



Registration Number:

Date & session:

ST JOSEPH'S UNIVERSITY, BENGALURU-27
M.Sc. Biotechnology- III SEMESTER
SEMESTER EXAMINATION: OCTOBER 2023
(Examination conducted in November/December 2023)
BT 9423: PLANT, ANIMAL AND ENVIRONMENTAL BIOTECHNOLOGY
(For current batch students only)

Time: 2 hours

Max Marks: 50

This paper contains **TWO** printed pages and **THREE** parts

Instructions:

- Draw diagrams wherever necessary and label them correctly.
- Draw the diagrams and graphs using a ballpoint pen.

PART-A

Answer any **SEVEN** of the following:

2m x 7 = 14 marks

1. Briefly explain how DNA barcoding could be useful in analysing the species diversity within a biodiversity hotspot.
2. What are the major benefits of growing (i) Bt and (ii) Roundup Ready crops?
3. Why were plant 'secondary metabolites' called so? Why are they important in the context of the biological warfare between plants and herbivores?
4. How do monoclonal antibodies differ from polyclonal antibodies? Name the technique used in the production of monoclonal antibodies.
5. What does 'passage number' mean?
6. Mention an advantage and a disadvantage of using viral vectors for gene therapy.
7. How did the first 'Green revolution' impact the environment?
8. What is mycoremediation? Mention an organism used for the same.
9. Mention any two second generation feedstocks used in production of bioethanol.

PART B

Answer any **FOUR** of the following:

5m x 4 = 20 marks

10. What are invasive plant species? Give any two reasons for why these species are problematic, and any two preventive measures in this regard. (5 marks)
11. Using a flowchart, represent the major experimental steps you would perform in order to generate a transgenic mango variety overexpressing the phenylpropanoid biosynthesis gene, '*Pal*'. What may be the benefits of this variety? (4+1 marks)
12. What is biopharming? How are transgenic animals used for the same? (2+3 marks)
13. Why is fetal bovine serum critical for animal cell culture? What will happen to cells which are deprived of this serum? (3+2 marks)
14. What are the different wastewater treatment methods? Mention at least one technique used in each of the methods.
15. What is *in-situ* bioremediation? Briefly discuss its types. Mention any four factors that impact bioremediation.

PART C

Answer any **TWO** of the following:

8m x 2 = 16 marks

16. a. Several genetic engineering techniques used in the laboratory are inspired by natural processes. Elaborate on this taking the example of virus-induced gene silencing (VIGS). Provide a comparative account of plant defence responses against viruses, and how this principle is used in RNAi technique (3+3 marks).
- b. Mention any two reasons for the constant increase in the global cultivation of transgenic crops, with respect to challenges facing agriculture. (2 marks)
17. Discuss in detail, the methodology that was followed in the formation of Dolly (4 marks). Why were three variants of sheep used? (2 marks). What were the physiological problems that Dolly was afflicted with? (2 marks)
18. Answer the following:
- What are alternate clean energy sources? Mention any two biomaterials that can be used in fabrication of solar cells. (2 marks)
 - What is ultrafiltration? Where is it used in the wastewater treatment process? (2 marks)
 - What is biocontrol? Explain how *Baculovirus* is used as a biocontrol agent. (4 marks)