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(iv) Traditional and modern methods of crop improvement

4. (a) Discuss the osmotic and cytotoxic effects of salinity stress in plants. (8)

(b) Discuss the role of nitric oxide (NO) in stress sensing and signalling mechanisms in plants. (7)

5. (a) Describe the zig-zag model in plant defense with the help of suitable diagrams. (8)

(b) Explain temperature stress in plants. Discuss the role of heat shock proteins in stress tolerance mechanisms. (7)

6. (a) What is osmotic stress? Elaborate on the mechanism of various ion transporters during salinity stress in plants. (8)

(b) Give a brief account of stress-tolerant genetically engineered plants. (7)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 7234

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Unique Paper Code : 2163010024

Name of the Paper : Plant Stress Biology

Name of the Course : **Botany**

Semester : VIII

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **FOUR** questions in all.
3. Question No. **1** is compulsory.
4. **All** questions carry equal marks.
5. Draw well-labelled diagram wherever necessary.

1. (a) Expand the following (**any five**) : (5×1=5)

(i) LEA

(ii) MAPK

(iii) AQPs

(iv) SA

(1000)

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(v) SOD

(vi) HSPs

(b) Match the following : (5×1=5)

- | | |
|----------------------|--|
| (i) HSP70 | a) Detoxification of H_2O_2 |
| (ii) Catalase | b) Wound and herbivory signalling |
| (iii) Calmodulin | c) Quaternary ammonium osmoprotectant |
| (iv) Glycine betaine | d) Calcium Sensor |
| (v) Jasmonic acid | e) Chaperone induced by temperature stress |

(c) Fill in the blanks (**any five**) : (5×1=5)

- (i) One of the mechanisms to evade drought stress in plants is to produce more _____ which helps in stabilizing the membranes and enzymes.
- (ii) *Atriplex nummularia* is an example of _____ .
- (iii) _____ of a plant is the heat-killing temperature depending upon the time of exposure.

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(iv) The antioxidant enzyme that converts hydrogen peroxide to water and oxygen in peroxisomes is _____ .

(v) _____, the most ubiquitous second messenger is involved in drought and salt stress signalling pathway.

(vi) Transgenic alfalfa (*Medicago* sp.) overexpressing tobacco Mn SOD shows enhanced tolerance to _____ stress.

2. Differentiate between (**any three**) : (3×5=15)

- (i) Acclimation vs Adaptation
- (ii) Salt exclusion vs Salt tolerance
- (iii) Alkaloids and Phenolics
- (iv) Biotrophs vs Necrotrophs

3. Write notes on the following (**any three**) : (3×5=15)

- (i) Late embryogenesis abundant proteins
- (ii) Hypersensitive response
- (iii) Mechanism of Salicylic acid signalling during plant stress

P.T.O.