



# UNIVERSITY OF THE PUNJAB

M.A./M.Sc. Part – II Supply 2020 & Annual – 2021

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.**

- Q1. (a) Define classification. Describe Engler and Prantle system of classification?  
(b) What is Binomial Nomenclature? Give its significance
- Q2. (a) Describe structure and functions of Parenchyma and Collenchyma tissues.  
(b) What is meristem? Explain Tunica Corpus theory regarding it.
- Q3. (a) What is vascular cambium? Briefly explain its origin and structure?  
(b) What is secondary growth? How seasonal activity play its role in secondary growth?
- Q4. (a) Explain different types of leaf modifications in Angiosperms.  
(b) Write a note on structure of monocot root.
- Q5. (a) Describe the various types of simple tissues and their structure and functions.  
(b) Describe the sub-microscopic structures of cell wall.
- Q6. (a) Give the development of a typical Dicot embryo in an Angiosperm.  
(b) Briefly explain the Gametophyte of an Angiospermic plant.
- Q7. (a) Write a note on population study, ecospecies and coenospecies?  
(b) What is the role of embryology and anatomy in taxonomic evidences?



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**M.A./M.Sc. Part – II Supply 2020 & Annual – 2021**

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) What are Somaclonal variations? Write down their advantages and disadvantages. (10)  
b) Discuss various components used in Plant Tissue Culture media. (5)
- Q.2 a) Describe the process of Callus formation and its maintenance. (8)  
b) What is the role of Cytokinins and Gibberellins in Plant Tissue Culture? (7)
- Q.3 a) What is Somatic Embryogenesis? Discuss in detail the various steps involved in Somatic Embryogenesis. (10)  
b) Define plant Protoplasts. Why are they important? (5)
- Q.4 a) What are Aseptic techniques? Why are these techniques important in a Plant Tissue Culture lab? (8)  
b) Name and explain some factors affecting Organogenesis. (7)
- Q.5 Write short notes on the followings: (5)  
a) Disease-free plants through in vitro means (5)  
b) Totipotency (5)  
c) Germplasm conservation
- Q.6. What is Micropropagation? Explain its various stages along with flow chart/Diagrams. Discuss various advantages of this technique. (15)
- Q.7. What are Cell Suspension Cultures? How are various Cell Lines developed? What are the usual difficulties faced by tissue culturists for the initiation of such lines? What may be the potential benefits of Cell Suspensions? (15)





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Subject: Botany

Paper: IX (Plant Physiology)

Roll No. ....

Time: 3 Hrs. Marks: 60

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

- Q.1 (a) Define water potential. Discuss its components? (5)  
(b) Discuss the structure and properties of water? (7)
- Q.2 (a) Discuss in detail the signal transduction in eukaryotes. (6)  
(b) Write a note on the types and role of second messengers? (6)
- Q.3 (a) Discuss the biosynthesis and role of Gibberellins? (5)  
(b) Write a note on the deficiency symptoms of nitrogen and phosphorus? (7)
- Q.4 (a) Write a note on phloem loading. (6)  
(b) Discuss in detail the source and sink interaction? (6)
- Q.5 (a) Discuss the structure & organization of photosynthetic apparatus? (6)  
(b) Differentiate between oxygenic and anoxygenic photosynthesis? (6)
- Q.6 (a) Write a note on micro and macro nutrients? (6)  
(b) Define phytochrome. Discuss its function in detail? (6)
- Q.7 (a) Discuss the properties of photosystems? (6)  
(b) Discuss the transport of  $e^-$  through thylakoid membrane? (6)
- Q.8 (a) Define mycorrhizae. Also discuss its types and role in plants. (6)  
(b) Write a note on Glycolysis. (6)
- Q.9 (a) Write a note on Electron Transport Chain. (6)  
(b) Define respiratory substrate. How respiratory quotient predict the nature of respiratory substrate. (6)



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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) What are RESTRICTION ENZYMES? Explain their role in the production of recombinant DNA. 6  
b) Describe various DNA REPAIR MECHANISMS. 6
- Q2: a) Define TRANSDUCTION. How the process of transduction can be used for MAPPING bacterial genes? 6  
b) Write a note on the factors affecting GENE EQUILIBRIUM. 6
- Q3: a) What do you understand by the term TRANSPOSITION? Explain various mechanisms of TRANSPOSITION. 7  
b) Write a note on CATABOLITE REPRESSION of the lac operon. 5
- Q4: a) What do you know about EXTRANUCLEAR INHERITANCE? Explain cytoplasmic pattern of inheritance in fungi. 5  
b) Explain in detail the MOLECULAR BASIS of MUTATION. 7
- Q5: a) Explain GENE-PROTEIN RELATIONSHIP. 7  
b) What do you understand by the term GENE THERAPY? Explain. 5
- Q6: a) Explain the phenomenon of MULTIPLE ALLELISM with the help of examples. 7  
b) Write a note on the evolutionary significance of MUTATION. 5
- Q7: a) Define EPISTASIS. Give three example to explain the phenomenon. 6  
b) What do you understand by the term SITE-SPECIFIC RECOMBINATION? Explain with the help of example. 6
- Q8: a) Describe various properties of GENETIC CODE. 6  
b) Describe lac –OPERON as a negative control system of gene regulation. 6
- Q9: a) Write in detail about the CROWN GALL DISEASE in plants. 6  
b) Write a note on HUMAN GENOME PROJECT. 6



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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) Write a note on Noise pollution (6)  
(b) How radiation pollution effect on environment? (6)
- Q.2. (a) How fungicides and pesticides are sources of soil pollution? (6)  
(b) How sewage and sludge water can be treated? (6)
- Q.3. (a) What is waterlogged? How waterlogging effect vegetation? (6)  
(b) What are Wetlands? How they can be protected? (6)
- Q.4. (a) Write a note on importance of forests (6)  
(b) How global warming change climate of the earth? (6)
- Q.5. (a) What is chemical composition, causes, effects and resolution of photochemical smog? (7)  
(b) Briefly explain the acid rain (5)
- Q.6. (a) Discuss properties of saline and sodic soil (6)  
(b) What are major problems of environment cause by increasing rate of human population growth? (6)
- Q.7. (a) What is National Conservation Strategy of conservation and management? (6)  
(b) Write a note on algal bloom and eutrophication. (6)
- Q.8. Write a note on (6)  
(a) Heavy Metal Pollution (6)  
(b) Ozone Pollution (6)



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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) Briefly describe various types of Pits (5)  
(b) Write a note on the structure and properties of cell wall. (10)
- Q2. (a) Briefly describe all the concepts and theories of evolution of apical organization (10)  
(b) Write a note on reproductive shoot apex? (5)
- Q3. (a) Write a detailed note on secondary growth in angiosperms. (10)  
(b) Differentiate between stomata and hydathode in plants (5)
- Q4. (a) What is stele, describe its types with evolution perspective. (10)  
(b) What is "Stellar Theory"? (5)
- Q5. (a) Write comprehensive essay on xylem with special emphasis on types of wood? (10)  
(b) Discuss in detail the evolution of sieve elements in phloem (5)
- Q.6 (a) Define Periderm. Discuss the components of periderm in detail. (7.5)  
(b) Write a note on periderm formation. (7.5)
- Q.7 (a) Write note on structure of root also differentiates b/w mono and dicot root? (7.5)  
(b) Discuss the contrasting traits and types among root and shoot. (7.5)
- Q.8 (a) Define leaf. Elaborate the histology of angiosperm leaf. (7.5)  
(b) Write a note on leaf venation. (7.5)
- Q.9 (a) Write a note on structure and development of flower. (7.5)  
(b) Discuss in detail the economic aspects of applied plant anatomy. (7.5)