UNIVERSITY OF THE PUNJAB

Part-II A/2016
Examination:- M.A./M.Sc.

Roll No. .....

Subject: Botany
PAPER: Opt. V [Environmental Bacteriology (Special Paper)]

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

NOTE: Attempt any FIVE questions from the following. Each question carries equal marks.

Q. 1 Answer the following short questions?

a. What are "Biosensor"?
b. Define Phytoremediation ?
c. Under which ministry the national Biosafety guidelines could be monitored?
d. Explain the term activated sludge.
e. What are the bases of Biosafety guidelines?
f. Write any two important environmental law

Q. 2.Write a short note on the following:

1. Xenobiotic compounds
2. Biofilm

Q. 3. What are the relation between Pollution and environment?

Q. 4. Describe the bacterial cell structure with diagrame?

Q. 5. How bacteria can plays role in the process of Bioremediation?

Q. 6. Describe the transport of heavy metals in a bacterial cell?

Q. 7. What are the bases of bacterial classification, how many basic categories are present?

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Part-II A/2016
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.

Q. 1(a). What are the different types of cultures used in Plant Tissue Culture techniques? (8 marks)

(b). Define aseptic techniques? Why these techniques are important in tissue culture? (7 marks)

Q. 2(a). Describe the process of callus formation and its maintenance. (7 marks)

(b). What are protoplasts and how are they isolated and cultured? (8 marks)

Q. 3(a). What are the factors effecting somatic embryogenesis? (7 marks)

(b). Discuss in detail the anther and pollen cultures. (8 marks)

Q. 4(a). What is the difference between short term and long term cryopreservation? Describe the main steps of long term cryopreservation. (8 marks)

(b). What are the main components of nutritional medium used for plant tissue culture? (7 marks)

Q. 5(a). What are the different stages and applications of micro propagation? (8 marks)

(b). Define organogenesis? Discuss each step of this process in detail (7 marks)

Q. 6(a). What is a suspension culture? What are the growth characteristics of a suspension culture? (7 marks)

(b). What is the role of auxins and cytokinins in Plant Tissue Culture? (8 marks)

Q.7. Write short notes on: (5 marks each)

a) Germplasm conservation

b) Secondary metabolites

c) Inorganic nutrients

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Subject: Botany **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 the term meristems. What are the characteristic features of meristematic cells?
   (b) Explain the various groups of classification of meristematic tissues in the plant body.

2. **(a)** How does the cytohistological zonation explain the shoot apical organization in gymnosperms? Support your explanation with few examples.
   (b) Discuss the open and close types of apical organization in the roots.

3. **(a)** What is vascular cambium and its function? How is it organized? Explain the cell divisions in the cambial initials.
   (b) What are trichomes? Give the classification of trichomes. What are the steps involved in their formation?

4. **(a)** Give an outline of the system of classification proposed by Engler and Prantl. Give the merits and demerits of this system.
   (b) Briefly describe the role of anatomical characters in taxonomy.

5. **(a)** Write a comparative account of classification systems proposed by Hutchinson and Takhtajan.
   (b) What is the role of Embryology and Paleobotany in taxonomic evidences?

6. **(a)** What are laticifers? Which type of substances they may contain? Name and explain their different types.
   (b) Write a note on numerical taxonomy.

7. **(a)** Write a detailed account on the shape, arrangement, occurrence and function of parenchyma cells.
   (b) What do you know about unit of classification and taxonomic hierarchy?

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Part-II A/2016
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Subject: Botany **TIME ALLOWED: 3 hrs.**
PAPER: IX (Plant Physiology) **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. How does the relative air humidity affect the transpiration rate of a leaf? If the air surrounding a transpiring leaf becomes warmer, how will this affect the transpiration rate of the leaf? (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 itswater potential gradient in this model? (6)

Q.5

A. Which enzyme is responsible for cyanide-resistance respiration in plants? What are the energetic consequences of cyanide-resistance respiration? (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. Discuss how comparisons of absorption spectra and action spectra have aided the identification of phytochrome as the photoreceptor involved in red/far-red responses. (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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Subject: Botany
PAPER: X (Molecular Genetics)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 60

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

1. What are insertion sequences (IS)? Describe their role in creating variations and changes in chromosomes and their role in conservational genetics. (12 marks)
2. Write a note on the following (6x2 = 12 marks)

a. Gene therapy

b. DNA typing

3. What are restriction enzymes? Describe different types of restriction enzymes, their role in cutting and making recombinant DNA molecules? (12 marks)
4. What are the molecular bases of mutations at the level of genes? Explain the biological repair mechanisms of mutated DNA molecules. (12 marks)
5. Explain Translation in detail. (12 marks)
6. Describe recombination of genetic material in bacteria. How one can use conjugation, transformation and transduction to map bacterial chromosome? Do describe the merits and demerits of all three processes. Describe conjugation in detail. (12 marks)
7. What are operons? Explain the negative and positive control of lac operon? How they control the transcription and gene regulation in eukaryotes? (6+6 = 12 marks)
8. What is site specific recombination? How recombination and rearrangement of chromosomes take place? Explain. (12 marks)
9. What do you know about extra-chromosomal inheritance? Explain cytoplasmic pattern of inheritance in fungi and extra-genomic plasmids in eukaryotes. (12 marks)

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Subject: Botany
PAPER: XI (Environmental Biology)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 60

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

Q1. a) What is photochemical smog? Discuss its causes, impacts and remedies. 6

b) What are the effects of acid rain on vegetation 6

Q2. a) Write a detailed note on eutrophication. 6

b) Discuss the environmental impacts of fungicides, pesticide and herbicides. 6

Q3. a) Write a brief note on heavy metal pollution. 6

b) What are important measures to overcome the effect of radiation pollution? 6

Q4. a) What are the major causes of deforestation in developing countries like Pakistan? 6

b) Write a brief note on ozone depletion. 6

Q5. a) How hydroelectric dams are causing different kinds of environmental problems? 6

b) Write a note on greenhouse effect. 6

Q6. a) What are the major goals of national conservation strategy discuss with special reference to the environment. 12

Q7. a) Discuss the importance of wetlands. Also describe their environmental problems. 6

b) How water logged soils effect the crop productivity? 6

Q8. a) Write a note on sustainable environmental management. 6

b) How salt affected soils can be managed? 6