REV-01
BMB/18/23

2023/12

SET
A

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. Pure water is known to be which of the following?
   a. Strong electrolyte b. Good conductor of electricity
   c. Non-electrolyte d. Acidic
2. Which of the following is not a failure in pH meters?
   a. Defective electrodes b. Defective input circuitry
   c. Defective electronic circuitry d. Defective calibration
3. Which of the following reference electrodes are used as internal and external reference electrodes in combination electrodes?
   a. Silver/silver chloride electrode b. Calomel electrode
   c. Mercury/mercury sulphate electrode d. Mercury/mercury chloride electrode
4. Which one of the following is an example of adsorption?
   a. Ammonia in contact with water b. Anhydrous $CaCl_2$ with water
   c. Silica gel in contact with water vapours d. All of the above
5. In Thin Layer Chromatography, the sample is:
   a. In contact with mobile phase b. Not in contact with mobile phase
   c. Coated at the level of mobile phase d. Coated below the level of mobile phase
6. Isotopes of an element have a different number of:
   a. Neutron b. Proton
   c. Electron d. Negatron
7. Helium nuclei particles are called:
   a. Alpha particles b. Beta particles
   c. Gamma particles d. Delta particles
8. 1 Ci is equal to..... disintegrations per second.
   a. 3.7×10^{10} b. 2.7×10^{10}
   c. 1.7×10^{10} d. 3.9×10^{10}
9. The use of insulin hormone to purify its receptor is an example of:
   a. Gel filtration chromatography b. Affinity chromatography
   c. Size exclusion chromatography d. Ligand chromatography
10. A 1mCi source of ^{32}P gives a dose of 10 $mSvh^{-1}$ at 1 cm. What will be the dose rate at 5 cm?
    a. 0.5 $mSv\ h^{-1}$ b. 0.4 $mSv\ h^{-1}$
    c. 1.0 $mSv\ h^{-1}$ d. 0.8 $mSv\ h^{-1}$

11. The Unit of molar extinction co-eficient:
    a. L/mol/cm
    b. L/g/cm
    c. g/mol/cm
    d. L/cm/mol

12. Radio immune assay was developed by:
    a. Vector & Logan
    b. Berson & Yalow
    c. Chals & Wastone
    d. Lewis & Bronstand

13. Movement of biomolecules depends on:
    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

14. Protein separation is done through:
    a. PFGE
    b. PAGE
    c. Agarose gel electrophoresis
    d. None of the above

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

16. First Mass spectrometer was constructed by:
    a. Luwenhoek
    b. J.J. Thompson
    c. Edward Jenner
    d. Galileo

17. The force related to magnetic field is:
    a. Columbic force
    b. Lorentz force
    c. Electric force
    d. Momentum

18. Isoelectric focusing is related to:
    a. 1D electrophoresis
    b. Mass spectroscopy
    c. 2D electrophoresis
    d. Immunoelectrophoresis

19. Ouchterlony Procedure follows:
    a. Double diffusion in Two Dimension
    b. Double diffusion in one Dimension
    c. Single diffusion
    d. None of the above

20. ELISA allows for rapid screening and quantification of the presence of..... in a sample.
    a. Amino acid
    b. DNA
    c. Protein
    d. Antigen

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Descriptive

Time : 2 hr. 30 mins. **Marks : 50**

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

1. Explain the two methods to measure radioactivity with proper diagrams. 10
2. Explain ion exchange chromatography with a labelled diagram. 10
3. Explain the two types of density gradient centrifugation with diagrams. 10
4. Explain the working principle of a pH meter with a diagram. 10
5. Define Beer-Lambert's law. Derive the expression for molar extinction co-efficient. 10
6. a) Write a note on Applications of UV visible spectroscopy. 5+5=10
   b) A light is passed through a 1 mm path length cell containing 0.005 moles/dm^3 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?
7. Write short notes on: 5+5=10
   a) 2D gel electrophoresis
   b) Ouchterlony Procedure
8. Describe briefly the principle of mass spectroscopy with neat labelled diagram. List out few applications. 8+2=10

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