REV-01
MMB/01/05

2025/12

SET A

M.Sc. MICROBIOLOGY
FIRST SEMESTER (REPEAT)
BIOINSTRUMENTATION
MMB-102

[USE OMR FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

Objective

Time: 30 min. **Marks: 20**

1X20=20

Choose the correct answer from the following:

1. Centrifugation based on which of the following law?
   a. Pascal's law
   b. Stokes law
   c. Stain law
   d. Patrick's law

2. G force is applicable for
   a. Electrophoresis
   b. HPLC
   c. Centrifugation
   d. AFM

3. API-electrospray is a process of
   a. Crystallization
   b. Filtration
   c. Chromatography
   d. Ionization

4. The first protein to be crystallized was
   a. Hemoglobin
   b. Albumin
   c. Alpha-lactalbumin
   d. Globulin

5. A non-SI metric unit for sedimentation coefficient is
   a. Svedberg unit
   b. Siemens
   c. Becquerel
   d. Curie

6. Enzymes can be immobilied using any of the following materials except
   a. Calcium alginate
   b. Water
   c. Polymer
   d. Chitin

7. Can two molecules fragment in the same manner?
   a. No
   b. Yes
   c. Sometimes
   d. Cannot be determined

8. The mass analyser is similar to which of the following in optical spectrometer?
   a. Monochromator
   b. Detector
   c. Sample
   d. Source

9. Mass spectrometry was discovered by whom?
   a. Walter Kaufmann
   b. J. J Thomson
   c. Francis Aston
   d. Ernest O. Lawrence

10. Enzyme immobilization is_____.

a. Changing pH
b. Conversion of active enzyme to inactive form
c. Conversion of inactive enzyme to active form
d. Making enzymes insoluble and reusable

11. Which of the following analytical method is used to measure the analyte concentration depending on the quantity of light received by the analyte?

a. Spectroscopy
b. Decantation
c. Potentiometery
d. None of the above

12. The purpose of a blank in a spectrophotometer is

a. to cancel readings due to the color of the reagents
b to account for imperfections in the cuvette
c. Both a and b
d None

13. The blank for a spectrophotometer should be composed of

a. water
b uninoculated medium
c. empty cuvette
d liquid as defined in the experiment protocol

14. In a chromatogram, the area under the peak can be used to determine which of the following:

a. Components of the sample
b. Amount of components in the sample
c. Column efficiency
d. Column resolution

15. What is the wavelength range of the UV spectrum?

a. 100 nm to 500 nm
b. 200 nm to 800 nm
c. 300 nm to 1000 nm
d. 400 nm to 1600 nm

16. Lysozyme is used for _____

a. bacterial cell disruption
b. Fungal cell disruption
c. Viral cell disruption
d. None

17. In chromatography, the stationary phase can be _____ supported on a solid

a. Solid or liquid
b. Liquid or gas
c. Solid only
d. Liquid only

18. Which of the following is not the product of cell disruption?

a. DNA
b. RNA
c. Protein
d. Water

19. Chromatography is a physical method that is used to separate and analyze _____

a. Simple mixtures
b. Complex mixtures
c. Viscous mixtures
d. Metals

20. Which of the following technique uses sound waves for cell disruption?

a. Homogenization
b. Sonication
c. Blender
d. Mortar and Pestle

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(Descriptive)

Time : 2 hrs. 30 min. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. What is Cell Disruption? Describe the various methods of Cell Disruption. **5+5=10**

2. Explain the principle of MALDI-TOF with diagram. **10**

3. Explain the methods of enzyme immobilization in detail. **10**

4. **Write short notes on:** **5 + 5 = 10**
   a) Density Gradient Centrifugation
   b) Differential Centrifugation

5. What is protein crystallization? Explain the techniques. **10**

6. Describe the instrumentation of UV-VIS spectrophotometer. Differentiate between a single beam spectrophotometer and a double beam spectrophotometer. **6 + 4 = 10**

7. a. Define Buffer. What are the different types of buffers? Give examples for each type. **5**
   b. Write the differences between Paper chromatography and Thin Layer Chromatography. **5**

8. What is the basic principle of chromatography? Write a note on the applications of chromatography. **5+5=10**

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