Exam.Code:0911
Sub. Code: 6326

2123

B.E. (Bio-Technology) Seventh Semester

BIO-714: Bio-Analytical Techniques

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: ***Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Section.***

x-x-x

1. Answer Briefly: (10X1=10)
   a) Name the different components of HPLC.
   b) In mass spectrometer, the sample that has to be analyzed is bombarded with_____.
   c) The chemical shift observed in a 90MHz NMR is 1782 Hz. What will be the chemical shift if we use 300MHz NMR?
   d) Mention any two limitations of Beer Lambert's law.
   e) What is gold sputtering? Where is it used?
   f) The emission wavelength is always higher than absorption wavelength in florescence spectroscopy, why?
   g) What is one of the main limitations of using XRD?
   h) Name the factors that may influence the absorption spectra of a sample.
   i) FID is an acronym for_____.
   j) How is Raman Scattering different from Rayleigh scattering?

Section A

2 a) Discuss Beer-Lambert's law and its derivation. How can this law be verified in the laboratory? (5)
b) You have been given a sample in which lead concentration has to be determined. Name the technique that you would be using and discuss its working principle with the help of a diagram. (5)

3 a) J coupling is very common in ^{1}H NMR. Explain the reason for its occurrence, using $CHCl_2CH_2Cl$ as an example. (6)
b) Mention the differences between ^{1}H NMR and ^{13}C NMR. (4)

4 a) Give a schematic of longitudinal and transverse magnetization on applying and removing radiofrequency waves in MRI. (5)
b) Describe the principle of spectroflorometry by highlighting the different phases of fluorescence. (5)

Section B

5 a) What is Bragg's Law of diffraction and its significance in crystal structure determination? (5)
b) Name a microscope which does not have any lens. Describe its working principle using a diagram. (5)

6 a) Write a descriptive note on working of scintillation counter. (5)
b) You are provided with a mixture of isotopes which you have to separate, which analytical technique you will be using. Discuss the methodology in detail. (5)

7 a) How is electron microscope different from light microscope? Mention any ten major differences. (5)
b) Discuss the process of sample preparation and imaging in SEM. (5)

x-x-x