

**2023/TDC(CBCS)/ODD/SEM/  
BOTDSE-503T (A/B)/146**

**TDC (CBCS) Odd Semester Exam., 2023**

**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 Option—B

**OPTION—A**

Course No. : BOTDSE-503T (A)

**( Stress Biology )**

**SECTION—A**

Answer *fifteen* questions, selecting any *three* from  
each Unit : 1×15=15

**Unit—I**

1. Define the term stress adaptation.

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2. What is stress avoidance?
3. What is ROS?
4. What is eustress?

Unit—II

5. What are PR proteins?
6. Define the term hypoxia.
7. What is the function of methyl jasmonate in plants?
8. State one reason of insufficient availability of oxygen to plants.

Unit—III

9. What is calmodulin?
10. Name two phospholipids found in plasmamembrane.
11. What is the function of phosphatidic acid in plants?
12. State one function of phospholipid in root hairs plasmamembrane of plants.

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Unit—IV

13. What are osmoprotectants?
14. What is the purpose of aerenchyma formation during hypoxic condition?
15. Name a plant hormone that regulates stress responses.
16. Mention two major causes of osmotic stress in plants.

Unit—V

17. What is Haber-Weiss cycle?
18. Define oxidative stress.
19. State the function of GSH.
20. What is Fenton reaction?

SECTION—B

Answer *five* questions, selecting *one* from each Unit : 2×5=10

Unit—I

21. What is hypersensitive reaction?
22. What do you mean by systematic and acquired resistance?

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( Turn Over )

( 4 )

Unit—II

23. What are the roles of osmoprotectants during salinity stress?
24. Discuss the role of glycinebetaine in plant stress tolerance.

Unit—III

25. How is calmodulin activated by  $Ca^{+2}$  ions?
26. What are phospholipase enzymes?

Unit—IV

27. How can light stress alter shoot growth?
28. What is the function of aerenchyma?

Unit—V

29. State the effect of hydrogen peroxide in plants.
30. Discuss the function of ROS as signalling molecule.

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SECTION—C

Answer *five* questions, selecting *one* from each  
Unit : 5×5=25

Unit—I

31. Discuss various adaptive strategies in plants during osmotic stress.
32. Explain the term stress tolerance.

Unit—II

33. Write a note on high-temperature stress in plants.
34. What are different osmotic adjustments made by plants during salt stress?

Unit—III

35. What is phosphoinositide signalling?
36. Write a note on calcium signalling cascades.

Unit—IV

37. How root-to-shoot ratio in plants alters significantly during stress?
38. Write a brief note on compatible solutes in plants and their function.

( 6 )

Unit—V

39. Write a brief note on non-enzymatic antioxidant metabolism in plants.
40. What are the various sites of ROS production in plants and how is ROS production controlled by antioxidant enzymes?

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OPTION—B

Course No. : BOTDSE-503T (B)

( Plant Breeding )

SECTION—A

Answer *fifteen* questions, selecting any *three* from each Unit : 1×15=15

Unit—I

1. Define mass selection.
2. What is pedigree breeding?
3. What is hybrid breeding?
4. What is hybrid vigour?

Unit—II

5. Define acclimatization.
6. What is hybridization?
7. State the advantages of self-pollination.
8. State the advantages of cross-pollination.

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Unit—III

9. Define polygenic inheritance.
10. What do you mean by qualitative traits?
11. What is Mendalian inheritance?
12. What is dihybrid cross?

Unit—IV

13. Define heterosis.
14. What is inbreeding depression?
15. What is deleterious allele?
16. Name any one hypothesis which can explain superiority of hybrids.

Unit—V

17. What is polyploidy?
18. Define mutation.
19. What is distant hybridization?
20. What are allopolyploids?

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SECTION—B

Answer *five* questions, selecting *one* from each

Unit : 2×5=10

Unit—I

21. State the difference between pureline selection and mass selection.
22. What are the asexual modes of reproduction in crop plants?

Unit—II

23. What is marker-assisted selection (MAS)?
24. Define the term mass cloning.

Unit—III

25. Discuss about homozygous and heterozygous alleles.
26. State the difference between monohybrid and dihybrid crosses.

Unit—IV

27. What is genetic homozygosity?
28. What is over-dominance hypothesis?

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( Turn Over )

( 10 )

Unit—V

29. What are transgenic plants? Give one example.
30. Discuss the difference between point mutation and chromosomal rearrangements.

SECTION—C

Answer *five* questions, selecting *one* from each  
Unit :  $5 \times 5 = 25$

Unit—I

31. Write a note on undesirable consequences of plant breeding.
32. State the differences between open-, self- and cross-pollination in plants.

Unit—II

33. What are the advantages and limitations of vegetative propagation?
34. Discuss the centre of origin for any two crop plants.

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Unit—III

35. Discuss the significance of kernel colour in wheat.
36. How can human skin color be a trait for identifying diversity of human population?

Unit—IV

37. Discuss the difference between epistasis and complementation.
38. Discuss the application of inbreeding depression in plant breeding.

Unit—V

39. Discuss the role of biotechnology in crop improvement.
40. Discuss the role of mutation breeding in development of crop varieties.

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