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B.Sc./5th Sem/BOT/25(NEP)

2025

5th Semester Examination (CCFUP : NEP)

BOTANY

Paper : MDSE 1-T
(Single Core Major Elective-1)

Full Marks : 40

Time : Two Hours

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

[Stress Biology]

Group - A

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

1. Differentiate acclimation from adaptation.
2. What do you mean by salinity stress?
3. Define PR protein.
4. What is hypersensitive reaction?
5. What is calmodulin?
6. What do you mean by osmotic adjustment?
7. Define ROS.
8. What is scavenging mechanism?

P.T.O.



(2)

Group - B

Answer any *four* questions : 5×4=20

9. Mention the factors affecting the success of plantlet growth during acclimatization stage. Explain these factors briefly. 2+3
10. Why acclimation is so important in plants? Give the positive role of it. 3+2
11. What role do antioxidants play in plant stress? Define systemic acquired resistance. 3+2
12. Discuss the role of plant growth regulators in mediating stress acclimation. 5
13. What is 'primed acclimation'? Give example. Define cross-acclimation. (2+1)+2
14. What is phospholipid signalling? Give the role of aerenchyma development in plants to mitigate environmental stress. 2+3

Group - C

Answer any *one* question : 10×1=10

15. Explain the mechanisms of photosynthetic adjustment under changing light conditions in plants. What are the functions of HSPs during heat acclimation? 7+3
16. Compare and contrast the Low-Oxygen Quiescence Strategy (LOQS) and Low-Oxygen Escape Strategy (LOES) in flooded plants. How do plants adjust to combined abiotic stresses? What is compatible solute production? 6+2+2

(3)
OR



[Industrial & Environment Microbiology]

Group - A

Answer any *five* questions : 2×5=10

1. Define biological nitrogen fixation.
2. State two major role of arbuscular mycorrhizal fungi in agriculture. 1+1
3. Differentiate between total coliform and fecal coliform bacteria.
4. Differ batch and continuous fermentation.
5. Name two advantages of enzyme immobilization in industrial applications.
6. Name a fermented food with nutritional value.
7. Mention the need of spray drying.
8. Name the microorganism and substrate used for citric acid production by fermentation.

Group - B

Answer any *four* questions : 5×4=20

9. Describe the components of a typical laboratory-scale bioreactor with a labelled diagram. 3+2
10. Compare the working principles of continuously stirred tank fermenter (CSTF), air-lift fermenter, and fluidized bed bioreactor. Mention one industrial application for each type. 3+2

P.T.O.

11. Describe the open plate sedimentation method for isolating airborne microbes with a labelled diagram of the procedure. 3+2
12. Differentiate between BOD and COD with their significance in assessing waste water pollution. 5
13. Outline the laboratory method for isolating root nodulating bacteria from nodules, including media and confirmatory tests. 5
14. Outline the laboratory method for qualitative and quantitative estimation of amylase activity from a microbial fermentation broth. 5

Group - C

Answer any *one* question : 10×1=10

15. Explain the fermentation process for penicillin production by *Penicillium chrysogenum*, mentioning substrate, media components, fermentation type (submerged) and downstream processing (solvent extraction). Compare batch vs. fed-batch systems in a tabular form. 6+4
16. What is Bioremediation? How would you decontaminate soil by the process. State the method of enzyme immobilization. 2+6+2

