2022/12

SET B

B.Sc. MICROBIOLOGY
FIFTH SEMESTER
INSTRUMENTATION & BIOTECHNIQUES
BMB-504

[USE OMR SHEET FOR OBJECTIVE PART]

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

Objective

Time: 30 mins. **Marks: 20**

Choose the correct answer from the following: ***1×20=20***

1. In centrifugation, which of the following force is not used?
   a. Electrostatic force
   b. Gravitational force
   c. Centripetal force
   d. Centrifugal force
2. Isotops are chemical element which have:
   a. Different atomic number
   b. Same mass number
   c. Both a) and b)
   d. None of the above
3. First dimension in 2D-Gel electrophoresis is:
   a. PAGE
   b. Isoelectric focusing
   c. Agarose gel electrophoresis
   d. None of the above
4. In agarose gel electrophoresis the amount of agarose typically used is:
   a. 50-70%
   b. 80-100%
   c. 0.5-2.0%
   d. 2.0-5.0%
5. An example of a most popular protein stain is:
   a. Methylene blue
   b. Ethidium bromide
   c. Brilliant green
   d. Coomassie brilliant blue
6. Molar absorbtivity is the measure of the:
   a. Amount of light absorbed per unit length
   b. Amount of light absorbed per unit concentration
   c. Amount of light reflected and absorbed per unit concentration
   d. None of the above
7. Double diffusion in Two Dimension is also known as:
   a. Oudin Procedure
   b. Mancini technique
   c. Oakley- Fulthrope Procedure
   d. Ouchterlony Procedure
8. _____ is one-dimensional double electro-immunodiffusion test.
   a. Countercurrent immunoelectrophoresis
   b. Rocket immunoelectrophoresis
   c. RIA
   d. ELISA
9. _____is used for routine analysis of amino acid mixtures.
   a. Absorption chromatography
   b. Affinity chromatography
   c. Ion exchange chromatography
   d. None of the above
10. In which type of chromatographic technique stationary phase is a porous matrix?
    a. Absorption chromatography
    b. HPLC
    c. GC
    d. Size exclusion chromatography

11. What is density gradient centrifugation used for?
    a. Purification of viruses, ribosomes and membranes
    b. To remove small particles
    c. To remove dirt
    d. To get rid of big particles

12. After centrifugation of milk, the supernatant is:
    a. Fat
    b. Whey
    c. Casein
    d. Water

13. The SI unit of radioactivity is:
    a. Curie
    b. Rutherford
    c. Becquerel (Bq)
    d. None of the above

14. Which of the following statement is true regarding movement of biomolecules?
    a. The rate of migration is directly proportional to current
    b. The rate of migration is inversely proportional to current
    c. The rate of migration is directly proportional to the resistance of the medium
    d. Low voltage is used for separation of high molecular weight compounds

15. For separation of protein which technique is used?
    a. Agarose gel electrophoresis
    b. Pulsed field gel electrophoresis
    c. PAGE
    d. None of the above

16. Spectroscopic methods require:
    a. Less time and more amount of sample than classical methods
    b. More time and more amount of sample than classical methods
    c. Less time and less amount of sample than classical methods
    d. More time and less amount of sample than classical methods

17. RIA was developed by:
    a. Berson & Yalow
    b. Chals & Wastone
    c. Vector & Logan
    d. Lewis & Bronstand

18. Ring-shaped precipitation band is formed in:
    a. Ouchterlony Procedure
    b. Mancini technique
    c. Oakley- Fulthrope Procedure
    d. Oudin Procedure

19. *chroma* meaning "color" and *graphos* meaning:
    a. To draw
    b. To write
    c. To read
    d. To animate

20. Paper chromatography was discovered by:
    a. Synge and Martin
    b. Mikhail Tsvet
    c. Lathe and Ruthven
    d. Leuwenhoek

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Descriptive

Time : 2 hr. 30 mins. Marks : 50

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

1. Explain briefly about the common immunodiffusion techniques with suitable diagrams. 10

2. Derive the mathematical expression for molar extinction co-efficient. 2+8=10

3. Define Beer-Lambert's law. Solve the following questions: 2+5+3=10
   a) Monochromatic light is passed through a 1 mm path length cell containing 0.005 moles/dm3 solution. The light intensity is reduced to 16% of its value. Calculate the molar extinction coefficient of the sample. What would be the transmittance if the cell path is 2mm?
   b) There is a substance in a solution (4 g/liter). The length of cuvette is 2 cm and only 50% of the certain light beam is transmitted. What is the extinction co-efficient?

4. Describe briefly the principle of Ultracentrifugation. Write a note on preparative and analytical centrifuge. 5+5=10

5. Write short note on: 5+5=10
   a) Autoradiography
   b) Biological applications of radioisotopes

6. With a neat labelled diagram describe the principle of HPLC. Discuss its applications. 7+3=10

7. Write short notes on: 5+5=10
   a) Counter immunoelectrophoresis
   b) RIA

8. Explain different ELISA techniques with suitable diagrams. 10

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