REV-01
BBT/35/40

2024/05

SET B

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: ***1×20=20***

1. What is density gradient centrifugation used for?
   a. To remove small particles
   b. Purification of viruses, ribosomes, and membranes
   c. To remove dirt
   d. To get rid of big particles
2. Which of the following analytical method is used to measure the analyte concentration depending on the quantity of light received by the analyte?
   a. Potentiometery
   b. Spectroscopy
   c. Decantation
   d. None of the above
3. What is the wavelength range of the UV spectrum?
   a. 100 nm to 500 nm
   b. 300 nm to 1000 nm
   c. 400 nm to 1600 nm
   d. 200 nm to 800 nm
4. In centrifugation, which of the following force is not used?
   a. Electrostatic force
   b. Gravitational force
   c. Centripetal force
   d. Centrifugal force
5. Gel electrophoresis separates nucleic acid molecules based on.....
   a. Charge on molecules
   b. Size of the molecules
   c. Nature of the molecules i.e. whether DNA or RNA
   d. Chemical properties of the nucleic acids
6. Nanomaterials are the materials with at least one dimension measuring less than.....
   a. 1 nm
   b. 10 nm
   c. 100 nm
   d. 1000 nm
7. The melting point of particles in nano form.....
   a. Increases
   b. Decreases
   c. Remains same
   d. Increases then decreases
8. What is the principle of centrifugation?
   a. Sedimentation principle
   b. Filtration principle
   c. Evaporation principle
   d. Size reduction principle
9. If the amount of agarose added is more, the molecule under analysis should have the following characteristic:
   a. Small size
   b. Large size
   c. Size has no relation with the amount of agarose
   d. The amount of molecules under analysis matters

10. What is other name for zonal centrifugation?
    a. Isopynic centrifugation
    b. Gradient centrifugation
    c. Density gradient centrifugation
    d. Differential centrifugation

11. The protein bands transferred by the western blotting are previously.....
    a. Electrophoresed
    b. Heated
    c. Calibrated
    d. Mixed

12. In which type of chromatography, is the stationary phase held in a narrow tube, and the mobile phase is forced through it under pressure?
    a. Column chromatography
    b. Planar chromatography
    c. Liquid chromatography
    d. Gas chromatography

13. The principle on which thin-layer chromatography is based is that the.....
    a. Different compounds are absorbed on an absorbent to different degrees
    b. Different compounds are absorbed on an absorbent to the same degrees
    c. Different compounds are adsorbed on an adsorbent to different degrees
    d. None of the above

14. Western Blotting is used to transfer.....
    a. Genes
    b. Proteins
    c. DNA
    d. Probe

15. The resolving power of TEM is derived from.....
    a. Electrons
    b. Specimens
    c. Power
    d. Ocular system

16. The cathode of the transmission electron microscope consists of a:
    a. Tungsten wire
    b. Bulb
    c. Iron
    d. Gold wire

17. Which part of the light microscope controls the intensity of light entering the viewing area?
    a. Coarse adjustment screw
    b. Fine adjustment screw
    c. Condenser lens
    d. Diaphragm

18. The contrast in a phase contrast microscope is created by:
    a. Staining
    b. Using different light intensities
    c. Using fluorescent dyes
    d. All of the above

19. Chromosomal anomalies can be studied by which type of microscopy?
    a. Bright field microscopy
    b. Electron microscopy
    c. Phase contrast microscopy
    d. Fluorescent microscopy

20. Centrifugation is not employed in which of the following processes?
    a. To squeeze out water from wet clothes
    b. For blood and urine tests
    c. To separate butter from cream
    d. Different pigments from an extract of flower petals

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Descriptive

Time : 2 hr. 30 mins. Marks : 50

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

1. What is thin layer chromatography? Describe its principle. Also differentiate between paper chromatography and thin layer chromatography. 2+5+3=10

2. Differentiate between: 5×2=10
   a) Agarose gel electrophoresis and Polyacrylamide gel electrophoresis
   b) SEM and TEM

3. What is Western Blotting? Describe the stepwise procedure of Western Blotting. 2+8=10

4. Define the following terms: 2×5=10
   a) Stationary phase
   b) Mobile phase
   c) Chromatograph
   d) Analyte
   e) Elution

5. What is centrifugation? Describe its principle. Write a note describing the rate zonal centrifugation with an appropriate diagram. 2+3+5=10

6. Write short notes: 2×5=10
   a) Applications of Nanotechnology
   b) Applications of Biosensors

7. What is the principle of Phase contrast microscopy? Discuss the basic instrumentation of a phase contrast microscope. 5+5=10

8. Explain the instrumentation of a UV-VIS spectrophotometer. Differentiate between a single beam and a double beam spectrophotometer. 5+5=10

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