cladistics in Taxonomy.  
b. Explain the phytochemical features of interest In taxonomical studies with examples.

**Unit – III**

5. a. Write an essay on the various systems of Angiosperm classification  
b. Explain in detail about the basic concepts of Molecular Systematics.

**OR**

6. a. Write an essay on the relevance of Taxonomy to conservation, sustainable utilization of bio resources and ecosystem research.  
b. Explain in detail about the relative merits and demerits of Thorne systems of classification.

**Unit – IV**

7. a. Write in detailed on origin, evolution, Botany, cultivation and uses of Cotton.  
b. Write an account of the origin of agriculture and add a note on secondary centers.

**OR**

8. a. Write an account of the origin, evolution, botany, cultivation and uses of Red gram.  
b. Write an essay on the world centers of domestication with special focus on the Indo-Burmese center.

**Unit – V**

9. a. Write an essay on Green Revolution, its history, benefits and adverse consequences.  
b. Explain in detail about the introduction, concept, objectives and scope of Ethnobotany.

**OR**

10. a. Write an essay on the principles of conservation and the *in-situ* and *ex-situ* strategies undertaken in India.  
b. Explain in detail about the concept of biodiversity, its status in India, its utilization and concerns.