

Exam Code: 225102

Paper Code: 2230

Programme: Master of Science (Botany) Semester: II

Course Title: Pteridology

Course Code: MBTL-2071 ✓

Time Allowed: 3Hours

Max Marks: 70

Note: Attempt five questions in all, selecting atleast one question from each section. Fifth question may be attempted from any section. Each question carries 14 marks.

SECTION A

1. What do you know about origin of land floras? Explain telome theory about differentiation of organs in vascular plants. 14
2. Explain life cycle of pteridophytes with reference to alternation of generations with diagrams. 14

SECTION B

3. Describe comparative organography, and reproduction with appropriate diagrams in Rhyniales and Psilotales. 14
4. Explain life cycle of genus *Lycopodium* of order Lycopodiales with diagrams. 14

SECTION C

5. a) Explain about morphology of *Equisetum*.
b) Give a brief account of evolution of sorus in filicales with examples. 2*7= 14
6. a) Illustrate stelar types in pteridophytes.
b) Explain mechanism of sporangial dehiscence and spore dispersal in ferns. 2*7= 14

SECTION D

7. Explain heterospory and seed habit with example. And state how seeds might have developed from heterosporous condition? 14
8. Describe role of polyploidy and hybridization in speciation in ferns in detail. 14

Exam Code: 225102

Paper Code: 2231

Programme: Master of Science (Botany) Semester: II

Course Title: Diversity and Biology of Gymnosperms

Course Code: MBTL-2072 ✓

Time Allowed: 3Hours

Max Marks: 70

Note: Attempt five questions in all, selecting atleast one question from each section. Fifth question may be attempted from any section. Each question carries 14 marks.

SECTION A

1. Define Gymnosperms? Explain about diversity of their vegetative and reproductive organs with suitable diagrams and examples. 14
2. a) How is Geological time table useful in the study of fossil gymnospermic plants?
b) Explain important geological formations of gymnosperms in India. 2*7= 14

SECTION B

3. What are Cycadofilicales? Describe their general characters, and reproduction with appropriate diagrams. 14
4. Write about distinguishing features of order Pentoxylales along with male and female reproductive details. 14

SECTION C

5. a) Explain about morphology of Cycadales.
b) Describe the structure of male and female strobili in Ginkgoales. 2*7= 14
6. a) Illustrate Reproductive structures in case of Coniferales.
b) Give an account of Welwitschiales with examples. 2*7= 14

SECTION D

7. Explain evolutionary tendencies in gymnosperm organography with particular reference to male and female sporophylls and cones. 14
8. What do you mean by Cytology of Gymnosperms? Explain cytology in different orders of gymnosperms. 14

Programme: Master of Science (Botany) Semester: II

Course Title: General Microbiology

Course Code: MBTL-2073

Time Allowed: 3 Hours

Max Marks: 70

Note: Candidates are required to attempt five questions in all, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 14 marks.

Section – A

Ques.1 Write short notes on:

- a) Culture media
- b) Pure culture methods
- c) Staining
- d) Micrometry

(4×3.5=14)

Ques. 2 Discuss the conjugation, transformation, and transduction? (14)

Section – B

Ques. 3 Explain the nomenclature and classification of plant virus? (14)

Ques. 4 Explain: -

- a) AIDS
- b) Replication of virus

(2×7=14)

Section – C

Que 5 Write short notes on:

- a) Aero microbiology
- b) Biodegradative organism
- c) Methodology of bio remediation

(5+5+4=14)

Ques. 6 Explain the process of Primary, Secondary, and tertiary waste water treatment? (14)

Section – D

Ques. 7 Write short notes on:

- a) Primary and secondary metabolites
- b) Production of beverages in industry

(2×7=14)

Ques. 8 Describe the process of microbial transformation? (14)

Exam Code: 225102

Paper Code: 2233

Programme: Master of Science (Botany) Semester: II

Course Title: Cell Biology

Course Code: MBTL-2074

Time Allowed: 3Hours

Max Marks: 70

Note: Attempt five questions in all, selecting atleast one question from each section. Fifth question may be attempted from any section. Each question carries 14 marks.

Section- A

1. Discuss in detail the complexity of an organism in terms of different levels of structural organization.
2. Write short note on:
 - a). Fluid Mosaic Model
 - b). Cellular Transport
 - c). Ion Pumps

Section- B

3. a). Briefly describe the structure and function of cytoskeleton and its role in motility.
b). What is operon? Briefly discuss the structure of operon with help of example.
4. Briefly describe:
 - a). Heterochromatin and Euchromatin
 - b). Structure and Function of Golgi bodies and Vacuoles.

Section- C

5. Write short notes on:
 - a). Meiosis is called as 'reductional division'.
 - b). Bacterial Growth Curve
6. What are cell surface receptors? Explain signalling through G-protein coupled receptors.

Section- D

7. Write brief notes on:
 - a). Neurotransmission and its regulation
 - b). Bacterial chemotaxis
8. Write a detailed note on Bacterial and plant two-component signaling systems.

Programme: Masters of Science (Botany) Semester - II

Course Title: Ecological Modelling and Forest Ecology

Course Code: MBTL-2075 ✓

Time Allowed: 3 Hours

Max Marks: 70

Note: Candidates are required to attempt five questions in all, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 14 marks. Draw well labelled diagrams wherever necessary.

Section-A

1. Describe the Matrix model for population growth along with its advantages. (14)
2. What is Exponential Population growth? Explain its graph along with examples. (14)

Section-B

3. What is Chi square test? Write down the steps and formula for chi square test for measuring association between two species. (14)
4. What is Mc Arthur-Wilson theory of Island Biogeography? Explain why it is called as Theory of Equilibrium and give its ecological implications. (14)

Section-C

5. Explain the various types of Forest along with their climatic regions. (14)
6. Write note on the following:
 - i. Concept of Ecological efficiencies. (7)
 - ii. Methods for conservation of forest. (7)

Section-D

7. What are Biosphere Reserves? Give overview of Biosphere reserves of India. (14)
8. Describe Air Act 1981 in detail along with constitution provisions and penalties. (14)

Exam Code: 225102

Paper Code: 2235

Programme- Master of Science (Botany) Semester-II

Course Title - Theoretical Biology

Course Code - MBTL-2336

Time Allowed: 3 Hours

Max Marks: 70

Note: Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Students can use only Non-programmable & Non-Storage type calculator and statistical tables. Each question carries 14 marks.

Section-A

- 1(a). What do you understand by Logarithmic function? Explain with the help of graph. [9]
- (b). If $\cos x = -\frac{3}{5}$, x lies in the third quadrant, then find the values of other five trigonometric ratios. [5]
- 2(a). Explain Power function with graph and also give one suitable example. [9]
- (b). Find the value of $\cot\left(\frac{-15\pi}{4}\right)$. [5]

Section-B

- 3(a). Find $\frac{d^2y}{dx^2}$ if $y = 9x^7 + 5x^4 + 2x + 9$. [7]
- (b). Evaluate $\int \frac{\sin^2 x}{1 + \cos x} dx$. [7]
- 4(a). What is differentiation? Explain Product Rule, Chain Rule and Quotient Rule by any one suitable example. [9]
- (b). Find the derivative of $\sin(x^2 + 1)$ with respect to x . [5]

Section-C

- 5(a). Define (i) Sample space
 (ii) Independent event
 (iii) Mutually exclusive events. [7]
- (b). If a card is drawn at random from an ordinary pack of cards, what is the probability that it is
 (i) a red card (ii) a club card (iii) a Jack [7]
6. If M and N are any two events (Subset of Sample space S), from the class C of events and are not disjoint, and then prove that

$$P(M \cup N) = P(M) + P(N) - P(M \cap N)$$
 [14]

Section-D

- 7(a). A certain drug was administered to 500 people out of a total of 800 included in the sample to test its efficiency against typhoid. The result are given below-

	Typhoid	No Typhoid	Total
Drug	200	300	500
No drug	280	20	300
Total	480	320	800

On the basis of these data can it be concluded that the drug is effective in preventing the typhoid (given for one degree of freedom, the value of chi-square variable at 0.05 = 3.84) [7]

- (b). Define regression. Derive the regression line of Y on X with least square method. [7]
- 8(a). Define Normal Distribution? What are the main characteristics of a Normal Distribution? [7]
- (b). Discuss in details t – test for testing the significance of single mean. [7]

Exam Code: 225104

Paper Code: 4217

Programme: Master of Science (Botany) Semester-IV

Course Title: Plant Anatomy

Course Code: MBTL-4071

Time Allowed: 3 Hours

Max Marks: 60

Note: Attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. All questions carry 12 marks. Draw well labelled diagrams wherever necessary.

SECTION-A

Q1) a. Write down brief notes on leaf traces and leaf gaps.

b. Discuss the origin and activity of vascular cambium in typical dicot stem. (6,6)

Q2) What is meant by root-stem transition? Illustrate various types with suitable diagram. (12)

SECTION-B

Q3) Discuss the formation of resin cavities and tyloses in dicot stems. (12)

Q4) What is wood? Elucidate the physical and anatomical features of any four hardwoods of India. (12)

SECTION-C

Q5) Discuss the surface and internal anatomy of monocot seeds. (12)

Q6) Discuss the ultrastructural surface features of fruits and their importance in plant taxonomy. (12)

SECTION-D

Q7) Explain following:-

a. What are Laticifers? Discuss their structure and function.

b. List the characteristic features of a mycorrhizal root. (6,6)

Q8) Discuss the modifications of leaf anatomy with particular reference to hydrophytes and xerophytes. (12)

Exam Code: 225104

Paper Code: 4218

Programme: Master of Science (Botany) Semester-IV

Course Title: Structure and Metabolism of Plant Hormones

Course Code: MBTL-4072

Time Allowed: 3 Hours

Max Marks: 60

Note: Attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 12 marks. Draw well labelled diagrams wherever necessary.

Section A

Q1. Write a note on the following:

a. Comparative note on Plant growth regulators and hormones

b. Quantitative analysis methods for plant hormones

(6,6)

Q2. Discuss the diversity in biosynthetic pathways of auxins in plants. (12)

Section B

Q3. Write a detailed note on:

a. Developmental and commercial roles of cytokinins.

b. Discovery and regulation of cytokinins.

(6,6)

Q4. Discuss discovery, biosynthesis and regulation of gibberellins. (12)

Section C

Q5. Write a note on:

a. Physiological and commercial roles of ABA.

b. Biosynthesis of brassinosteroids

(6,6)

Q6. Explain discovery, biosynthesis and developmental roles of Ethylene in plants. (12)

Section D

Q7. Give an account of

a. Biosynthesis of Jasmonic acid.

b. Tumor induction by *Agrobacterium* and *Pseudomonas*.

(6,6)

Q8. Describe the biology of genetic transformation by *Agrobacterium tumefaciens*. (12)

Exam Code: 225104

Paper Code: 4219

Programme: Master of Science (Botany) Semester-IV

Course Title: Plant Tissue Culture and Biotechnology

Course Code: MBTL-4073

Time Allowed: 3 Hours

Max Marks: 60

Note: Attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 12 marks.

Section A

1. Define micropropagation. Discuss the types and stages of micropropagation. (12)
2. Write illustrated notes on the following:-
 - (a) Role of shoot tip culture in production of pathogen free plants
 - (b) Application of plant tissue culture in crop improvement (6 X 2 = 12)

Section B

3. Define Somaclonal Variations. Discuss in detail method for production of pathogen free plants through tissue culture. (12)
4. Write illustrated notes on the following:-
 - (a) Synthetic seeds
 - (b) Procedure for isolation of Somaclonal variants for salt resistance (6 X 2 = 12)

Section C

5. Write the different methods involved in vector less transgenesis to generate transgenic plants. (12)
6. What is the importance of plant cell culture in production of secondary metabolites? (12)

Section D

7. Describe briefly the role of Plant Tissue Culture in crop improvement. (12)
8. Describe briefly the approaches for in vitro germplasm conservation, their advantages and limitations. (12)

Exam Code: 225104
(20)

Paper Code: 4220

Programme: Master of Science (Botany)
Semester-IV

Course Title: Analytical Techniques

Course Code: MBTL-4074 ✓

Time Allowed: 3 Hours

Max Marks: 60

Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries (12) marks.

Section —A

1. Explain Principle and applications phase contrast microscopy.
2. Write detailed procedure of
 - a) Cytophotometry
 - b) Flow cytometry

Section —B

3. What are chromatographic techniques? Discuss instrumentation of Gas Chromatography.
4. Discuss "detailed procedure and applications of centrifugation.

Section —C

5. What are Atomic absorption and plasma emission spectroscopy? Explain their applications.
6. How NMR is applicable in structure elucidation of the compounds? Explain in details.

Section -D

7. What are DNA hybridization and cot Curves. Explain in details.
8. Discuss various types of blotting techniques.

Exam Code: 225104
(20)

Paper Code: 4221

Programme: Master of Science (Botany)
Semester-IV

Course Title: Diversity and Biology of Angiosperms

Course Code: MBTL-4075

Time Allowed: 3 Hours

Max Marks: 60

Note: Attempt five questions in all, selecting at least one question from each section. The fifth question can be attempted from any section. Each question carries equal (12) marks.

Section — A

1. a) Write an account on the phenetic system versus phylogenetic system.
b) Explain the concept of cladistics in plant taxonomy.
2. Briefly outline the phylogenetic system given by Hutchinson with its merit and demerits.

Section — B

3. Write the salient features of the International Code of Botanical Nomenclature and also discuss the working knowledge of botanical Latin.

4. Give an account on the phylogeny of order Ranales and its taxonomic treatment in modern taxonomy.

Section — C

5. a). Explain the role of chemotaxonomy and cytotaxonomy in plant taxonomy.
b). Discuss the various biosystematics approaches to plant taxonomy.
6. Write a note on the taxonomic studies of agamic, hybrid and polyploid complexes.

Section — D

7. Explain the concept of phytogeography, its role and significance. Also, discuss the major phytogeographic regions of India.
8. Give an account on plant introduction, plant explorations and the effect of plant invasions on local plant diversity.

Exam Code: 225104

Paper Code: 4222

Programme: Master of Science (Botany) Semester-IV

Course Title: Immunology

Course Code: MBTL-4076 (Opt.-II)

Time Allowed: 3 Hours

Max Marks: 60

Note: Attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries 12 marks.

Section A

Q1) Give historical prospective of immune system and overview on innate immunity.

Q2) Write briefly about immunodeficiency disorder.

Section B

Q3) Write a short note on: -

(a) Super antigens

(b) Molecules that enhance immunogenicity

Q4) Discuss the antigen recognition by cells of innate immunity.

Section C

Q5) Describe the structure and properties of gamma globulins.

Q6) Write a note on:

(a) Monoclonal antibody

(b) Cross reactivity

Section D

Q7) Write briefly about primary and secondary lymphoid tissue.

Q8) Explain the cells of innate immunity.