



UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – II Annual Examination – 2022

Subject: Botany

Paper: IX (Plant Physiology)

Roll No.

Time: 3 Hrs. Marks: 60

NOTE: Attempt any FIVE questions. Each question carry equal marks.

1.
 - A. Discuss the structure and properties of water?
 - B. Describe root pressure and explain under what conditions it might occur.
2.
 - A. Diagram the flow of electrons that occurs in cyclic electron transport. (6)
 - B. Photorespiration is generally considered to be a wasteful process that decreases the yield of C3 plants. Under what conditions is the role of photorespiration minimized in plants?
3.
 - A. What is an essential element? How many have been identified? What is a beneficial element? Provide an example of a beneficial element.
 - B. What is meant by the term "active transport"? What is the difference between primary and secondary active transport?
4.
 - A. Leaves of aquatic plants living under water are devoid of stomata. Leaves that float in water have stomata in the upper surface growing in contact with air, but lack them in the surfaces that are in contact with water. Aerial leaves have stomata in both surfaces. Explain.
 - B. What are the two major factors responsible for light-dependent stomatal opening?
5.
 - A. Describe the pressure-flow model of translocation in the phloem. Does water move down its water potential gradient in this model.
 - B. Write a note on compositions of phloem sap in plants.
6.
 - A. Is the main function of aerobic respiration the production of ATP? Explain your answer. What are the respective contributions of glycolysis and oxidative phosphorylation to the cellular ATP pool?
 - B. What are the metabolic advantages and disadvantages of anaerobic fermentation?
7.
 - A. Create a diagram showing how hormone concentrations in a plant are regulated during homeostasis.
 - B. Define cytokinins. Also discuss biosynthesis and role among plants.
8.
 - A. Describe the three main categories of phytochrome responses and the types of phytochromes that regulate them.
 - B. Describe a brief account of vernalization.
9.
 - A. Using cereal endosperm as an example, discuss the mechanism of the mobilization of seed storage reserves.
 - B. Discuss the starch-statolith hypothesis in relation to gravitropism in roots



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M.A./M.Sc. Part – II Annual Examination – 2022

Roll No.

Subject: Botany (Special Paper)

Paper: Opt. I / XIII-1-N (Plant Tissue Culture and its Agricultural Applications)

Time: 3 Hrs. Marks: 75

NOTE: Attempt any FIVE questions. All questions carry equal marks.

Q.1. (a)	Discuss the various aspects of shoot regeneration from cultured plant cells and tissues.	8
(b)	Describe various methods of protoplast fusion.	7
Q.2.	Write a short note on the following: (a) Meristem culture (b) Somatic Embryogenesis (c) Surface sterilization	15
Q.3.	Briefly describe different stages of Micropropagation, giving the salient operation/requirements during each step.	15
Q.4. (a)	What is Totipotency? How can we exploit totipotency in plant tissue culture?	5
(b)	What is Organogenesis? Describe different steps of this process, also discuss various factors affecting organogenesis.	10
Q.5. (a)	What are Somatic hybrids? Write applications of Somatic Hybridization technology.	8
(b)	How do plant growth regulators affect plant morphogenesis?	7
Q.6. (a)	Discuss the applications of haploid plants with the help of suitable examples.	8
(b)	What is Cryopreservation? Describe the steps of long term cryopreservation.	7
Q.7.	Differentiate between the following terms: (a) Micropropagation and Clonal Propagation (b) Organ and Organoid (c) Callus and Suspension cultures	(5 marks each)



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M.A./M.Sc. Part – II Annual Examination – 2022

Subject: Botany (Special Paper) Paper: Opt.VII / XIII-7-N (Advance Plant Anatomy)

Roll No.

Time: 3 Hrs. Marks: 75

NOTE: Attempt any FIVE questions. Each question carry equal marks.

- Q.1 (a) Write a note on the gross microscopic structure of cell wall. (7.5)
(b) Discuss in detail the process of wall formation in detail. (7.5)
- 2.(a) Discuss the concept and types of stele. (7.5)
(b) write down the comprehensive role of bundle sheath cells (7.5)
- Q.3 (a) Write down a comprehensive note on epidermis with special reference to stomata. (7.5)
(b) Discuss in detail the types of external secretory structures. (7.5)
- Q.4 (a) Discuss in detail the physiologic aspect of periderm formation. (7.5)
(b) Write a note on the characteristic components and origin of phellogen. (7.5)
- Q.5 (a) Discuss in detail the origin and external morphology of stem. (7.5)
(b) Define stele. Also elaborate its basic types in detail. (7.5)
- Q.6 (a) Write a note on anomalous secondary growth in plants. (7.5)
(b) Discuss in detail the types of stem. (7.5)
- Q.7 (a) Write down a detailed note on the morphology of foliage leaf. (7.5)
(b) Elaborate the types of venation in leaf. (7.5)
- Q.8 (a) Write a note on the structure and function of root. (7.5)
(b) Describe in detail the concept of transition region. (7.5)
- Q.9 (a) Write a note on the ecological aspects of applied plant anatomy. (7.5)
(b) Discuss the abscission of flower in detail. (7.5)



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M.A./M.Sc. Part – II Annual Examination – 2022

Subject: Botany

Paper: VIII (Plant Anatomy and Taxonomy of Angiosperms)

Roll No.

Time: 3 Hrs.

Marks: 60

NOTE: Attempt any FIVE questions from the following. Each question carry equal marks. Support your answers with the required figures.

- Q.1.** (a) Define Meristematic tissue? Explain its different types.
(b) Differentiate between parenchyma and collenchyma tissues.
- Q.2.** (a) What is meant by classification. Describe the aims and objectives of Plant classification.
(b) Explain the Englar and Prantl system of classification.
- Q.3.** (a) Differentiate between microspecies and macro-species; Ecospecies and Coenospecies.
(b) Write a note on numerical taxonomy?
- Q.4.** (a) What are secretory tissues? Describe their different types.
(b) Explain the Pteridosperm theory regarding the origin of Angiosperms.
- Q.5.** (a) what is ICBN? Describe the history of ICBN.
(b) Define Nomenclature. Explain the principles and rules of Nomenclature.
- Q.6.** (a) Define vascular cambium? Explain the types of divisions in vascular cambium.
(b) What is seasonal activity. Give its role in Secondary Growth.
- Q.7.** (a) What is meant by abnormal secondary growth?
(b) Briefly describe the origin and evolutionary specialization of phloem.



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M.A./M.Sc. Part – II Annual Examination – 2022

Subject: Botany

Paper: X (Molecular Genetics)

Roll No.

Time: 3 Hrs. Marks: 60

NOTE: Attempt any FIVE questions. All questions carry equal marks.

- Q1 A) Discuss molecular basis of gene mutation *via* induced mutation (6)
B) Discuss *Lac* operon system and positive gene regulation (6)
- Q2 A) Describe different types of vectors used in Recombinant DNA Technology. (6)
B) Discuss DNA damage identification in nucleotide excision repair mechanism. (6)
- Q3 A) Explain transcriptional gene regulation in Eukaryotes. (6)
B) Describe insertion and deletion mutations. And make diagrams. (6)
- Q4 A) Discuss genetically modified plants and their advantages. (6)
B) Explain RNA splicing mechanism with examples. (6)
- Q5 A) Discuss the holiday model of gene recombination (6)
B) Discuss site directed mutagenesis. (6)
- Q6 A) What is catabolite repression in *lac operon* System? (6)
B) What are the insertion sequences in prokaryotes? (6)
- Q7 A) Describe different steps involved in PCR. (6)
B) Discuss Applications of computational tests to analyze genome and gene products (6)
- Q8 A) What are the applications and proposed benefits of Human Genome Project (6)
B) Describe the type of lesions repaired by Base Excision Repair mechanism (BER). (6)
- Q9 A) Discuss Plasmids and Bacteriophages as tools of recombination. (6)
B) Define the following terms: (6)
1) Episome 2) Recombinant DNA 3) Cosmids 4) Ligase enzyme 5) Exons 6) DNA glycosylase



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M.A./M.Sc. Part – II Annual Examination – 2022

Subject: Botany

Paper: XI (Environmental Biology)

Roll No.

Time: 3 Hrs. Marks: 60

NOTE: Attempt any FIVE questions. Each question carry equal marks.

- Q.1.** a) Define water pollution. Explain its major sources and impact on vegetation. (6)
b) How plants help to prevent soil erosion? (6)
- Q.2.** a) What is deforestation? Explain its causes and effects? (7)
b) What are the effects of wetlands on environment? (5)
- Q.3.** a) What are chlorofluorocarbons? What are their effects on environment? (6)
b) How sewage and sludge water can be treated? (6)
- Q.4.** a) Write a note on heavy metal pollution? (6)
b) What are effects of organic and inorganic pollutants on plants? (6)
- Q.5.** a) What is sediment pollution? Highlights its effects on environment? (7)
b) Briefly explain the acid rain. (5)
- Q.6.** a) Write a note on Radiation Pollution. (5)
b) What is Global Warming? How it effect the environment? (7)
- Q.7.** a) Write a note on Algal Bloom and Eutrophication. (6)
b) What is Noise Pollution, its causes and effects? (6)
- Q.8.** a) What is Water Logging? What are main causes of waterlogging? (7)
b) Write a note on Reclamation of salt-affected soils. (5)