



UNIVERSITY OF THE PUNJAB

Part-II A/2018
Examination:- M.A./M.Sc.

Roll No.

Subject: Botany (Special Paper)

TIME ALLOWED: 3 hrs.

PAPER: Opt. I (Plant Tissue Culture and its Agricultural Applications) MAX. MARKS: 75

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

- | | | Marks |
|------|--|-------|
| Q. 1 | (a) Write a note on significance of Plant Tissue Culture techniques in the field of Agriculture. | (8) |
| | (b) What is Cellular Totipotency? What factors do contribute in callus induction and its subsequent maintenance? | (7) |
| Q. 2 | a) Discuss various steps involved in the formation of Somatic Embryos in a typical dicot. | (10) |
| | (b) What growth factors may contribute towards Somatic Embryogenesis. | (5) |
| Q. 3 | Define Micropropagation. What are its various stages? Explain. | (15) |
| Q. 4 | Discuss the methods involved in the isolation and purification of Plant Protoplasts. | (15) |
| Q. 5 | (a) Discuss the importance of selection of suitable explants in Plant Tissue Culture studies. | (8) |
| | (b) Write a note on production of Secondary Metabolites through Plant Tissue Culture. | (7) |
| Q. 6 | Differentiate between the following terms: | (15) |
| | (a) Differentiation and de-differentiation. | |
| | (b) In vitro and In vivo studies. | |
| | (c) Compact and Friable callus cultures. | |
| Q. 7 | Write short notes on the following: | (15) |
| | a) Germplasm conservation | |
| | b) Aseptic techniques | |
| | c) Somaclonal variation | |



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Subject: Botany (Special Paper)
PAPER: Opt.VII (Advance Plant Anatomy)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

- Q.1 (a) Write a detail note on sub-microscopic structure of cell wall? (8)
(b) Discuss the role of secretory tissue in plants? (7)
- Q.2 (a) Write a note on vegetative shoot apex of vascular cryptogams? (8)
(b) What are the main role of stomata and trichome in the epidermis? (7)
- Q.3 (a) Write a note on morphological specialization of xylem vessels? (8)
(b) Write detail note on the secondary growth in xylem? (7)
- Q.4 (a) Define apical meristem differentiate b/w vegetative and reproductive shoot apex? (8)
(b) Discuss the process of cell wall formation and describe its properties? (7)
- Q.5 (a) Explain the morphology of periderm and rhytidome (7)
(b) Explain branch traces and branch gaps with the help of diagram? (8)
- Q.6 (a) Explain the origin of flower with the help of diagram (8)
(b) Discuss seed, acts as a storage tissue? (7)
- Q.7 (a) Explain the bundle sheath and bundle extension from an ecological point of view? (8)
(b) Discuss organographic and ontogenic specialization of vessels? (7)
- Q.8 (a) Discuss the ovule types with the help of suitable diagram? (7)
(b) Write a note on economic aspects of applied plant anatomy (8)
- Q.9 (a) Write a note on stealer theory? (8)
(b) Discuss the changes in leaf anatomy with changing environmental conditions? (7)



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TIME ALLOWED: 3 hrs.

PAPER: VIII (Plant Anatomy and Taxonomy of Angiosperms)

MAX. MARKS: 60

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

1. (a) Define classification. Discuss Bentham and Hooker system of classification in detail.
(b) What is the role of Embryology and Paleobotany in taxonomic evidences?
2. (a) Explain the primary structure of Root in angiosperms with neat and clean labeled diagram.
(b) Write down origin, structure and functional specialization of the parenchyma tissues.
3. (a) Explain the Takhtajan system of classification. Give its merits and de-merits.
(b) Give classification of meristem on the basis of position and origin.
4. (a) Define a specie. Explain Taxonomic and biological concepts of species.
(b) Describes the various tissues formed during secondary growth of a root.
5. (a) Discuss phloem tissue with appropriate diagram.
(b) Explain Cycadian and Pteridosperm theories regarding the evolution of Angiosperms.
6. (a) Write a detailed account on the shape, arrangement, occurrence and function of Vascular cambium.
(b) Write a note on types of Stomata.
7. (a) What is ICBN? Describe different rules of ICBN.
(b) What is secondary growth? Briefly describe it in dicot stem.



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Subject: Botany
PAPER: IX (Plant Physiology)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 60

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

Q.1

- A. What is the importance of the water potential concept in plant physiology? What are the components of the water potential? (6)
- B. Imagine two adjoining cells, the left one with a water potential of -0.5 MPa and the right one with a water potential of -0.2 MPa. Will the water move from Left to Right, or Right to Left? (6)

Q.2

- A. How do plants optimize nutrient uptake from the soil? How can mycorrhizas help? (6)
- B. What does Nernst equation describe? If the current carried by K^+ ions diffusing through a K^+ channel is plotted against the membrane potential, at what potential will the direction of current reverse? (6)

Q.3

- A. Photosynthesis in oxygen-evolving organisms is said to involve two distinct photosystems. Describe these two photosystems and provide two lines of experimental evidence that led to their discovery. (6)
- B. Discuss various steps involved in Calvin Cycle. (6)

Q.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. (6)
- B. Describe the pressure-flow model of translocation in the phloem. Does water move down its water potential gradient in this model? (6)

Q.5

- A. Define respiratory substrate. How does respiratory quotient predict the nature of respiratory substrate? (6)
- B. What are the main enzymatic steps mediating the assimilation of sulfate? What is sulfate activation? Why is it necessary for the assimilation of sulfate into organic compounds? (6)

Q.6

- A. Create a diagram showing how hormone concentrations in a plant are regulated during homeostasis. (6)
- B. Draw a diagram showing how auxin contributes to gravitropic responses in the shoot and root. What is the basis for the different responses in the shoot and root. (6)

Q.7

- A. Using cereal endosperm as an example, discuss the mechanism of the mobilization of seed storage reserves. (6)
- B. Discuss the starch-statolith hypothesis in relation to gravitropism in roots. (6)

Q.8

- A. What is the ecological function of photoperiodism? Discuss variations in the photoperiodic response. (6)
- B. Discuss the roles of various hormones in regulating leaf senescence. (6)

Q.9

- A. Why gene regulation among eukarotes is so complex? Justify your opinion with suitable examples. (6)
- B. Compare the process of signal transduction in prokaryotes and eukaryotes (6)



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PAPER: X (Molecular Genetics)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 60

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

- Q-1 a) What are lethal alleles? 6+6=12
b) What is crown gall disease in plants? What is the importance of agrobacterium?
- Q-2 a) Write a note on multiple alleles? 6+6=12
b) Explain ABO and RH blood grouping with reference to multiple alleles.
- Q-3 a) What is site specific recombination? 6+6=12
b) Explain holliday model of recombination.
- Q-4 Describe transposable elements in detail and what are insertion sequences in prokaryotes explain? 12
- Q-5 a) Write a note on properties of genetic code. 3x4=12
b) Plasmid vs episome
c) Start vs stop codon
d) Conjugation vs transformation
- Q-6 a) Explain homologous recombination 12=6+6
b) What is Hardy Weinberg law?
- Q-7 Write a note recombinant DNA technology. 12
- Q-8 What is lac operon system in prokaryotes? How it is induced and repressed explain? 12
- Q-9 What are the restriction enzymes? Describe their role in cutting and forming the recombinant DNA 12



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PAPER: XI (Environmental Biology)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 60

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

- Q.1. (a) What are chlorofluorocarbons? What are their effects on environment?(6)
(b) Write a note on heavy metal pollution?(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 chemical composition, causes, effects and resolution of photochemical smog?(7)
b) What is acid rain?(5)
- Q.4. a) Write a note on algal bloom and eutrophication?(6)
b) What is noise pollution its causes and effects?(6)
- Q.5. (a) What are impacts of Greenhouse gases on environment?(6)
(b) What are main problems of environment cause by increasing rate of human population?(6)
- Q.6. a) What is ozone layer? How it is decreasing day by day and effect the environment?(5)
b) What is global warming? How it effect the environment?(7)
- Q.7. Write a note on Rangelands?(12)
- Q.8. (a) What are rangelands and explained their types?(6)
(b) What are major problems of environment regarding to conservation strategies and management?(6)