Exam.Code:0911
Sub. Code: 33386

2124

B.E. (Bio-Technology) Seventh Semester

BIO-714: Bio-Analytical Techniques

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.

x-x-x

I. Answer briefly: -

a) Define pyrolysis.

b) The grid in electron microscope is made up of_____.

c) Why is degassing done in solvent before chromatography?

d) Define limit of resolution in a microscope.

e) Draw the chemical structure of TMS.

f) What is a chromatogram?

g) ESR is an acronym for_____.

h) Name the two monochromators used in florescence spectrophotometer.

i) FRET is an acronym for_____.

j) Define Larmor frequency.

(10x1)

UNIT - I

II. a) You are an environmental biologist and had to report about heavy metal pollution in a lake. Which analytical technique you will use to determine the metal ion concentration in the water, explain the working protocol in detail.

b) Describe the principle of spectroflorimetry by highlighting the different phases of fluorescence.

(2x5)

III. a) Define chemical shift. A compound Y shows a chemical shift of 7.46 ppm using a 90 MHz NMR. Calculate the chemical shift of Y in Hz. What will the chemical shift of Y using a 300 MHz NMR (both in Hz and ppm)?

b) Explain the n+1 rule using an example. Discuss the reason for J coupling/ spin-spin splitting.

(2x5)

P.T.O.

IV. a) What is Bragg's Law of diffraction and its significance in crystal structure determination? (4)

b) Explain spin-spin and spin-lattice relaxation in MRI. (3)

c) In IR spectroscopy the spectrum ranges from 600-4000cm^{-1}. What is the significance of these two numbers have based on electromagnetic spectrum and how to you get to these numbers? (3)

UNIT - II

V. a) Differentiate between the working of Scanning tunneling microscope and Atomic force microscope. (5)

b) Discuss the instrumentation details of a mass-spectrometer with the help of a diagram. (5)

VI. a) Name the two types of detectors in Gas chromatography. Elaborate on each type. (4)

b) Write a descriptive note GM counter and scintillation counters. (6)

VII. a) How can isotopes be identified using a Mass spectroscopy, Explain using suitable examples. (5)

b) Mention various applications of radioisotopes in biomedical research. (5)

x-x-x