

**B. Sc. BIOTECHNOLOGY
SIXTH SEMESTER
BIOANALYTICAL TOOLS
BBT-601**

(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. Chromatography is a physical method that is used to separate and analyse
 - a. Simple mixtures
 - b. Complex mixtures
 - c. Viscous mixtures
 - d. Metals
2. The technique of electrophoresis, for the separation of charged molecules was developed by
 - a. Tswett
 - b. Svedberg
 - c. Tisekius
 - d. Sanger
3. HPLC stands for
 - a. High pressure liquid chromatography
 - b. High performance liquid chromatography
 - c. Both 'a' and 'b'
 - d. None of the above
4. In chromatography, the stationary phase can be ----- supported on a solid
 - a. Solid or liquid
 - b. Liquid or gas
 - c. Solid only
 - d. Gas only
5. An isocratic elution in HPLC is one in which the composition of the solvent
 - a. Remains constant
 - b. Changes continuously
 - c. Changes in a series of steps
 - d. None of these
6. In electrophoresis, DNA will migrate towards
 - a. Cathode
 - b. Anode
 - c. Both 'a' and 'b'
 - d. None of them
7. Gas chromatography can be performed in which of the following ways?
 - a. Only in columns
 - b. Only on plane surfaces
 - c. Either in columns or in plane surfaces
 - d. Neither in columns or in plane surfaces
8. 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

9. The speed of migration of ions in an electric field depends on
 - a. Magnitude of charge and mass of molecules
 - b. Magnitude of charge and shape of molecules
 - c. Shape and size of molecules
 - d. Magnitude of charge, shape and mass of molecules
10. In chromatography, which of the following can the mobile phase be made of?
 - a. Solid or liquid
 - b. Liquid or gas
 - c. Gas only
 - d. Liquid only
11. Which is the technique suited for the separation of large DNA fragments
 - a. AGE
 - b. PAGE
 - c. PFGE
 - d. SDS-PAGE
12. Which of the following centrifugation technique is used to separate certain organelles from whole cell?
 - a. Rate zonal centrifugation
 - b. Normal centrifugation
 - c. Differential centrifugation
 - d. Isopycnic centrifugation
13. What does the electrophoresis apparatus consist of?
 - a. Gel, buffer chamber and fire pack
 - b. Buffer chamber and electrophoresis unit
 - c. Electrophoresis unit and gel separator
 - d. Power pack and electrophoresis unit
14. What is rate zonal centrifugation?
 - a. Based on separation of particles by mass
 - b. Based separation of particles by density
 - c. Based on separation of particles on solubility
 - d. Based on separation of particles on size
15. Which of the following is used as a media for density gradient centrifugation?
 - a. Agarose
 - b. Ficoll
 - c. Luria broth
 - d. Propylene glycol
16. The most advanced form of centrifuge is:
 - a. High speed centrifuge
 - b. Low speed centrifuge
 - c. Ultracentrifuge
 - d. Table top centrifuge
17. The wavelength of absorption is 495nm. In what part of the electromagnetic spectrum does this lie?
 - a. Infrared
 - b. Microwave
 - c. Ultraviolet -visible
 - d. Radiowave
18. Which part of the light microscope controls the intensity of light entering the viewing area?
 - a. Coarse adjustment screw
 - b. Fine adjustment screw
 - c. Diaphragm
 - d. Condenser lens

19. What is the name of an instrument used to measure the absorbance of a coloured compound in solution?
- a. Colourmeter
 - b. Coulometer
 - c. Calorimeter
 - d. Colorimeter
20. The most common type of gel used for DNA separation is
- a. Agar
 - b. Polyacrylamide
 - c. Agarose
 - d. All of them

(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

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

1. What is Chromatography? What is the basic principle of Chromatography? Name the different types of chromatographic techniques 3+4+3
=10
2. Define the following terms: 2×5=10
 - a. Stationary Phase
 - b. Mobile Phase
 - c. Analyte
 - d. Eluate
 - e. Chromatogram
3. Explain the instrumentation of a UV-VIS spectrophotometer. Differentiate between a single beam and a double beam spectrophotometer. 6+4=10
4. What is centrifugation? Write a note on the different types of centrifuges available on the basis of the maximum speed attainable. 3+7=10
5. What is Thin layer chromatography? Describe its principle. Also differentiate between paper chromatography and Thin layer chromatography 3+5+2
=10
6. What is Agarose Gel Electrophoresis? What are factors affecting the migration of the particles in agarose gel electrophoresis. 3+7=10
7. Write a note on 2×5=10
 - a. Nanotechnology
 - b. Biosensors
8. Differentiate between: 2×5=10
 - a. Simple Microscope and Compound microscope
 - b. Agarose gel electrophoresis and Polyacrylamide gel electrophoresis

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