

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. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- a. Define pyrolyzation.
- b. Draw the structure of TMS and mention why it is used as standard in NMR spectroscopy.
- c. What is spin-lattice relaxation?
- d. The strength of magnetic field is measured in\_\_\_\_\_.
- e. Mention one limitation of x-ray crystallography.
- f. The samples in TEM should be ultra thin, explain why?
- g. What is electrothermal atomization, where is it used?
- h. After alpha emission the mass number of an element is changed by\_\_\_\_\_ and atomic number is changed by\_\_\_\_\_.
- i. Give two applications of atomic absorption spectroscopy.
- j. Which light sources are commonly used in spectrofluorometry?

(10x1)

UNIT - I

II. a) Differentiate between single beam and double beam spectrophotometer. Draw a schematic for each of them.

b) Elaborate on the working principle of Magnetic resonance imaging. (5,5)

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. (5,5)

IV. a) Write a detailed note on instrumentation of atomic absorption spectroscopy.

b) Draw an overview of different class of compounds showing their position on IR spectra. (5,5)

P.T.O.

(2)

UNIT - II

- V. a) What are the advantages and disadvantages of using a scintillation counter over a Geiger-Muller counter?  
b) Mention about applications of different isotopes that have clinical applications. (5,5)
- VI. Draw a labeled diagram of Mass Spectrophotometer and Discuss different types of ionization. (10)
- VII. a) Which analytical technique can be used to measure the concentration of elements in given sample? Elaborate on its working principle.  
b) Define chromatography and mention it's any five applications. (5,5)

x-x-x