STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI 600086
(For students admitted from the Academic Year 2019-2020 and thereafter)
CODE: 19ID/IC/BA55
B.Sc. DEGREE EXAMINATION, NOVEMBER 2022
FIFTH SEMESTER

COURSE	**:**	**INTERDISCIPLINARY CORE**	
PAPER	**:**	**BIOANALYTICAL TECHNIQUES**	
TIME	**:**	**3 HOURS**	**MAX. MARKS: 100**

SECTION A

Answer all the questions

I. **Choose the correct option in the following:** **(10x1 = 10 Marks)**

1. The function of condenser on a light microscope is
a. To focus the light source
b. To provide the light source
c. To diffuse the light source
d. To control the light source

2. The wavelength of radiation with a frequency of 8.0 x 10^{14} Hz is _____m.
a. $3.75x10^{-7}$ b. $2.4x10^{23}$ c. $3.75x10^{7}$ d. $2.4x10^{-23}$

3. The size of the particle of the precipitate will be large if
a. High relative super saturation
b. Low relative super saturation
c. degree of supersaturation is large
d. colloidal solution is used

4. Identify the organic precipitant from the given list of precipitants-
a. dimethyl glyoxime
b. Ammonium hydroxide
c. sulphuric acid
d. H_2S

5. The Separation techniques that exploit differences in Electric charge is _____
a. Extraction b. Chromatography c. Electrophoresis d. Distillation

6. The Solvent extraction is governed by _____ law
a. Boyle's law
b. Ostwald dilution law
c. Nernst distribution law
d. Beer's law

7. The process of dispersing an insoluble material into a liquid as a colloid is called _____.
a. Occlusion b. Nucleation c. Peptization d. Coagulation

8. In electron microscope the specimens are mounted on _____.
a. copper grid b. diamond slide c. resin d. spur

9. The _____rotor holds the sample tubes at an angle of 45°.
a. vertical b. fixed angle c. swinging bucket d. horizontal

10. The microscope lens located in the eyepiece is _____ lens.
a. Ocular b. Binocular c. Objective d. Condenser

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II. Fill in the blanks: **(10 x1 = 10 Marks)**

11. Von Weimarn equation is _____.

12. Sectioning is accomplished by using a cutting apparatus called _____

13. Phase contrast microscope was invented by _____.

14. Point illumination and spatial hole are used in _____ microscope.

15. The anionic detergent used in PAGE is _____.

16. An example of Acid stain is _____.

17. The medium for density gradient centrifugation is_____.

18. When Ethidium bromide is exposed to _____ light, it will fluoresce.

19. The ratio of increase in size of optical image over the actual size of object being viewed is _____.

20. A _____ is substance which has the ability of combining with moisture from its surrounding atmosphere.

III. Match the following: **(5 x 1 = 5 Marks)**

21.	Chloroform	a. Desiccant
22.	Low wavelength	b. Precipitating agent for Nickel ions
23.	Phosphorous pentoxide	c. Beer Lambert's law
24.	dimethyl glyoxime	d. High energy wave
25.	UV-Visible spectroscopy	e. low energy wave
		f. solvent

IV. Answer in a line or two: **(5 x 1 = 5 Marks)**

26. Give a simple way to regenerate silica gel

27. Expand FIGE.

28. What is Numerical aperture?

29. Name a masking agent in gravimetry.

30. Give the principle for separating DNA fragments.

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SECTION B

V. Answer <u>any five</u> of the following: (5x6 = 30 Marks)

1. a. Mention any 3 stains used for electron microscopy.
   b. List the conditions for a good desiccant. (3+3 Marks)

2. a. Write short notes on FAA
   b. Mention the types of Density gradient Centrifugation. (3 +3 Marks)

3. a. Explain with examples solvent extraction using chemically active solvents.
   b. Calculate the concentration of a solution of the compound that has an absorbance of 0.625. Given: molar absorptivity of compound at 425nm is 2.45×10^3 L mol^{-1} cm^{-1} (3+3 Marks)

4. a. Draw the diagram of capillary electrophoresis system. (3 Marks)
   b. Explain the principle involved in AAS and Fluorimetry. (1 ½ +1 ½ = 3 Marks)

5. a. Define Immunoelectrophoresis and give its applications.
   b. Give the important conditions to be maintained for separation of a metal ion by precipitation method. (4+2 Marks)

6. a. Explain the following: (1 ½ +1 ½ = 3 Marks)
   i) Concentrated sulphuric acid as a desiccant
   ii) Post precipitation
   b. List the limitation of Beer Lambert's law. (3 Marks)

7. Explain the estimation of sodium ions by Flame photometry (6)

SECTION C

VI. Answer <u>any two</u> of the following: (2x20 = 40 Marks)

8. a. Explain in detail the instrumentation and applications of TEM.
   b. Discuss the steps involved in agarose gel electrophoresis.
   c. Differentiate between Nephlometery and Turbidimetry techniques (8+8+4 Marks)

9. a. Give an account of different types of Coprecipitation.
   b. Discuss in detail the technique of steam distillation
   c. List the properties of solvents used in solvent extraction (8+6+6 Marks)

10. a. Describe the steps involved in differential centrifugation with a flow chart**.**
    b. Draw the ray diagram for DIC**.**
    c. Discuss the factors affecting solvent extraction.
    d. Explain with a neat diagram, the extraction of a plant pigment using Soxhlet extractor. (5+5+6+4 Marks)

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