

C 3087

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Fourth Semester

Biotechnology

BT 1254 — INSTRUMENTAL METHODS OF ANALYSIS

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is a figure of merit?
2. What are the two types of memories?
3. Define signal to noise ratio.
4. Name the type of noise that can be reduced by, decreasing the temperature of a measurement?
5. Define black body radiation.
6. Define the term effective band width of a filter.
7. State Beer's law.
8. Name any two compounds which are Raman active.
9. What is electro osmotic flow?
10. Define ground state of a molecule.

PART B — (5 × 16 = 80 marks)

11. (a) What are the factors that are of vital importance in selecting an analytical method?

Or

- (b) Write a brief note on Feedback circuits, and the voltage follower circuit.

12. (a) (i) Explain thermo gravimetric analysis? (12)
(ii) Why are the applications of TGA more limited than those for DSC and DTA? (4)

Or

- (b) (i) Explain differential scanning calorimetry? (12)
(ii) Write a short note on heat flux DSC? (4)

13. (a) Write short notes on supercritical chromatography and capillary electrophoresis.

Or

- (b) (i) What are the differences between GC and HPLC? (3)
(ii) What are the various types of detectors used in gas chromatography? (5)
(iii) What are the various pumps system used in HPLC? (5)
(iv) For a reverse phase separation predict the order of elution of ethyl acetate, diethyl ether, nitromethane. (3)
14. (a) (i) Explain Jablonski's diagram. (10)
(ii) Write short notes on infrared spectroscopy? (6)

Or

- (b) (i) Write a brief note on the importance of Raman spectroscopy in biological studies? (8)
(ii) With a diagram explain double beam spectrophotometer? (8)

15. (a) (i) What are the various methods of optical spectroscopy, based upon working phenomena? (4)
- (ii) What are the major components of a spectroscopic instrument? (4)
- (iii) What are the various types of radiation sources? Explain two of them. (8)

Or

- (b) (i) Contrast between spontaneous and stimulated emission. (4)
- (ii) Describe the advantage of a four level laser system over a three level type. (4)
- (iii) Why is glass better than fused silica as a prism construction material for a monochromator to be used in the region of 400 to 800 nm? (8)