STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI 600 086
(For students admitted from the Academic Year 2019-2020 and thereafter)
B.Sc. DEGREE EXAMINATION, NOVEMBER 2023
FIFTH SEMESTER

COURSE : INTERDISCIPLINARY CORE
PAPER : BIOANALYTICAL TECHNIQUES
SUBJECT CODE : 19ID/IC/BA55
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 process of dispersing an insoluble material into a liquid as a colloid is called _____.
   a. Occlusion b. Nucleation c. Peptization d. Coagulation
2. In electron microscope the specimens are mounted on _____.
   a. copper grid b. diamond slide c. resin d. spur
3. The microscope lens located in the eyepiece is _____ lens.
   a. Ocular b. Binocular c. Objective d. Condenser
4. What is the correct name for the microscope lens located in the eyepiece?
   a. Ocular b. Binocular c. Objective d. Condenser
5. Flame photometry is a/an _____ spectroscopic technique
   a. Emission b. Transmittance c. Absorption d. Scattering
6. The unit of Molar absorption coefficient is
   a. mole $dm^{-3}cm^{-}$ b. $dm^{3}cm^{-}mole^{-}$ c. mole $dm^{-3}cm$ d. mole $dm^{3}cm$
7. A quantitative technique based on the measurement of light scattered at right angles to the incident direction by a dispersion is _____
   a. Turbidimetry b. Fluorimetry c. Nephelometry d. AAS
8. A photon of light has a wavelength of $4x10^{-4}$ m. Its frequency is _____ Hz
   a. $7.5x10^{11}$ b. $1.2x10^{7}$ c. $7.5x10^{13}$ d. $1.33x10^{-12}$
9. The function of condenser on a light microscope is
   a. To focus the light source b. To diffuse the light source
   c. To provide the light source d. To control the light source
10. The size of the particle of the precipitate will be large if
    a. High relative super saturation c. degree of supersaturation is large
    b. Low relative super saturation d. colloidal solution is used

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

11. The Separation techniques that exploit differences in Electric charge 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. An example of Acid stain is _____.
16. The medium for density gradient centrifugation is_____.
17. When Ethidium bromide is exposed to _____ light, it will fluoresce.
18. The ratio of increase in size of optical image over the actual size of object being viewed is _____.
19. A _____ is substance which has the ability of combining with moisture from its surrounding atmosphere.
20. An example of a precipitating agent is _____.

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

21.	Methanol	a. Desiccant
22.	High wavelength	b. Relation between Absorbance & Concentration
23.	Sulphuric acid	c. TDS of water sample
24.	Beer Lambert's law	d. High energy wave
25.	Turbidimetry	e. Low energy wave
		f. solvent

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

11. Give one application of solvent extraction.
12. What is Numerical aperture?
13. Give the principle for separating DNA fragments.
14. Give the relation between energy and wavelength.
15. Give the significance of Von Weimer ratio.

SECTION B

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

11. a. Explain FAA. (3 marks)
    b. List the steps involved in recrystallisation. (3 marks)

12. a. Write informative notes on Freeze etching (3 marks)
    b. Mention the types of Density gradient Centrifugation. (3 marks)

13. a. .Explain what are desiccants with examples. (3 marks)
    b. Calculate the concentration of a solution of the compound that has an absorbance of 0.825. Given: molar absorptivity of compound at 425nm is 2.45×10^3 L $mol^{-}cm^{-}$ (3 marks)

14. a. Draw the diagram of capillary electrophoresis system. (3 marks)
    b. Explain the principle involved in Nephelometry and Turbidimetry. (1.5+1.5 = 3 marks)

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

16. a. Explain the following: (1.5+1.5 = 3 marks)
    i) phosphorus pentoxide as a desiccant
    ii) post precipitation
    b. List the advantages and disadvantages of organic precipitants. (3 marks)
17. Explain the principle and the estimation of sodium ions by Flame photometry (6 marks)

SECTION C

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

26. a. Give an account of different types of Coprecipitation. (8 marks)
    b. Discuss the steps involved in agarose gel electrophoresis. (8 marks)
    c. Complete the following (4)

S. No.	Absorbance	Transmittance
a.	2	_____
b.	_____	1.0
c.	0.50	_____
d.	_____	0.25

27. a. Explain in detail the instrumentation and applications of TEM. (8 marks)
    b. Discuss in detail the technique of steam distillation (6 marks)
    c. Give an account of the factors affecting solvent extraction. (6 marks)

28. a. Describe the steps involved in differential centrifugation with a flow chart**.** (5 marks)
    b. Draw the ray diagram for DIC**.** (5 marks)
    c. List the properties of solvents used in solvent extraction (6 marks)
    d. Explain with a neat diagram, the extraction of a plant pigment using Soxhlet extractor. (4 marks)

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