Group – E

Answer ***any one*** question.

17. Write on the chronological discovery of "Culture Independent" Techniques. Write a short note on the summary of the technique used in the amplicon metagenomics study. 4+4

18. Differentiate the basic difference between amplicon and short gun sequencing. Define alpha and beta diversity in microbial ecological study. 6+2

Group – F

Answer ***any two*** questions.

19. What is research proposal? What do you mean by 'Problem Statement'? 1+4=5

20. What is the goal of the 'literature review' section of your project proposal? Define the term "Funnel Point" and explain how this helps the evaluator(s) to uncover the crucial frontier areas of the research topic? 3+2=5

21. What is Plagiarism? How is it relevant to the preparation of a strong research proposal? Why timeline is important in drafting a good research proposal? 1+2+2=5

22. Write a title and two to three sample specific aims of your hypothetical research proposal with a brief description (in 2-3 lines) of each specific aim. 5

M. Sc. (Biotechnology) Examination, 2023

(2nd Year, 2nd Semester)

Selected Topics on Biotechnology

Paper – MSBT 431

Time : Two hours Full Marks : 50

Group – A

Answer ***any one*** question.

1. a) What are the desirable properties of probiotics?

   b) Mention at least one microbial species with application as probiotics. 4+4=8

2. a) What are probiotics and antibiotics?

   b) What are the future prospects of probiotics? 4+4=8

Group – B

Answer ***any two*** questions.

3. Define the term immunophenotyping. State the significance of immunophenotyping in disease biology. 2+2=4

4. State the difference between side and forward scattering in flow cytometry analysis. Define the basic principle of Annexin V staining for aposptosis. 2+2=4

5. State the difference in basic principles of HPLC and gas chromatography. Which chromatographic technique shall we prefer for the separation of long chain fatty acids? Why we couple MS-MS with chromatography? 2+1+1=4

6. State the significance of PAM sequence in CRISPR-CAS9 technology. Define the function of tracrRNA. Give one example where we can use CRISPR technology as a molecular diagnostic tool for any disease. 2+1+1=4

Group – C

Answer ***any four*** questions. 2×4=8

7. What do you mean by top down and bottom up approach in nanoparticle synthesis?

8. Differentiate between nanoencapsulation and nanoemulsion with example.

9. What are the importance of nanoliposome as drug delivery system?

10. What are the actual usage of DLS and Zeta Potential in characterization of nanoparticles?

11. Write briefly about active and passive targeting of drug nanocarriers that are used to treat diseases like cancer.

12. Write two characteristics and uses of quantum dots in cancer nanotherapeutics.

13. What are nanoshells? Write its working principle in brief.

14. Write the uses of ultraviolet-visible spectrophotometer (UV-Vis) and differential thermal analyzer (DTA) in characterization of nanomaterials.

Group – D

Answer ***any one*** question.

15. a) What is "Triad" of tissue engineering? 1

    b) What are hydrogels? State the purposes of using hydrogels in tissue engineering applications? 2

    c) Explain two different techniques of phase-separation for scaffold fabrication. 2

    d) What is the main purpose of using "Bioreactor" in tissue engineering? Describe the static culture system to develop engineered tissue construct. 1+2=3

16. a) Write two main biological properties to make a scaffold for tissue engineering with proper justification? 3

    b) What is your opinion of implanting the "ECM-based acellular tissues" for the treatment of aortic valve diseases. 2

    c) What are the main drawbacks of using autograft, allograft and xenograft method for grafting tissues in patients? 3