Exam Code: 225202 **Paper Code: 2230**

Programme: Master of Science (Botany) Semester- II

Course Title: Pteridology

Course Code: MBTL-2071

Time Allowed: 3 Hours **Max Marks: 60**

Note: Attempt five questions in all, selecting one question from each section. Fifth question may be attempted from any section. Each question carrics 12 marks.

SECTION A

1. Explain telome theory about differentiation of organs in vascular plants along with its significance and shortcomings. 12
2. Explain monophyletic vs polyphyletic origin of pteridophytes with examples. 12

SECTION B

3. Draw labelled diagrams to show life cycle of any of heterosporous pteridophyte. 12
4. Give a comparative account of gametophyte of *Psilotum*, *Rhynia*, and *Lycopodium*. 12

SECTION C

5. Draw the external and internal structure of sporocarp of *Marsilea* and give an account of the mode of its spore dispersal. 12
6. Describe systematic position and distinguishing features of *Ophioglossum*. 12

SECTION D

7. Explain spore structure along with pattern of spore germination in ferns, diagramatically. 12
8. What is apomictic life cycle? Explain apogamy and apospory with examples. 12

Exam Code: 225202 **Paper Code:2231**

Programme: **Master of Science (Botany)** Sem_**II**
Course Title: **Diversity and Biology of Gymnosperms**
Course Code: **MBTL-2072**

Time Allowed : **3 Hrs** Maximum Marks: **60**

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. Each question carries equal marks (12 marks)

SECTION A

1. What are the first seed plants? Explain about most accepted classification system of gymnosperms. 12

2. Explain distribution of gymnosperms in India and in the world in different time and places. 12

SECTION B

3. What are Glossopteridales? Describe their general characters, and reproduction with suitable diagrams. 12

4. Write about distinguishing features of order Cordaitales along with male and female strobili diagrams. 12

SECTION C

5. a) Explain about morphology of Cycadeoidales.
   b) Describe the reproductive structures in Taxales. 2*6= 12

6. a) Illustrate reproductive structures in case of Ephedrales.
   b) Give an account of Gnetales with examples. 2*6= 12

SECTION D

7. Explain evolutionary tendencies in gymnosperm life cycle with particular reference to male and female cones, ovules and seeds. 12

8. What is cytology of Gymnosperms? Explain cytology in different orders of these plants. 12

Exam Code: 225202 **Paper Code: 2232**

Programme: Master of science (Botany) Semester: II

Course Title: General Microbiology

Course Code: MBTL-2073

Time Allowed: 3 Hours **Max Marks: 60**

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.

Section – A

Que.1 Write short notes on: (4×3=12)

a) Nature of virulence
b) Nutrition of bacteria
c) Toxins of pathogenic bacteria
d) Enzyme of pathogenic bacteria.

Que 2 Discuss the sterilization methods in details? (12)

Section – B

Que 3. Explain the transmission of plant viruses with control measure? (12)

Que 4 Explain: - (6+6=12)

a) Morphology and nature of virus particle
b) Replication of virus with reference to TMV and bacteriophage.

Section – C

Que 5 Write short notes on: (4+ 8=12)

a) Ecological impact of raw sewage on receiving methods
b) Waste water treatment.

Que 6 Explain the process and advantage of bioremediation in detail? (12)

Section – D

Que 7 Write short notes on: (2×6=12)

a) Production of food products in industry
b) Organic acid production in industry.

Que 8 Describe the genetical engineered microorganism in detail? (12)

Exam Code: 225202 **Paper Code:** 2233

Programme: Master of Science (Botany)
Semester: II
Course Title: Cell Biology
Course Code: MBTL-2074

Time Allowed: 3 Hrs **Maximum Marks:** 60

Serial No.	The question paper has four sections (A-D). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. All the questions will have equal marks (12 marks).	Marks
	Section- A	
1.	**Briefly describe:**	
	a) Process of active transport	6
	b) Mechanism of sorting and regulation of intracellular transport	6
	Comment on:	
2.	**a) Lipid bilayer model**	
	b) Levels of cellular organization	4
	c) Electrical properties of membranes	4
		4
	Section- B	
3.	**Briefly describe the structure and functions of:**	
	a) Lysosomes	4
	b) Endoplasmic Reticulum	4
	c) Cell Wall	4
4.	**a) Mitochondria is called 'powerhouse of the cell'. Discuss**	6
	b) What are transposons? Describe their structure and functions.	6
	Section- C	
5.	**Comment upon:**	
	a) Secondary Messengers	6
	b) Regulation of cell cycle	6
6.	**What are signal transduction pathways? Discuss regulation of signalling pathways.**	12
	Section- D	
7.	**Write short notes on:**	
	a) Adhesion molecules	4
	b) Quorum sensing	4
	c) Gap junctions	4
8.	**Briefly describe:**	
	a) Regulation of hematopoiesis	6
	b) Principles of cell communication	6

Exam Code: 225202 **Paper Code: 2234**

Programme: Master of Science (Botany) Semester: II

Course Title: Ecological Modelling and Forest Ecology

Course Code: MBTL-2075

Time Allowed: 3 Hours **Max Marks: 60**

Note: 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 12 marks. Draw well labelled diagrams wherever necessary.

Section-A

1. Explain the following:
   i. Matrix model of Population Growth. (4)
   ii. J and S shape population growth curve. (4)
   iii. Leslie-Gower Model. (4)
2. What is Predation? Explain Lotka Voltera Model for Predator Prey Interaction. (12)

Section-B

3. What is Species Diversity? Explain the various indices of measurement of diversity. (12)
4. Write note on following:
   i. Mc Arthur-Wilson theory of Island Biogeography (4)
   ii. Point Correlation Coefficient for association. (4)
   iii. Shannon-Weaver measure. (4)

Section-C

5. Explain the following:
   i. Energy flow in an Ecosystem (3)
   ii. Mechanism of Litter Decomposition (4)
   iii. Methods for measurement of Production in plants. (5)
6. What is Forestry? Describe Social and Urban forestry along with their objectives and dimensions. (12)

Section-D

7. What are different Constitutional provisions for Environment Conservation? Give benefits of Biosphere reserves. (12)
8. Describe Water Act 1974 in detail along with constitution provisions, penalties and case study. (12)

Exam Code: 225202 **Paper Code: 2235**

Programme: Master of Science (Botany) Semester–II

Course Title: Theoretical Biology

Course Code: MBTL-2336

Time Allowed: 3 Hours **Max. Marks: 60**

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. Students can use only Non-programmable & Non-storage type calculator and statistical tables.

Section-A

1(a). What do you understand by exponential function? Explain with the help of graph. [8]

(b). Find the value of $\sin\left(\frac{-11\pi}{3}\right)$. [4]

2(a). What do you understand by linear function? Illustrate with the help of example and graph. [8]

(b). Let $f(x) = 4x^2$ and $g(x) = 2x+3$ be two functions then find the value of $f + g)(x)$, $(f-g)(x)$, $(fg)(x)$, $\left(\frac{f}{g}\right)(x)$ [4]

Section-B

3(a). What is differentiation? Explain Product Rule, Chain Rule and Quotient Rule by any one suitable example. [8]

(b). Find the derivative of log (sec x + tan x) with respect to x. [4]

4(a). What is Definite integral? Illustrate three basic rules of integration. [8]

(b). Evaluate $\int \frac{1-sinx}{cos^2x}\,dx$ [4]

Section-C

5. Define Probability? Prove multiplication theorem of probability for n events. [12]

6(a).A box contain 3 red balls, 5 blue balls, 8 green balls and 4 black balls. A ball is picked at a random, find the probability of getting:

(i) a Blue ball
(ii) a Red ball
(iii) No black ball [4]

(b). If A and B are any two events (Subset of Sample space S), from the class C of events and are not disjoint, then prove that

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$ [8]

Section-D

7. Define Normal Distribution? Discuss any four main characteristics of a Normal Distribution. [12]

8(a). Mean of 25 observations was found to be 78.4. But it was found that 96 was misread as 69. Find the correct mean. [6]

(b). Find the correlation coefficient between the height of father and height of son from the following data :

Height of father (in inches) X	65	66	67	68	69	70	71
Height of son (in inches) Y	67	68	66	69	72	72	69

[6]