

POST GRADUATE DIPLOMA IN APPLIED ANALYTICAL CHEMISTRY
(Final Examination 2011 - 2012)

Date: 03.05.2012

PAPER - II

Marks: 100

SECTION - I

Write answers of two sections in two different answer sheets.

- Q. 1. Answer the following. (Any 4) (20)
- Draw a schematic diagram of Gas Chromatography. Explain in brief the function of each component of G.C..
 - Discuss applications of IR spectroscopy
 - Give detail comparison between HPLC and GC.
 - Compare packed columns with capillary columns used in GC.
 - Compare Isocratic elution with gradient elution in HPLC.
 - Explain Finger Point Region of IR and its significance
- Q. 2. Answer the following. (Any 4) (20)
- Along with the schematic diagram, explain the instrumentation of HPLC.
 - Compare Normal Phase LC with Reverse Phase LC.
 - Explain the characteristics of ideal detector. Explain any one detector used for GC with the help of diagram.
 - Give applications of HPLC and GC.
 - Explain principle & technique of Thin Layer Chromatography.
 - Write a note on Cation exchangers & anion exchangers.
- Q. 3. State True /False (Any 5) (05)
- Mass spectrometer can separate the components of the mixture.
 - Rt of a component in a mix can be increased / decreased by changing flow rate of mobile phase.
 - In GC, Temp. programming is used to decrease RT of the components in mix.
 - Identification of the sample components is done by RT matching in GC & HPLC.
 - For separation of polar components, non polar column is used
 - Separation is enhanced if no. of theoretical plate is increased
 - Peak broadening increases the accuracy of GC / HPLC analysis
- Q. 4. Complete the following. (Any 5) (05)
- Sources of IR radiations are
 - Name the detectors used in GC
 - Rf =
 - Wave number is
 - Chromatogram is a graph of
 - State some types of molecular vibrations
 - In IR spectroscopy the frequency range of $1650-1750\text{ cm}^{-1}$ usually consist of...

PAPER – II
(SECTION – II)

Use different answer sheet

- Q. 1. State True/False. (Any 10) (10)
- i. For measuring absorption of very dilute solutions, cell of more length can be used.
 - ii. UV rays have more energy than X rays
 - iii. NMR technique uses longer wavelength radio rays than IR technique
 - iv. UV absorption readings can be taken in glass cell.
 - v. In Flame photometry technique, atomic absorption property of an element is made use of
 - vi. Hollow Cathode lamp is used as source of radiation in AAS.
 - vii. The symbol ^1H stands for Proton NMR
 - viii. The solvent is Deuterated which allows Anisotropy
 - ix. The signal appearing away from TMS is termed as Deshielded
 - x. Zeeman effect is observed in UV-visible spectroscopy
 - xi. The shielded signal will appear close to solvent signal
 - xii. Only those nuclei will be resorted if they have spin quantum no. as $I = 0.5$
- Q. 2. Answer the following. (Any 4) (20)
- i. Explain the principle and instrumentation of AAS.
 - ii. Define the concept of chemical shift in NMR.
 - iii. Explain the different transitions taking place in UV-visible spectroscopy.
 - iv. Write a note on DSC.
 - v. Write a note on Green Chemistry.
 - vi. Write applications and disadvantages of Flame Photometry.
 - vii. Explain Beer Lambert Law
- Q. 3. Answer the following. (any 4) (20)
- i. Explain the principle and working of double beam spectrophotometer.
 - ii. Explain the concept of D_2O exchange in NMR spectroscopy.
 - iii. Compare UV spectroscopy with IR spectroscopy.
 - iv. Define shielding & de-shielding in NMR spectroscopy along with examples.
Explain the use of TMS as an internal standard.
 - v. Discuss the important applications of UV visible absorption spectroscopy
 - vi. Write a note on ICP. (Inductively Coupled Plasma.)
 - vii. Explain effect of Auxochromes & Chromophore on electronic absorption.