

M.Sc. Semester-III Examination, 2022
(Agriculture) in Genetics and Plant Breeding
PAPER: PPH-301 (Theory)

(PHYSIOLOGICAL AND MOLECULAR RESPONSES OF PLANTS TO ABIOTIC STRESSES)

Full Marks: 50

Time: 2 Hours

GROUP-A

1. Answer any **FIVE** questions.

2×5=10

- a) Differentiate between Escape and avoidance.
- b) Explain Electrical Conductivity (EC) of soil? List the different crops suitable for high EC, moderate EC and low EC condition.
- c) How reactive oxygen species are generated in plants? What are the different forms of ROS?
- d) Write down the deficiency symptoms of following essential nutrients
i. Fe ii. Zn.
- e) What are the symptoms of alkali stress in plants?
- f) Mention the biochemical indices related with drought resistance.
g) Mention the name of the genes associated with drought stress and salt stress signalling in plants.
- h) What is chlorophyll stability index?

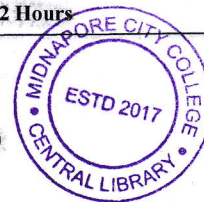
GROUP-B

2. Answer any **FOUR** questions.

5×4=20

- a) Define temperature stress and give its different types. Mention the scale used for scoring the heat tolerance. What is heat shock protein? 3+2
- b) What is heavy metal stress? Explain the various methods to reduce heavy metal stress? 2+3
- c) Explain the physiological effects of Heat stress.
- d) Write the reasons for limited success in abiotic stress breeding in crops.
- e) Briefly explain about drought hardening.
- f) Explain the selection criteria for dehydration avoidance.
- g) Discuss the importance of wild relatives for abiotic stress breeding programme.
- h) Differentiate between resistance and tolerance mechanism. How salt tolerance varies across species and variety? 2+3

P.T.O.



GROUP-C

3. Answer any TWO questions.

10×2=20

- a) Classify different abiotic stresses. Write the reasons for limited success in abiotic stress breeding in crops. Describe the way by which you can test whether a major QTL for drought tolerance effective over a range of environment and cultivars.

2+4+6

- b) Differentiate between saline and sodic soil. Which chromosome of rice carry a major QTL for the salt-tolerance ability and what are the major genes located within that QTL? Describe the traits of an ideal high-yielding salinity tolerant rice variety.

2+4+4

- c) Explain the breeding strategy for improving salinity tolerance in rice.

- d) What is drought stress? What are the morphological and physiological impact of drought stress in plants? Explain plant traits affecting drought response and plant breeding approaches for drought resistance.

2+4+4