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Sardar Patel University
M.Sc. Industrial Biotechnology Semester I Examination
Paper: Bioinstrumentation (PS01CIBT02)
December 1, 2012. Saturday

Time: 10:30 a.m. to 1:30 p.m.

Max. Marks: 70

Note: Figures at the right indicate marks.

- Q.1 Choose the most appropriate answer (08)
- i) Resolution of microscope is limited by the
 a) numerical aperture b) wavelength c) both 'a' and 'b' d) none
- ii) Electron gun of electron microscope
 a) is a triode b) has two cathodes and one anode
 c) both 'a' and 'b' d) has two anodes and one cathode
- iii) In Adsorption chromatography stationary phase is
 a) liquid b) solid c) either liquid or solid d) none
- iv) Which of the following rotors present the shortest possible path-length for a sedimenting particle during centrifugation?
 a) swinging bucket rotor b) fixed angle rotor
 c) vertical tube rotor d) Elutriator rotor
- v) The role of 2-mercaptoethanol in sample preparation buffer for SDS-PAGE is:
 a) to provide negative charge to proteins
 b) to maintain protein in native state
 c) to reduce disulphide bonds
 d) to enhance solubility of proteins
- vi) _____ can be eliminated by performing scintillation based quantitation of radioactivity in dark.
 a) chemiluminescence b) color quenching
 c) optical quenching d) phosphorescence
- vii) Which spectroscopic technique will you employ to determine the types of functional groups in a molecule?
 a) NMR b) ESR c) AAS d) IR
- viii) ESR spectroscopy is useful in
 a) determination of proton environments in a molecule
 b) quantification of metal ions in a sample
 c) determination of mass of a molecule
 d) analysis of paramagnetic substances

- Q.2 Attempt any seven of the following: (14)
- Define: aberration of lens.
 - Differentiate between bonded phase and liquid-liquid chromatography
 - Explain the term 'interference' in microscopy.
 - 'GLC columns after packing must be conditioned before use'. Explain.
 - Explain the term: Electroendosmosis.
 - Explain significance of slit-width in UV-Visible Spectroscopy.
 - Define: Molar extinction coefficient.
 - What is SI unit of radioactivity? Give its definition.
 - Define: Svedberg unit.
- Q.3 a. Write a brief account on specialized components of phase contrast microscopy. (06)
- b. Explain the construction of an electro-magnetic lens. (06)
- OR
- b. Explain the scanning modes in scanning-tunneling microscopy. (06)
- Q.4 a. Write a note on: Detectors used in GLC (06)
- b. Write a note on: Gel permeation chromatography (06)
- OR
- b. Write a note on: Ion-exchange chromatography (06)
- Q.5 a. Discuss basic theory of NMR and enlist its applications. (06)
- b. Write a note on: Detectors employed in UV-Visible spectroscopy. (06)
- OR
- b. Give a comparison between atomic absorption and atomic emission spectroscopy. Describe any one method of atomization in detail. (06)
- Q.6 a. Write a note on: Ultra-centrifugation and its applications. (06)
- b. Discuss factors influencing scintillation counting in detail. (06)
- OR
- b. Write a note on: Biosensors (06)
- X-X-X-X-X-X-X-X-