

M.Sc. sem IV June 2018

Analytical chemistry - II

Q.P. Code:-10287

[Time: 2½ Hours]

[Marks:60]

Please check whether you have got the right question paper.

- N.B:
1. All questions are compulsory.
 2. Use of log table or non-programmable calculator is permitted.

- Q.1 a) Attempt any two of the following:- 08
- i. Explain the function of thermocouple and bolometer as infrared transducers.
 - ii. Give an account of infrared sources along with their function in infrared spectrometer.
 - iii. Discuss application of NMR spectroscopy with reference to quantitative analysis of the chemical compounds.
 - iv. Explain the term spin-spin relaxation involved in NMR spectroscopy.
- b) What are group frequencies? Discuss their use for identification of group of chemical compounds with suitable example. 04
- OR
- b) What is ¹³C NMR? What are its advantages? 04
- Q.2 a) Attempt any two of the following:- 08
- i. Describe the working of FT Raman spectrometer with a schematic diagram.
 - ii. Write note on surface - Enhanced Raman spectroscopy.
 - iii. Explain determination of molecular weight and molecular formula of organic sample by using mass spectrophotometer.
 - iv. Discuss the function of chemical ionization sources in mass spectrometer.
- b) Discuss the applications of - Resonance Raman spectroscopy. 04
- OR
- b) Explain the function of fast atom bombardment sources in mass-spectroscopy. 04
- Q.3 a) Attempt any two of the following:- 08
- i. What are radio release methods? Explain the role of radioactive kryptonates in radio release method.
 - ii. In thermal analysis method, why is the thermocouple used for measuring sample temperature seldom immersed directly into sample?
 - iii. Describe the working of instrument used in DTA with suitable diagram.
 - iv. Describe direct and substoichiometric isotope dilution method in detail.
- b) Sketch the plot for the titration of radioactive silver a titration with inactive chloride. If 10cm³ of known sample was used for the titration and equivalence point was obtained at 6.0 cm³ of 0.1M solution of silver tagged with radioactive silver of negligible mass. Calculate the concentration of chloride in solution. [Cl=35.5] 04
- OR
- b) Explain the instrumentation of DSC. 04

P.T.O

Q.4 a) Attempt any two of the following :-

- i. Explain the principle and working of ICP-OES.
- ii. Explain the principle of GC-MS and the interfaces used.
- iii. What is MS-MS coupling? What are the interfaces available for this purpose?
- iv. Describe the light pipe used in GC-IR instrument.

b) Give the principle and working of HPLC-MS.

OR

b) Explain application of ICP-MS. What are the interfaces available for ICP-MS?

Q.5 Attempt any four of the following:-

- i. Explain the principle of far-infrared spectroscopy.
- ii. What is ^{31}P NMR? What are its advantages over normal NMR?
- iii. Explain the method of handling of solid samples in Raman spectroscopy.
- iv. Discuss the applications of tandem mass spectroscopy.
- v. Discuss the advantages of Neutron Activation analysis.
- vi. Draw a neat labeled diagram of the instrumentation in X-ray radiography.
- vii. What is hyphenation? Why is it required? What are its advantages?
- viii Give application of GC-IR technique.