## PART-B : Descriptive

**Time: 2 hrs. 40 min.** **Marks: 50**

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

1. What is sedimentation? Describe its theory and application in separation of particles of an aqueous mixture in the laboratory experiments. 3+7=10

2. Define half-life of an isotope. Explain the different types of radioactive decay emitting α, β and γ radiations. 3+7=10

3. What do you mean by autoradiography? Explain the resolving power of autoradiograph and autoradiographic emulsion used in preparation of radiogram. 2+8=10

4. What is ion exchange chromatography? Explain anion exchange chromatography for protein separation with diagram. 3+7=10

5. Write short notes on: (a) Beer-Lambert's law and its applications, (b) Determination and applications of extinction coefficient. 5+5=10

6. What is the basic principle of Agarose gel electrophoresis? Explain how DNA can be separated using Agarose gel electrophoresis. 3+7=10

7. What are the different types ELISA techniques? Describe Sandwich ELISA technique for the detection of pathogens. 4+6=10

8. Define antigen-antibody interaction and cross reactivity. Write a note on Radio Immuno Assay (RIA). 4+6=10

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# B.Sc. BIOTECHNOLOGY
## SECOND SEMESTER (REPEAT)
## BIOINSTRUMENTATION
## BBT -201

(Use separate answer scripts for Objective & Descriptive)

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

## PART-A : Objective

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

Choose the correct answer from the following: 1X20=20

1. Radioactive particles emit radiation particles in the process of decay.
   a. True
   b. False

2. Tendency of particles to settle from the fluid in which they are merged is referred as sedimentation.
   a. True
   b. False

3. Radiations emitted by the radioactive material cannot penetrate the human body.
   a. True
   b. False

4. Liquid scintillation counter is used to measure the activity of alpha radiation.
   a. True
   b. False

5. In centrifugation the centrifugal force acts in quick separation of the particles.
   a. True
   b. False

6. F. Muller invented the fact of emitting radiations by the radioactive materials.
   a. True
   b. False

7. Chromatography is a physical method that is used to separate and analyze---------
   a. Simple mixtures
   b. Complex mixtures
   c. Viscous mixtures
   d. Metals

8. The most common type of gel used for DNA separation
   a. Agar
   b. Polyacrylamide
   c. Agarose
   d. All of the above

9. In SDS-PAGE, separation is based on
   a. Molecular weight
   b. Shape
   c. Charge
   d. All of the above

10. In an SDS-PAGE
   a. Proteins are denatured by the SDS
   b. Proteins have the same charge-to-mass ratio
   c. Smaller proteins migrate more rapidly through the gel
   d. All of the above

11. In isoelectric focusing, proteins are separated on the basis of their
   a. Relative content of positively charged residue only
   b. Relative content of negatively charged residue only
   c. Size
   d. Relative content of positively and negatively charged residue

12. ..... in a gel filtration column
   a. Smaller proteins enter the beads more readily
   b. Large proteins elute first
   c. Both (a) and (b)
   d. Large proteins enter the beads more readily

13. Thin layer chromatography is
   a. Partition chromatography
   b. Electrical mobility of ionic species
   c. Adsorption chromatography
   d. None of the above

14. In chromatography, the stationary phase can be _____ supported on a solid.
   a. Solid or liquid
   b. Solid only
   c. Liquid or gas
   d. Liquid only

15. In chromatography, which of the following can the mobile phase are made of?
   a. Solid or liquid
   b. Gas only
   c. Liquid or gas
   d. Liquid only

16. Identify the term that is used to ensure surgical instruments are free from micro-organisms
   a. Disinfected
   b. Cleaned
   c. Debrided
   d. Sterilization



17. Place the following reactants in their proper order for the indirect ELISA test
   1 = enzyme-linked antibody
   2 = known antigen
   3 = patient serum
   4 = substrate
   a. 2 4 1 3
   b. 3 2 1 4
   c. 1 4 3 2
   d. 4 1 3 2

18. In a chromatographic separation, which of the following indices is most appropriate for the qualitative identification of a substance?
   a. Relative retention factor $R_{rel}$
   b. Retention factor $R_f$
   c. Retention time
   d. Resolution

19. Which of the following wavelength ranges is associated with UV spectroscopy?
   a. 0.8 – 500 μm
   b. 400 – 100 nm
   c. 380 -750 nm
   d. 0.01 – 10 nm

20. According to the Beer-Lambert Law, on which of the following does absorbance not depend
   a. Colour of the solution
   b. Distance that the light has travelled through the sample
   c. Solution concentration
   d. Extinction coefficient of the sample

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