

[70]

Sardar Patel University
M.Sc. Biotechnology Semester I Examination
Paper: Bioinstrumentation (PS01CBIT02)
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 the term 'chemical shift and its significance in NMR spectroscopy.
 - Define: Molar extinction coefficient.
 - Define half life of radio-isotopes.
 - 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. Discuss various factors influencing electrophoretic separation of molecules in poly-acrylamide gel. Enlist the applications of PAGE and SDS-PAGE. (06)
- b. Explain the principle of IEF and discuss its applications in detail. (06)
- OR
- b. Write a note on: Affinity chromatography and its applications (06)
- Q.5 a. Discuss sample preparation in IR spectroscopy. (06)
- b. Discuss various types of interferences in atomic spectroscopy and the ways to minimize them. (06)
- OR
- b. Describe any two types of mass analyzers in detail. (06)
- Q.6 a. Write a note on: Density gradient centrifugation and its applications (06)
- b. Write a note on: Scintillation counting (06)
- OR
- b. Write a note on: Biosensors (06)

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