

**M. SC. (ANALYTICAL CHEMISTRY) SEM-III (CHOICE BASED
CREDIT & GRADE SYSTEM) : SUMMER - 2018
SUBJECT: RECENT ANALYTICAL TECHNIQUES**

Day: **Wednesday**
Date: **25/04/2018**

S-2018-0876

Time: **03.00 PM TO 06.00 PM**
Max Marks. 60

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Neat diagram must be draw **WHEREVER** necessary.
- 5) Grape problem are supplied with the answer sheet.

SECTION - I

- Q.1** Attempt any **THREE** of the following : (15)
- a) Describe in brief different mass analyzers used in mass spectrometers.
 - b) Explain DCP mass spectrometer in detail.
 - c) What are the different detectors used in visible region? Describe any one of them in detail.
 - d) Define :
 - 1) Absorbance
 - 2) Radiant power
 - 3) Transmittance
 - 4) Absorptivity
 - 5) Radiant energy
 - e) Explain Atomic absorption spectroscopy based on Flame atomization.
- Q.2** **A)** Attempt any **TWO** of the following : (10)
- i) Describe electrospray ionization used in mass spectroscopy with the help of suitable diagram.
 - ii) Describe the interaction of EMR with matter.
 - iii) Write a note on monochromatores with optical spectrometers.
- B)** Solve **ANY ONE** of the following (05)
- i) 6.5 mg/mL solution of a substance (Mol. Weight – 250) has an absorbance 0.430 at 273 nm in 2 cm cell. What is the molar absorptivity of the given solution.
 - ii) In a mass spectroscopy an uni positive ion travels in semicircular trajectory with radius equal to 30cm. The ascending potential is fixed at 25 kV and m/z ratio for the ion is 7.5×10^{-7} . Find the magnetic flux density required for the above trajectory.

SECTION - II

- Q.3** Attempt any **THREE** of the following : (15)
- a) Explain the physiological significance of fat soluble vitamins.
 - b) Describe any one discrete automatic system used in industry.
 - c) What is the significance of saponification value in detergents?
 - d) Draw a sketch of C,H,N,O analyzer for organic compounds and describe each analysis in detail.
 - e) Explain determination of true glucose and describe its significance.
- Q.4** **A)** Attempt any **TWO** of the following : (10)
- i) Explain applications of flow injection analysis.
 - ii) Explain method for the analysis of urine and blood.
 - iii) Describe the use of Robots in automatic analysis.
- B)** Solve **ANY ONE** of the following (05)
- i) Calculate the energy of 450 nm photon of visible radiation in kJ / mol.
Given $\eta = 6.63 \times 10^{-34}$ J.s $h = 6.02 \times 10^{-23}$
 - ii) A serum sample is analyzed for potassium by ICP emission spectrometer using the method of standard addition. Two 0.55 M aliquots are added to 10.00 mL portion of water. Two one portion is added 10mL of 0.04M KCl solution. The net emission signals in arbitrary units are 30.54 and 65.27. What is the concentration of potassium in the serum.