

Roll No.....

PH. D. COURSE WORK EXAMINATION, 2022

ELECTIVE PAPER: BOTANY

PAPER CODE: PHBO102

PLANT PHYSIOLOGY, TISSUE CULTURE AND GENETIC ENGINEERING

Duration: 3 Hours

Max. Marks: 100

(Write your roll number at the top immediately on receipt of this paper)

Attempt all questions. All part of a question must be attempted in continuation. Start answering each question on a new page. Cite examples and draw diagrams wherever necessary.

Q1. Short Answer Type; attempt any 10 (not more than half page)

10×2=20

- i) Physical properties of soils.
- ii) Beneficial elements.
- iii) Phosphorus deficiency.
- iv) Anoxia condition in plants.
- v) Lipid peroxidation and its impact in plants.
- vi) Soil types and pH of soil.
- vii) cDNA synthesis.
- viii) DNA recombinant technology.
- ix) Tissue culture and its application.
- x) Application of genetic engineering.
- xi) Cold stress.
- xii) Food security.
- xiii) Heat shock proteins.
- xiv) Water stress.
- xv) Osmotic potential.

Q2. Short note type; attempt any 04 (not more than two pages)

4×5=20

- i) Write the physiological and molecular changes of temperature stress and write any ONE strategy for temperature tolerance in plants.
- ii) What are the major traits reduction under flooding stress in plants? Mention physiological adaptations during flooding stress.
- iii) What is the role of media in micropropagation? Enlist the different chemicals used in MS media.
- iv) How to produce virus-free plants *in vitro*? Mention its procedure, de merits and merits of virus free plants.
- v) Describe briefly mineral nutrient acquisition and transport in plants.
- vi) Write a critical note on production of hybrids and hybrid selection in plants.

Q3. Long note type (no limit of pages)

3×20=60

1.What are the criteria of essentiality of mineral elements? Discuss the physiological role of nitrogen in plants.

OR

What is diffusion? Differentiate between simple diffusion and facilitated diffusion along with its importance in plants.

2.Define soil and describe soil profiling with suitable illustrations. Make a critical note on soil pollution and impact on agricultural production.

OR

Why anther culture is important? Discuss method of anther culture with their applications.

3.What is gene cloning? Explain enzymes involved in genetic engineering.

OR

What are antioxidant defence systems in plants? Enlist the components of ascorbate-glutathione pathway and its role during stress conditions.
