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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

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