DHANAMANJURI UNIVERSITY

JUNE – 2021

Name of Programme : M.Sc. Botany

Semester : Fourth

Paper Code : BOT-616

Paper Title : Plant Anatomy and Embryology

Full Marks : 40

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. With the help of schematic diagrams, describe leaf traces and leaf gaps with its types in the nodal anatomy of dicot stem. 10

   Or

   What is the concept of Quiescent center? Describe the organization of Root Apex Meristem (RAM) on the basis of Korper-Kappe theory with suitable diagram. 3+7=10

2. Discuss the basic structure of secondary xylem with reference to axial and radial system with suitable sketch. 10

   Or

   What is Periderm? Describe with suitable diagram the process of development of periderm in dicot stem. 2+8=10

3. Describe in detail the molecular mechanisms of self-incompatibility found in Brassicaceae, Solanaceae and Papaveraceae. 10

   Or

   Define Megasporogenesis. Describe the different types of embryo sac found in angiosperms with the help of labeled diagrams. 2+8=10

4. Describe the development of the different types of endosperm found in angiosperms with suitable diagram. 10

   Or

   With the help labeled diagrams, describe the development of dicot embryo. 10

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DHANAMANJURI UNIVERSITY

JUNE – 2021

Name of Programme : M.Sc. Botany

Semester : Fourth

Paper Code : BOT-617

Paper Title : Biotechnology & Bioinformatics

Full Marks : 40

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. Write in brief the principle and technique of recombinant DNA technology. 10

Or

What are C-DNA library and genomic library? Draw and describe the structure of P^{BR} 322 along with its properties. 2+2+2+2+2=10

2. What is the principle of polymerase chain reaction? Write the role of PCR in gene cloning. 8+2=10

Or

What are different techniques of gene transfer. 10

3. Comment on the potentials of Python as programming software for Bioinformatics. Comment on the types of formats output generated by the BLAST tool. Construct a phylogenetic tree from the following sequences: 2+3+5=10

Sequence 1 - AAAAATGAT
Sequence 2 - TAAGCACAC
Sequence 3 - GCATGCATC
Sequence 4 - GCATGGATC
Sequence 5 - AAAATGATC

Or

Describe primary, secondary and composite biological databases with examples. Write a brief note on Sequence Submission Methods and Tools. 6+4=10

4. Briefly describe High Throughput Sequencing. Differentiate between Clone-by-clone method with Whole Genome Shotgun Sequencing Method. 6+4=10

Or

Write the role of QSAR in Computer Aided Drug Designing. Briefly describe the Lipinski's Rule of Five. 5+5=10

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DHANAMANJURI UNIVERSITY

JUNE - 2021

Name of Programme	**:**	**M.Sc. Botany**
Semester	**:**	**Fourth**
Paper Code	**:**	**BOT-624**
Paper Title	**:**	**Genetics-III**
Full Marks	:	**40**

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. Explain the mechanism of gene conversion in fungi 10

OR

Explain the different types of epigenetic gene silencing in filamentous fungi 10

2. Write briefly, the role of biotechnology in the identification of genes causing genetic diseases. 10

OR

How recombinant proteins are produced in *E. coli*? Discuss its limitations. 6+4=10

3. What is somaclonal variation? Discuss its achievement and limitations. 2+8=10

OR

Define germplasm. Discuss the various approaches for *in vitro* germplasm conservation. 2+8 = 10

4. Describe the transposable ds DNA phage (Phage Mu). Explain the genetic map of Mu Phage. 5+5 = 10

OR

Differentiate between temperate and virulent phages. Write the important aspects of lytic cycle with suitable diagram. 4+6 = 10

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DHANAMANJURI UNIVERSITY

JUNE - 2021

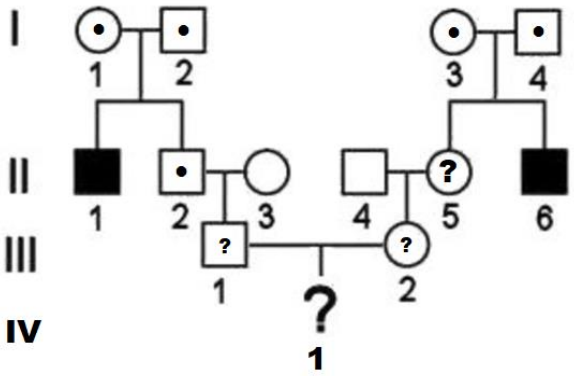
Name of Programme	:	**M.Sc. Botany**
Semester	:	**Fourth**
Paper Code	:	**BOT-625**
Paper Title	:	**Genetics-IV**
Full Marks	:	**40**

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. With appropriate diagrams, explain how (a) **nonpenetrance** and (b) **inbreeding** complicate Mendelian pedigree patterns. 5+5=10

OR

The following pedigree shows the inheritance of an autosomal recessive disease, with symbols having their usual meanings. 6+2+2=10



a. Calculate the risk of IV-1 individual having the disease.

b. Calculate the risk of IV-1 individual having the disease on the condition that a sister of III-2 is a carrier. 5+5 = 10

2. Discuss the defects of fructose metabolism. 10

OR

Describe the genetics of Mitochondrial Encephalomyopathy. 10

3. What is $\frac{dN}{dS}$ ratio? Give a significance of $\frac{dN}{dS}$ ratio in comparative genomics? Write the procedure of calculating $\frac{dN}{dS}$ ratio with any bioinformatics software. 1+1+8=10

OR

State four advantages of using *Arabidopsis thaliana* as a model organism. Write main contributions of *Arabidopsis thaliana* as a model organism. 4+6 = 10

4. Describe the effects of UV radiation on DNA. 10

OR

Write four differences between oncogenes and tumor suppressor genes. With an example, explain the mechanism of conversion of a proto-oncogene to an oncogene. 4+6 = 10

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DHANAMANJURI UNIVERSITY

JUNE – 2021

Name of Programme : M.Sc. Botany

Semester : Fourth

Paper Code : BOT-634

Paper Title : Ecology-III (Vegetation & Habitat Ecology)

Full Marks : 40

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. Describe briefly about the factors that affect distribution of natural vegetation. 10

Or

Write in detail the major terrestrial biomes of the world. 10

2. Describe the forest types of India as given by champion and seth. 10

Or

Write a descriptive note on the prevention and control of forest fire. 10

3. What is a wetland? Based on hydrogeomorphic setting, write an account of the different types of wetlands. 2+8=10

Or

Draw a neat labelled diagram of a lentic freshwater ecosystem showing clearly the different stratifications. Give the names of the organisms associated with this ecosystem. 6+4=10

4. What is rhizosphere? How many zones can rhizosphere be subdivided? Give an account on plant growth promoting rhizobacteria (PGPR). 3+3+4=10

Or

Write short notes on 5+5=10

a) Biomineralization

b) Bioremediation.

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DHANAMANJURI UNIVERSITY

JUNE – 2021

Name of Programme : M.Sc. Botany

Semester : Fourth

Paper Code : BOT-635

Paper Title : Applied and Advanced Ecology

Full Marks : 40

The figures in the margin indicate full marks for the questions.
Answer any four of the following questions

1. Define Ethnoecology. Discuss briefly the significance of Ethno-ecological Studies. 2+8=10
2. Explain Ecosystem Services Cascade with suitable diagrams.. 10
3. Discuss the ecological effects of pesticides on the environment? 10
4. Write short notes on:
   a) Organic farming and
   b) Domestication of crop plants. 5+5=10
5. What are the different factors that are responsible for Biodiversity Loss? 10
6. Write short notes on:
   a) CBD and
   b) Keystone Species. 5+5=10
7. Define Urban Ecology. Discuss the different techniques used in conserving the Urban Biodiversity. 2+8=10
8. Describe the different steps taken up so far for mitigating 'Climate Change? 10

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DHANAMANJURI UNIVERSITY

JUNE – 2021

Name of Programme : M.Sc. Botany

Semester : Fourth

Paper Code : BOT-644

Paper Title : Microbiology and Plant Pathology-III

Full Marks : 40

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. Describe the symptoms, causal organism, disease cycle and control measures of either brown leaf spot of rice or blister blight of tea. 10

   Or

   What are post harvest diseases? Discuss briefly the post harvest of any four fruit or vegetable diseases and their control measures. 10

2. Write notes on any two of the followings: 5 x 2 = 10

   a) Bacterial leaf blight of rice

   b) Angular leaf spot of cotton

   c) Brown rot of potato

   Or

   What are abiotic diseases? Discuss briefly some common abiotic diseases you have studied and their management. 10

3. Explain the following (any two): 5 x 2 = 10

   a) Bunchy top of banana

   b) Sandal spike disease

   c) Potato spindle tuber disease.

   Or

   Describe the symptoms, etiology and management of citrus greening and little leaf diseases of egg plant. 10

4. Describe the symptoms, causal organism, disease cycle and management of ear cockle diseases of wheat. 10

   Or

   Write notes of any two of the followings: 5 x 2 = 10

   a) Parasitic green algae.

   b) Doddar (Cuscuta sp.)

   c) Mistletoes (Dendrophthoae).

   d) Witch weed.

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DHANAMANJURI UNIVERSITY

JUNE – 2021

Name of Programme : M.Sc. Botany

Semester : Fourth

Paper Code : BOT-645

Paper Title : Microbiology and Plant Pathology-IV

Full Marks : 40

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. Discuss the role and importance of crop certification and seed health testing in plant disease management. 10

   Or

   What is plant quarantine? Describe briefly the types and importance of plant quarantine in the management of plant diseases in India. 10

2. Illustrate briefly the evolution, mechanism, factors and management of fungicide resistance. 10

   Or

   Define fungicide. Elaborate the characters of good fungicides and classify them according to their mode of action. 10

3. Describe different cultural practices adopted for plant disease management. 10

   Or

   What are the biopesticides? Describe the types and importance of biopesticides in plant disease control. 10

4. Define nanotechnology. Discuss briefly the role of nanotechnology in plant pathology. 10

   Or

   What is integrated disease management? Describe the basic objectives and components of integrated disease management. 10

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DHANAMANJURI UNIVERSITY

JUNE – 2021

Name of Programme : M.Sc. Botany

Semester : Fourth

Paper Code : BOT-654

Paper Title : Plant Physiology III

Full Marks : 40

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. Briefly discuss on the roles played by auxins in plant development. 10

Or

What is Salicylic acid? Briefly describe the physiological roles played by Salicylic acid in plants. 3+7=10

2. Describe the three main categories of phytochrome responses and the types of phytochromes that regulate them. 5+5=10

Or

What are cryptochromes? How do they function during photomorphogenesis? 2+8=10

3. Describe briefly, the biochemical signalling in flowering. 10

Or

What is circadian rhythm in plants? Discuss the roles of circadian rhythm on flowering. 2+8=10

4. What are Senescence Downward and Senescence Upward genes? Describe the pattern of expression of senescence associated genes (SAGs) during leaf development. 4+6=10

Or

What is Richmond-Lang effect? Discuss the role of cytokinins in the regulation of senescence. 2+8=10

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DHANAMANJURI UNIVERSITY

JUNE - 2021

Name of Programme	**:**	**M.Sc. Botany**
Semester	**:**	**Fourth**
Paper Code	**:**	**BOT-655**
Paper Title	**:**	**Plant Physiology-IV**
Full Marks	:	**40**

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. Describe different types of primary direct and indirect drought injuries in the plants. 10

OR

What are the main adaptations of plants to salt stress? How the succulence helps in mitigation of adverse effects of high salinity in the plants? 7+3 =10

2. Describe the cytological changes encountered during chilling injuries. How are the nature of membrane lipids related with the chilling resistant in plants? 7+3 =10

OR

What are the changes induced in the endogenous PGRs by the flooding stress? Describe the changes in ATP demand and supply in the plants during waterlogging condition. 6+4=10

3. Examine the structure and biological properties of some important nitrogen-containing secondary metabolites in the plants. 10

OR

Describe the biological role of flavonoids in the plants. Comment on volatile organic compounds as a means of molecular communication. 5+5 = 10

4. With a labelled diagram describe the synthesis of activated 5C units. 5+5 = 10

OR

With the schematic diagrams, describe the patterns in biosynthesis of major alkaloids in the plant. 4+6 = 10

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DHANAMANJURI UNIVERSITY

JUNE – 2021

Name of Programme : M.Sc. Botany

Semester : Fourth

Paper Code : BOT-664

Paper Title : Recent trends in taxonomy, taxonomic tools and data analysis

Full Marks : 40

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. Describe the prospects of phylogenetic classifications. 10

Or

Write the significant attributes of homology and homoplasy in plant classification. 5+5=10

2. Draw a hypothetical phenogam and explain phenons and ranks. 5+5=10

Or

Describe the tools of molecular taxonomy. 10

3. Explain how to calculate NPC and grain surface areas. Give examples of its taxonomic application. 6+4=10

Or

Describe ABC model of floral development. 10

4. Explain various methods of character coding for data analysis in numerical taxonomy. 10

Or

Draw a hypothetical cladogram and explain the probable groupings or classification of taxa. 5+5=10

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DHANAMANJURI UNIVERSITY

JUNE – 2021

Name of Programme : M.Sc. Botany

Semester : Fourth

Paper Code : BOT-665

Paper Title : Diversity, Nomenclature, conservation of plants and publications.

Full Marks : 40

The figures in the margin indicate full marks for the questions.
Answer all questions.

1. Write the role of taxonomy in conserving biodiversity. 10

   Or

   Describe the RET categories of IUCN. Mention how will it help in conservation of biodiversity. 6+4=10

2. Differentiate valid and legitimate names of taxa giving examples. 5+5=10

   Or

   Describe the importance of typification. Write in detail the different types giving examples. 5+5=10

3. Define taxonomic key. Explain the different types of interactive keys with their advantages. 2+8=10

   Or

   Describe how keys help in identification of taxa. 10

4. Write what do you know about taxonomic publications. 10

   Or

   Give an example of describing a new species for publication in a journal. 10

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