



**2021/TDC/CBCS/ODD/  
BOTDSE-503T (A/B)/145A**

**TDC (CBCS) Odd Semester Exam., 2021  
held in March, 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 Option—B

**OPTION—A**

Course No. : BOTDSE-503T (A)

**( Stress Biology )**

**SECTION—A**

Answer any *fifteen* of the following questions :

1×15=15

1. Define stress with relation to plants.

2. What is acclimatization in short?



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3. What is acclimatization in plant tissue culture?
4. Write an adaptive feature of halophytes.
5. What do you mean by negative water potentials?
6. Give an example of a salt resistance plant.
7. Mention one high-temperature injury in plants.
8. What is the number of carbon atoms in jasmonic acid?
9. What is the full form of CRT?
10. Name the tissue layer of a grass leaf where  $\text{Ca}^{2+}$  is mainly found.
11. Where is the 'CAX' located in plant cell?
12. What are phospholipids?
13. What is secondary acquired resistance?
14. What is the function of glutathione?

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15. Name a plant hormone that regulates stress responses.
16. Name an organic compound that accumulates in the cytoplasm of plant cells under water stress condition.
17. What are the three reactive oxygen species?
18. Name the enzyme by the action of which superoxide is converted to hydrogen peroxide.
19. Which cellular organelle produces the reactive oxygen species?
20. Name two endogenous sources of ROS.

SECTION—B

Answer any *five* of the following questions :  $2 \times 5 = 10$ .

21. How do plants adapt to drought stress?
22. Differentiate between acclimation and adaptation.
23. What is hypersensitive response?

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24. What are phytoalexins in plants?
25. What phospholipids do in plants?
26. What is calcium gradient?
27. What is the utility of leaf waxing?
28. What is the function of aerenchyma?
29. Define osmotic potential.
30. How is ROS produced in plants?

SECTION—C

Answer any *five* of the following questions : 5×5=25

31. Give an account of the physiological adaptations of xerophytic plants.
32. Write notes on the following :
  - (a) Ephemeral annuals
  - (b) Drought-enduring plants
33. Explain how mangrove vegetation overcomes the physiological dryness.

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34. Write an elaborate note on the effects of heat-shock stress in plants.
35. Explain the role of calcium modulation in signal transduction in plant defense.
36. Write different functions of membrane phospholipids in cell signaling.
37. What are osmoprotectants? Write the important roles of osmoprotectants in improving drought tolerance in plants.
38. Write a note on hypersensitive response or reaction of plants on being attacked by insects or pathogenic micro-organisms.
39. Describe the production mechanism and scavenging of reactive oxygen species in plants.
40. Write notes on the following :
  - (a) Root-shoot ratio
  - (b) Antioxidative mechanism

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OPTION—B

Course No. : BOTDSE-503T (B)

( Plant Breeding )

SECTION—A

Answer any fifteen of the following questions :

1×15=15

1. Name the first agricultural research institute established in India.
2. Name the toxic chemical present in Khesari (*Lathyrus sativus*) seeds.
3. Define genetic erosion.
4. Where is the Central Rice Research Institute located?
5. State the law of homologous series in variation.
6. Mention the geographical areas fall under 'The Central Asia Centre of Origin' of crop plants.
7. What do you mean by adventive embryony?
8. What is pedigree record?

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9. Who proposed the term 'polygene'?
10. Define qualitative traits.
11. What are null alleles?
12. Who first studied the inheritance of kernel colour in wheat?
13. What is outbreeding?
14. What are identical genes?
15. What is called full-sib mating?
16. Define linebreeding.
17. Name the plant from which colchicine is extracted.
18. What is the scientific name of 'doob' grass?
19. What is the chromosome number of *Triticum spelta*?
20. Name the Indian scientist who developed a new variety of wheat, called 'Sharbati Sonora'.

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SECTION—B

Answer any *five* of the following questions :  $2 \times 5 = 10$

21. Write a note on cytoplasmic male sterility.
22. What is dichogamy?
23. Name four varieties in different crops that have been developed by mass selection in India.
24. Write a note on emasculation.
25. What is transgressive variation?
26. State the significance of quantitative genetics.
27. Give a short account of G. H. Shull in the field of genetics.
28. What do you mean by outbreeding?
29. Define irradiation.
30. Name two chemicals which can induce polyploidy.

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SECTION—C

Answer any *five* of the following questions :  $5 \times 5 = 25$

31. Give an account of the undesirable consequences of plant breeding.
32. Write the contrivances of self-pollination and cross-pollination.
33. Describe the methods of crop improvement for vegetatively propagated plants.
34. Describe the procedures of hybridization.
35. Explain the phenomenon of quantitative inheritance, taking the example of skin colour in human beings.
36. Write notes on the following :
  - (a) Multiple factor hypothesis
  - (b) Quantitative genetics
37. Write an elaborate note on inbreeding with suitable examples.
38. Explain the following :
  - (a) Inbreeding coefficient
  - (b) Linebreeding

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39. Give an illustrated account of the role of polyploidy in plant breeding.
40. Describe different methods of biotechnology employed in crop improvement programme.

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