

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



[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 x 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. What is the principle of centrifugation?
 - a. Sedimentation principle
 - b. Filtration principle
 - c. Evaporation principle
 - d. Size reduction principle
3. In chromatography, which of the following can the mobile phase be made of?
 - a. Liquid or gas
 - b. Solid or liquid
 - c. Gas only
 - d. Liquid only
4. The cathode of the transmission electron microscope consists of a:
 - a. Tungsten wire
 - b. Bulb
 - c. Iron
 - d. Gold wire
5. HPLC stands for:
 - a. High-pressure liquid chromatography
 - b. High-performance liquid chromatography
 - c. Both 'a' and 'b'
 - d. None of the above
6. 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
7. Beer Lambert's law gives the relation between which of the following?
 - a. Reflected radiation and concentration
 - b. Scattered radiation and concentration
 - c. Energy absorption and concentration
 - d. Energy absorption and reflected radiation
8. What is rate-zonal centrifugation?
 - a. Based on the separation of particles by mass
 - b. Based on the separation of particles by density
 - c. Based on the separation of particles on solubility
 - d. Based on the separation of particles on size
9. 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
10. Chromosomal anomalies can be studied by which type of microscopy?
 - a. Bright field microscopy
 - b. Phase contrast microscopy
 - c. Fluorescent microscopy
 - d. Electron microscopy

11. In Thin layer chromatography, the stationary phase is made of..... and the mobile phase is made of.....
- | | |
|------------------|-------------------|
| a. Solid, liquid | b. Liquid, liquid |
| c. Liquid, gas | d. Solid, gas |
12. The most advanced form of centrifuge is:
- | | |
|--------------------------|-------------------------|
| a. High speed centrifuge | b. Low speed centrifuge |
| c. Ultracentrifuge | d. Table top centrifuge |
13. The resolving power of TEM is derived from.....
- | | |
|--------------|------------------|
| a. Electrons | b. Specimens |
| c. Power | d. Ocular system |
14. What is the use of density gradient centrifugation?
- | | |
|--|------------------------------|
| a. To purify viruses, ribosomes, membranes | b. To remove dirt |
| c. To remove fine particles | d. To remove large particles |
15. In electrophoresis, DNA will migrate towards:
- | | |
|---------------------|-----------------|
| a. Cathode | b. Anode |
| c. Both 'a' and 'b' | d. None of them |
16. 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 |
17. 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 |
18. Which of the following statements is true about migration of biomolecules?
- | | |
|---|---|
| a. The rate of migration is directly proportional to the resistance of medium | b. Rate of migration is directly proportional to current |
| c. Low voltage is used for separation of high mass molecules | d. Rate of migration is inversely proportional to current |
19. The contrast in a phase contrast microscope is created by:
- | | |
|--------------------------------------|---------------------------|
| a. Using different light intensities | b. Using fluorescent dyes |
| c. Staining | d. All of the above |
20. Which of the following centrifugation is used to separate certain organelles from the whole cell?
- | | |
|--------------------------------|-----------------------------|
| a. Rate-zonal centrifugation | b. Normal centrifugation |
| c. Differential centrifugation | d. Isopycnic centrifugation |

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(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

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

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|---|----------|
| 1. What is the principle of Phase contrast microscopy? Discuss the basic instrumentation of a phase contrast microscope. Describe its applications. | 4+4+2=10 |
| 2. What is Paper chromatography? Write a note on its principle. Describe its applications. | 2+3+5=10 |
| 3. Differentiate between:
a) Simple microscope and compound microscope.
b) Thin-layer chromatography and Paper Chromatography. | 2×5=10 |
| 4. What is centrifugation? Describe its principle. What are the different types of centrifuges available on the basis of maximum speed attainable? | 2+3+5=10 |
| 5. Explain the instrumentation of a UV-VIS spectrophotometer. Differentiate between a single-beam and a double-beam spectrophotometer. | 5+5=10 |
| 6. What is Agarose Gel Electrophoresis? What are factors affecting the migration of the particles in agarose gel electrophoresis? | 5+5=10 |
| 7. Write short note on <i>any two</i> :
a) Applications of Biosensor
b) Applications of Nanotechnology
c) PAGE | 2×5=10 |
| 8. Describe the process of differential centrifugation. Differentiate between rate zonal centrifugation and isopycnic centrifugation. | 6+4=10 |

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