

2021

B.E. (Bio-Technology) Seventh Semester
BIO-714/704: 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. Answer the following questions briefly:-
- ESR is an acronym for_____. Mention its one limitation.
 - Explain T1 relaxation in MRI.
 - Mention two safety measures that should be taken while handling radioisotopes.
 - Why does TMS gives reading at 0 ppm in NMR analysis?
 - What is autoradiography?
 - Differentiate between Rayleigh and Raman scattering?
 - Give one example of alpha decay using an equation.
 - What is brachytherapy?
 - Define retention time, what are the factors on which it depends?
 - In which analytical technique hollow cathode lamp is used? What is its function?
(10x1)

UNIT – I

- II. a) Discuss the applications of absorption spectroscopy with respect to biotechnology.
b) Spectrofluorimetry is an important analytical technique. Describe its principle as well as limitations. (2x5)
- III. a) What is SERS and why it is important for Raman spectroscopy? Describe Stoke and Anti-stoke shift using a diagram.
b) Name the two important regions in IR spectroscopy chart. Mention the location of different functional groups on IR chart. (2x5)
- IV. a) Differentiate between ^{13}C and ^1H NMR and draw a labeled diagram of NMR instrument.
b) You are a pollution control official and have been given the responsibility to check the water quality which is disposed from an industrial plant into Yamuna river. Describe any one analytical technique you can use to check the concentration of various elements and discuss its working. (2x5)

(2)

UNIT - II

- V. 5. a) Explain the working of MALDI-TOF.
- b) Differentiate between Scanning electron microscope and Transmission electron microscope. (2x5)
- VI. a) Draw a labelled diagram of Mass Spectroscope. How are isotopes differentiated using Mass Spectroscopy?
- b) Assume a substance has a half-life of 11 years and the initial amount is 133 grams. How much will remain left at the end of 8 years? Mention various applications of radioisotopes in biomedical research. (2x5)
- VII. a) Discuss the differences in working of STM and AFM. Why is AFM considered better for biological samples?
- b) Discuss the working of any two detectors in Gas Chromatography. (2x5)

x-x-x