

B.TECH. DEGREE EXAMINATIONS: APRIL / MAY 2010

Fourth Semester

BIOTECHNOLOGY

U07BT404: Instrumental Methods of Analysis

Time: Three Hours**Maximum Marks: 100****Answer ALL the Questions:-****PART A (10 x 1 = 10 Marks)**

1. The device that is used to block the current in one direction and permit it in opposite direction is
A) Transformers B) Rectifiers C) Regulators D) Transistors.
2. Which of the following is the power law?
A) $P = IV^2$ B) $P = I/V$ C) $P = V^2I$ D) $P = IV$
3. The detector is placed at an angle of 90° with respect to source in
A) Absorption B) Chemiluminescence C) Emission D) Scattering
4. What length of mirror drive will provide a resolution of 0.1 cm^{-1} ?
A) 5 cm B) 10 cm C) 8 cm D) 4 cm.
5. The unit of molar absorptivity coefficient is
A) mol cm^{-1} B) $1 \text{ mol}^{-1} \text{ cm}^{-1}$ C) 1 mol cm^{-1} D) 1 cm^{-1}
6. The mathematical representation of Beer's law is
A) $A = -\log P_o/p$ B) $A = \log P_o/p$ C) $A = \log T$ D) $T = \log A$
7. Differential thermo gram is a plot between
A) ΔT Vs T_s B) ΔT Vs Time C) ΔQ Vs Time D) ΔQ Vs T_s
8. Relation between peak area and enthalpy is given by
A) $A = -k G m \Delta H$ B) $A = -k' G \Delta H$ C) $A H = K G m A$ D) $\Delta H = K' GA$
9. The value of selectivity factor (α) in
A) Zero B) One C) Less than one D) Greater than one
10. Which of the following substance that can be used as mobile phase for super critical chromatography?
A) SO_2 B) NO_2 C) Diethyl ether D) H_2O

PART B (10 x 2 = 20 Marks)

11. Differentiate precision and accuracy.
12. What is a transducer in an analytical instrument?
13. Sketch the various components of optical instruments.

14. Derive and prove that the interferogram frequency is proportional to optical frequency.
15. State Beer's law.
16. Name any two compounds which are Raman active.
17. Why does the glass transition for a polymer yield no exo (or) endothermic peaks?
18. Write the differences between DSC and DTA.
19. What is gradient elution?
20. List the variables that lead to zone broadening.

PART C (5 x 14 = 70 Marks)

21. a) Explain the various methods to enhance signal to noise ratio.

(OR)

- b) Define calibration and explain their methods.

22. a) Discuss in detail about photon and thermal transducers.

(OR)

- b) Explain time domain spectroscopy and how can you obtain time domain spectra with Michelson interferometer.

23. a) Derive Lambert – Beer's law and write about their limitations.

(OR)

- b) Write the short notes on IR spectrometry

24. a) Explain in detail about TGA and its applications.

(OR)

- b) Brief about DTA and how their thermo gram has been interpreted?

25. a) Write short notes on Ion exchange chromatography.

(OR)

- b) Explain HPLC with its instrumentation.
