

Code No: R09222302

R09

Set No. 2

II B.Tech II Semester Examinations, April/May 2012
ANALYTICAL METHODS IN BIOTECHNOLOGY
Bio-Technology

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. Define circular dichromism. Write the applications of Circular dichromism for biomolecules. [15]
2. What is the difference between precision and accuracy? What are various ways of expressing precision? [15]
3. Define the terms:
 - (a) Eddy diffusion.
 - (b) Selectivity factor.
 - (c) Retention time.
 - (d) Band broadening. [15]
4. Discuss about different types of molecular energies associated with a molecule with relevance to molecular spectroscopy. [15]
5. Write the principle of Electrophoresis. Write about different Electrophoretic techniques used for separation of nucleic acids. [15]
6. Write the principle and method of amperometric titrations. [15]
7. (a) Explain if a quartz cuvette can be used in measuring optical density of samples in the visible region of spectrum.
(b) Calculate the molar concentration and absorptivity of a certain compound 10mg/ml which had absorbance of 0.45 at 540nm, while unknown compound had absorbance of 0.750.(mol.wt 150). [8+7]
8. Write the differences between working of Geiger-muller counter and Scintillation counter. [15]

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Answer any FIVE Questions
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1. Write the working principle of voltametry and discuss about Polarography. [15]
2. Discuss the principle of sedimentation. Write different methods of centrifugation. [15]
3. Define optical rotatory dispersion. Explain the features of optical rotator dispersion curve. [15]
4. Define radioactivity. Discuss different applications of Radioisotopes. [15]
5. Write about temperature programming in Gas Chromatography. [15]
6. What is an Electromagnetic radiation. Discuss about different types of this radiation. [15]
7. (a) Explain sample preparation for IR Spectroscopy.
(b) Calculate the wave numbers for the wave lengths 3,6,9 μm . [8+7]
8. Write the principle of working of Scanning electron microscope and discuss its applications. [15]

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Set No. 1

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1. Write short notes on:
 - (a) Polarography.
 - (b) Hanging Drop mercury electrode.
 - (c) Standard electrode potential.
 - (d) Diffusion current in Voltammetry. [15]
2. Explain the main components of a Spectrophotometer and their function. [15]
3. Write about the instrumentation and working of Bright field microscope. [15]
4. Write about different Electrophoretic techniques used in the analysis of biomolecules. [15]
5. Explain Radioactivity. Discuss about Liquid Scintillation counters. [15]
6. Write the applications of Circular dichromism spectroscopy for conformational elucidation of Proteins and nucleic acids. [15]
7. In a gel filtration column a molecule X was eluted with separation volume (V_e) of 80 ml. The standards that were run are Ribonuclease A (mol wt. 1.3×10^4 , V_e 105ml); Aldolase (mol wt 1.58×10^5 , V_e 55ml); Blue dextran (mol wt 2×10^6 , V_e 530ml) and ovalbumin (mol wt 4.5×10^3 , V_e 71ml). Calculate the molecular weight of the compound. (graph sheet) [15]
8. Discuss about the phenomena that occurs when electromagnetic radiation interacts with matter. [15]

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Set No. 3

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Bio-Technology

Time: 3 hours

Max Marks: 75

Answer any FIVE Questions
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1. (a) Discuss about the commonly used parameters that are associated with an electromagnetic wave.
(b) An infra red wave has a wavelength of 44.00 μ m what is its wave number. [7+8]
2. Differentiate between:
(a) Voltammetry and polarography.
(b) Limiting current and Residual current in Voltammetry. [7+8]
3. Define Circular dichromism. Give a schematic diagram of Circular dichrometer. [15]
4. Write about 2D gel electrophoresis and its applications. [15]
5. Compare the instrumentation of a Spectrofluorimeter with that of a UV-Visible Spectrophotometer. [15]
6. Define radioactivity and discuss different methods of detection and measurement of radioactivity. [15]
7. (a) Write about instrumental errors and operative errors in the analysis of samples.
(b) How many significant figures are there in the following values: 0.00789 and 0.0054? [7+8]
8. (a) Write a note on band broadening and column efficiency.
(b) Calculate the R_f for a compound if the distance from the centre of the spot to the initial point is 2 cm and distance from beginning to the solvent is 10cm. [7+8]
