

L 1037

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2006.

Fourth Semester

Bio-Technology

BT 1254 — INSTRUMENTAL METHODS OF ANALYSIS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name at least two methods of calibration of an instrument.
2. Suggest two methods by which you can separate salt from DNA?
3. What is the van Deemter's equation?
4. What are amphiprotic compounds? Give examples.
5. How does the purity of DNA measured?
6. What is fluorescence resonance energy transfer?
7. What is Augers spectroscopy?
8. The infrared spectrum of CO shows a vibrational absorption peak at 2170 cm^{-1} . What is the force constant for the CO bond?
9. Why do infra red spectra seldom show regions at which the transmittance is 100%?
10. Distinguish fluorescence and phosphoresence.

PART B — (5 × 16 = 80 marks)

11. (i) What are the causes of absorption bands in materials? (6)
- (ii) Why do we prefer to express the Beer-Lambert law using absorbance as a measure of the absorption rather than % T? (6)
- (iii) What is the significance of the molar absorbtivity, e ? (4)

12. (a) (i) How are thermal methods used to study protein folding? (12)
(ii) What is flame absorption spectroscopy? (4)

Or

- (b) (i) In thermal analysis methods why is the thermocouple for measuring sample temperature seldom directly immersed into the sample? (4)
(ii) How would you study protein ligand binding using Isothermal Titration Microcalorimetry (ITC). (12)
13. (a) (i) Why is degassing of solvents important prior to HPLC purification? (4)
(ii) How would you separate the following : (12)
(1) Chlorophyll from leaves
(2) Formaldehyde from cigarette.

Or

- (b) (i) Write short notes on Raman Spectroscopy. (8)
(ii) Explain Jablonski's diagram. (8)
14. (a) (i) Application of FRET. (8)
(ii) Why is Fourier transformation important in spectroscopy? (8)

Or

- (b) (i) Explain size exclusion chromatography. (8)
(ii) Ion exchange chromatography. (8)
15. (a) (i) Explain the instrumentation of HPLC. (12)
(ii) What are the various detection systems? (4)

Or

- (b) (i) Why is HETP an important parameter in chromatography? (8)
(ii) Explain the differences between electrophoresis and chromatography. (8)