



**2022/TDC/ODD/SEM/  
BOTDSE-503T(A/B)/145A**

**TDC (CBCS) Odd Semester Exam., 2022**

**BOTANY**

**( 5th Semester )**

**Course No. : BOTDSE-503T**

**Full Marks : 50**

**Pass Marks : 20**

**Time : 3 hours**

*The figures in the margin indicate full marks  
for the questions*

**Candidates have to answer either from Option—A  
or from Option—B**

**OPTION—A**

**Course No. : BOTDSE-503T (A)**

**( Stress Biology )**

**UNIT—I**

**1. Answer the following questions : 1×3=3**

- (a) Define the term 'stress adaptation'.
- (b) Name the ROS produced in the mitochondria.
- (c) What is the function of Superoxide Dismutase (SOD)?



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2. Answer any one of the following : 2
- (a) What is signal transduction?
- (b) Name two factors that cause parthenogenesis.
3. Answer any one of the following : 5
- (a) Write notes on the following :  $2\frac{1}{2} \times 2 = 5$
- (i) Antioxidant defence
- (ii) Stress response in plant
- (b) Give a detailed account of proline in osmotic adjustment in plants during drought stress.

UNIT—II

4. Answer the following questions :  $1 \times 3 = 3$
- (a) What do you mean by the term 'hypersensitive reaction'?
- (b) Write one effect of salinity to plants.
- (c) What is systemic acquired resistance (SAR)?

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5. Answer any one of the following : 2
- (a) What is the function of calmodulin during plant response to stresses?
- (b) What is the role of aerenchyma in plants under flooding conditions?
6. Answer any one of the following : 5
- (a) Write notes on the following :  $2\frac{1}{2} \times 2 = 5$
- (i) Salinity stress
- (ii) PR proteins
- (b) Discuss the jasmonic acid signalling pathway for disease resistance in plants.

UNIT—III

7. Answer the following questions :  $1 \times 3 = 3$
- (a) What is the function of ascorbic acid in stress mitigation?
- (b) Define the term 'drought stress'.
- (c) What are aquaporins?

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( Turn Over )



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8. Answer any *one* of the following : 2

- (a) Discuss the function of glycerophospholipids.
- (b) What do you mean by the term 'hyperergy'?

9. Answer any *one* of the following : 5

- (a) Write notes on the following :  $2\frac{1}{2} \times 2 = 5$ 
  - (i) Calmodulin function in abiotic stress
  - (ii) Regulation of phospholipid signalling
- (b) Discuss the role of phosphatidylinositol in stress responses in plants.

UNIT—IV

10. Answer the following questions :  $1 \times 3 = 3$

- (a) What is lipid peroxidation?
- (b) What is the full form of ROS?
- (c) What is the EC number of catalase (CAT)?

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11. Answer any *one* of the following : 2

- (a) Discuss the role of jasmonic acid in abiotic stress responses in plants.
- (b) What is osmotic adjustment?

12. Answer any *one* of the following : 5

- (a) Write notes on the following :  $2\frac{1}{2} \times 2 = 5$ 
  - (i) Heat shock proteins (HSP)
  - (ii) Osmoprotectant
- (b) Discuss the role of cortical aerenchyma formation during drought stress in plants.

UNIT—V

13. Answer the following questions :  $1 \times 3 = 3$

- (a) What is the function of glutathione in ROS detoxification?
- (b) What is the role of ascorbic acid in ROS detoxification?
- (c) What is Halliwell-Asada pathway?



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14. Answer any one of the following : 2

- (a) What is the function of peroxidase enzyme in ROS detoxification?
- (b) How do plants respond to hypoxic conditions?

15. Answer any one of the following : 5

- (a) Write notes on the following :  $2\frac{1}{2} \times 2 = 5$ 
  - (i) Reactive oxygen species
  - (ii) Root-shoot ratio
- (b) Discuss the role of catalase and superoxide dismutase in ROS detoxification in plants.

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OPTION—B

Course No. : BOTDSE-503T (B)

( Plant Breeding )

UNIT—I

1. Answer the following questions :  $1 \times 3 = 3$

- (a) Enlist two principle objectives of plant breeding.
- (b) Define apomixis.
- (c) What is incompatibility relationship?

2. Answer any one of the following : 2

- (a) Discuss the difference between isogamy and heterogamy.
- (b) What is amphimixis? How does amphimixis differ from apomixis?

3. Answer any one of the following : 5

- (a) Describe the scope and nature of plant breeding.
- (b) Discuss the contribution of IARI in development of high-yielding crops.



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UNIT—II

4. Answer the following questions :  $1 \times 3 = 3$

- (a) Differentiate between apogamy and apospory.
- (b) What do you mean by parthenogenesis?
- (c) What do you mean by polygenic inheritance?

5. Answer any one of the following : 2

- (a) How can crop variety be improved?
- (b) Discuss the significance of acclimatization in crop improvement.

6. Answer any one of the following : 5

- (a) Write notes on the following :  $2\frac{1}{2} \times 2 = 5$ 
  - (i) Pure-line selection
  - (ii) Acclimatization
- (b) Discuss the advantages of pure-line selection.

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UNIT—III

7. Answer the following questions :  $1 \times 3 = 3$

- (a) What is mutation breeding?
- (b) Define the term 'mass selection'.
- (c) What is clonal selection?

8. Answer any one of the following : 2

- (a) What is compartmental selection? Enlist its application and uses.
- (b) Write a note on mass selection of crop improvement.

9. Answer any one of the following : 5

- (a) Enlist two advantages and disadvantages of hybridization.  $2\frac{1}{2} + 2\frac{1}{2} = 5$
- (b) What are the physiological effects of hybrid vigour?

UNIT—IV

10. Answer the following questions :  $1 \times 3 = 3$

- (a) Enlist one similarity between pedigree and bulk method of hybridization.



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- (b) What is the haploid chromosome number of *Oryza sativa* L.?
- (c) What is emasculation?
11. Answer any one of the following : 2
- (a) Write the comparison between heterosis and inbreeding depression.
- (b) Write notes on the following : 1+1=2
- (i) Progeny selection
- (ii) Single-line selection
12. Answer any one of the following : 5
- (a) Describe the 'dominance hypothesis' and 'over-dominance hypothesis' of heterosis.
- (b) Write notes on the following :  $2\frac{1}{2} \times 2 = 5$
- (i) Induced mutation
- (ii) Disease escape

UNIT—V

13. Answer the following questions :  $1 \times 3 = 3$
- (a) What do you mean by the term 'hybrid vigour'?

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- (b) Who formulated mutation theory?
- (c) Define the term 'disease endurance'.
14. Answer any one of the following : 2
- (a) Write detailed mechanism of hybridization.
- (b) Differentiate between pedigree and bulk method.
15. Answer any one of the following : 5
- (a) What are the different methods of breeding for disease resistance in crops?
- (b) Write notes on the following :  $2\frac{1}{2} \times 2 = 5$
- (i) Heterostyly
- (ii) Triple fusion

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