

II B.Tech II Semester Examinations, April/May 2012

INSTRUMENTAL METHODS OF ANALYSIS

Bio-Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

- Why electron spin resonance is also called electron para magnetic resonance?
 - Calculate the ESR frequency of an unpaired electron in a magnetic field 0.33τ . Given for free electron $g = 2$ & $\beta = 9.273 \times 10^{-24} JT^{-1}$. [8 × 2 = 16]
- A protein has a sedimentation coefficient value of 3.12×10^{-13} sec in water. Its diffusion coefficient in water is found to be 8.2×10^{-7} /cm. Both the above values have been corrected for 20⁰ C in water. The partial specific volume of the protein is 0.735, & the density of water at 20⁰ C is 0.9982. Determine the molecular weight of the protein?
 - Explain the principle involved in the above method. [8 × 2 = 16]
- Define the terms Refraction, Refractive index, Focal point & Focal length.
 - Describe the path of a light ray through a prism or lens.
 - How is the lens strength related to focal length? [5+6+5]
- What is fluorometric analysis? Discuss some of its important application in biological fields. [16]
- An unknown organic compound gave molecular ion peak at $m/e = 136$. Two possible structures corresponding to $m/e = 136$ are $C_{10}H_{16}$ (I) & $C_{10}H_2N$ (II). Which of the structures can be eliminated on the basis of nitrogen rule?
 - Discuss some of the important features of the mass spectra of amines. [8 × 2 = 16]
- Define the terms PMR spectra & CMR spectra.
 - Why greater sensitivity is required to record ^{13}C NMR spectra compared to that of PMR spectra?
 - Why ^{13}C spectra are spin decoupled or noise decoupled. [5+6+5]
- What are auxochromes? Why & how auxochrome increases the colouring power of a chromophore?
 - Explain with suitable examples, the meaning of blue & red shifts. [8 × 2 = 16]
- Write short notes on:
 - sensitivity
 - detection limits

Code No: R05222302

R05

Set No. 2

(c) precision

(d) accuracy

[4 × 4 = 16]

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8. What is fluorometric analysis? Discuss some of its important application in biological fields.

[16]

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R05

Set No. 1

(b) Explain the principle involved in the above method.

[8 × 2 = 16]

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R05

Set No. 3

- (b) Calculate the ESR frequency of an unpaired electron in a magnetic field 0.33τ .
Given for free electron $g = 2$ & $\beta = 9.273 \times 10^{-24} JT^{-1}$. [8 × 2 = 16]
