



# UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – II Annual Examination – 2020

Roll No. ....

Subject: Botany

Paper: VIII (Plant Anatomy and Taxonomy of Angiosperms)

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.**

- 1- (a) What is meant by apical meristem? Describe the evolution of apical organization.  
(b) Describe the parenchyma cells in details.
- 2- (a) Describe the aims and objectives of Plant classification.  
(b) Explain Phylogenetic system of classification.
- 3- (a) Define species. Describe the Taxonomic concept regarding the species.  
(b) Write the brief study of more recent classification system.
- 4- (a) What is xylem? Describe its different components.  
(b) Explain the Cycadian theory regarding the origin of Angiosperms.
- 5- (a) what is ICBN? Describe the rules of Nomenclature.  
(b) Describe the problems in Nomenclature.
- 6- (a) Explain the internal structure of a leaf with diagram.  
(b) What is the role of palaeobotany and palynology in Plant systematic?
- 7- (a) Describe the Numerical taxonomy in details.  
(b) Briefly describe the origin and evolutionary specialization of phloem.



# UNIVERSITY OF THE PUNJAB

**M.A./M.Sc. Part – II Annual Examination – 2020**

Roll No. ....

Time: 3 Hrs. Marks: 60

Subject: Botany

Paper: IX (Plant Physiology)

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

- Q.1.** a) List three unique properties of water that make it an ideal medium for cellular functioning, and explain how each property is useful to a plant. (6)  
b) What happens to a plant cell that is placed into a solution of pure water, with a water potential of 0. How do the cell's water potential, osmotic potential and pressure potential change? (6)
- Q.2.** a) Diagram the flow of electrons that occurs in cyclic electron transport. (6)  
b) What is an action spectrum? What is the relationship between the action spectrum for photosynthesis and the absorption spectrum of chlorophyll? (6)
- Q.3.** a) Describe the process of phloem loading. (6)  
b) Write a note on various materials translocated in phloem. (6)
- Q.4.** a) Write a note on Glycolysis with special peculiarities in plants. (6)  
b) What are the metabolic advantages and disadvantages of anaerobic fermentation? (6)
- Q.5.** a) Summarize the role of Auxins in mediating three different physiological responses. (6)  
b) Using cereal endosperm as an example, discuss the mechanism of the mobilization of seed storage reserves. (6)
- Q.6.** a) Differentiate between essential and beneficial element? Discuss the deficiency symptoms of potassium and manganese in plants. (6)  
b) Explain the symbiotic association between higher plants and nitrogen-fixing bacteria. (6)
- Q.7.** a) Give a concise account of stomatal opening driven by the uptake of potassium and its counter ions. (6)  
b) 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. (6)
- Q.8.** a) Describe the three main categories of phytochrome responses and the types of phytochromes that regulate them. (6)  
b) Distinguish between the phototropism and photoperiodism (type of plant responses to sunlight). (6)
- Q.9.** a) Define "vernalization" and discuss the role of epigenetic changes in gene expression. (6)  
b) Define the following terms in relation to circadian rhythm: period; phase; amplitude; entrainment; zeitgeber; free-running. (6)



# UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – II Annual Examination – 2020

Subject: Botany

Paper: X (Molecular Genetics)

Roll No. ....

Time: 3 Hrs. Marks: 60

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

- Q. 1:** What are insertion sequences (IS) and transposons (Tn)? Describe in detail the experiments of Marcus Rhodes and Barbara Mc'Clintock on the controlling elements in Maize. (12)
- Q. 2:** What is homologous recombination? Explain Holiday model of homologous recombination. (12)
- Q. 3:** Define operon. Explain Lac operon and how it is induced and repressed. (12)
- Q. 4:** Define replication. Describe the process of replication in prokaryotes and enzymes involved during replication. Why replication always takes place in 5'-3' direction? (12)
- Q. 5:** What do you know about the restriction enzymes. Describe in detail the types of restriction enzymes. How new restriction sites are generated within the restriction sites already present? (12)
- Q. 6:** Explain/differentiate the following: (6+6=12)
- (a) What is codon and anticodon? Write down the properties of codon.
  - (b) Differentiate between site directed and random mutagenesis.
- Q. 7:** What is meant by classical genetics? Describe the Mendel law of segregation and law of independent assortment with suitable examples. (12)
- Q. 8:** Define transformation. Explain the transformation in dicot plants through *Agrobacterium tumefaciens*. (12)
- Q. 9:** Write a note on recombinant DNA technology. (12)



# UNIVERSITY OF THE PUNJAB

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Roll No. ....

Subject: Botany

Paper: XI (Environmental Biology)

Time: 3 Hrs. Marks: 60

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

- Q.1.** a) How fungicides and pesticides are sources of soil pollution? (6)  
b) Briefly explain the photochemical smog (6)
- Q.2.** a) Define Radiation Pollution. What are the principles of radiation protection? (6)  
b) Define salinity? Describe the main types of salinity. (6)
- Q.3.** a) Define Water logging. How water logging effect on vegetation and environment? (7)  
b) Write a note on Noise Pollution (5)
- Q.4.** a) Define sediments pollution .What are main types of sediments pollution? (6)  
b) Write a note on wetlands and its types? (6)
- Q.5.** a) Discuss properties of saline and sodic soil. (6)  
b) What are measurements, classification and effects of radiation pollution? (6)
- Q.6.** a) Write a detail note on Greenhouse Effect. (7)  
b) How major problems of Pakistan can be resolve through National Conservation Strategy? (5)
- Q.7.** a) What are causes and effects of global warming? How it effects the environment? (7)  
b) Write note on sustainable environmental management. (5)
- Q.8.** a) Define Water Pollution. What are effects of organic and inorganic pollutants on plants? (7)  
b) How salinity effect on vegetation and environment? (5)



**UNIVERSITY OF THE PUNJAB**  
**M.A./M.Sc. Part – II Annual Examination – 2020**

Roll No. ....

Subject: Botany (Special Paper)

Paper: Opt. I (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 various applications of Plant Tissue Culture. (10)  
b) What are Secondary Metabolites? What is their significance? (5)
- Q.2** a) What is the role of Gibberellic Acid and Cytokinins in Plant Tissue Culture? (10)  
b) What is Agarose? Write down its role in plant tissue culture. (05)
- Q.3** a) Write an account of Somatic hybridization. What are its advantages? (10)  
b) Discuss the process of Root and Shoot development in tissue culture. (05)
- Q.4** a) Write an account of Pollen and Anther cultures in tissue cultures. (10)  
b) What is 'Medium undefined'? What may be its use in plant tissue culture media? (05)
- Q.5** Write a short note on followings: (05 each)
- a) Micropropagation
  - b) Differentiation and De-differentiation
  - c) Somatic Embryogenesis
- Q.6.** Write a detailed account of isolation and purification of plant protoplasts. (15)
- Q.7** a) What is Cryopreservation? Discuss its various methods. (10)  
b) Briefly explain significance of using Aseptic techniques in plant tissue culture. (05)



# UNIVERSITY OF THE PUNJAB

**M.A./M.Sc. Part – II Annual Examination – 2020**

Roll No. ....

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

Time: 3 Hrs. Marks: 75

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

- Q1. (a) Write a note on the gross microscopic structure of cell wall. (7.5)  
(b) Discuss in detail the process of wall formation with the help of suitable diagrams. (7.5)
- Q2. (a) Explain the types and origin of leaf? (7.5)  
(b) Differentiate between vegetative and reproductive shoot apex. (7.5)
- Q3. (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)
- Q4. (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)
- Q5. (a) Discuss in detail the origin and external morphology of stem. (7.5)  
(b) Define stele, also elaborate its basic types with the help of suitable diagrams. (7.5)
- Q6. (a) Write a note on anomalous secondary growth in plants. (7.5)  
(b) Discuss in detail the origin and structure of flower (7.5)
- Q7. (a) Write down a detailed note on the morphology of foliage leaf. (7.5)  
(b) Elaborate the types of venation in leaf. (7.5)
- Q8. (a) Discuss in detail the histology of the fruit wall with the help of diagram? (7.5)  
(b) Describe in detail the concept of transition region. (7.5)
- Q9. (a) How the leaf anatomy is changed with changing ecological factors? (7.5)  
(b) Discuss the abscission of flower in detail. (7.5)