

M. SC. (Analytical Chemistry) Sem-III (Choice Based Credit & Grade System) : WINTER - 2018

SUBJECT : RECENT ANALYTICAL TECHNIQUES

Day : Wednesday  
Date : 24/10/2018

W-2018-0989

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

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**N.B.:**

- 1) All questions are **COMPULSORY**.
  - 2) Figures to the right indicate **FULL** marks.
  - 3) Draw neat and labeled diagram **WHEREVER** necessary.
  - 4) Graph papers are supplied with the answer sheet.
  - 5) Answers to both the section should be written in **SEPARATE** answer books.
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**SECTION – I**

**Q.1** Attempt **ANY THREE** of the following: **[15]**

- i) Describe an electro spray ionization process in molecular mass spectroscopy with the help of diagram.
- ii) Explain in detail LASER based atomic fluorescence spectroscopy.
- iii) Describe AAS with the help of electro-thermal atomizer.
- iv) Describe ICP sources in mass spectroscopy and explain the use of MS in industries.
- v) Define photometric titrations. Explain its use in industry.

**Q.2** A) Answer **ANY TWO** of the following: **[10]**

- i) Describe various sources of radiation for atomic absorption methods.
- ii) Write down types of mass analysers and explain them in detail with suitable diagram.
- iii) Define: a) Photon                      b) Relaxation                      c) Photoelectric  
                    d) Absorbivity                      e) Fluorescence

**B)** Solve **ANY ONE** of the following: **[05]**

- i) Calculate the molar absorptivity of the given solution 20 mg/ml solution of a substance (molecular weight = 250) has an absorbance 0.340 at 280 nm in 1.0 cm cell.
- ii) Calculate the Kinetic Energy of singly charged ion ( $z = 1$ ), if it is accelerated through a potential  $1.5 \times 10^4$  V in an electron impact source.

P.T.O.

**SECTION – II**

**Q.3** Attempt **ANY THREE** of the following: **[15]**

- i) Explain the following terms:
  - a) Detergents having alcohol soluble materials.
  - b) Saponification value of the detergent.
- ii) Describe advantages and disadvantages of automatic analysis.
- iii) How do you determine true glucose? What is the clinical significance of true glucose estimation?
- iv) Explain physiological significance of fat soluble vitamins.
- v) Describe any two applications of flow injection analysis.

**Q.4** A) Attempt **ANY TWO** of the following: **[10]**

- i) Explain the test for sulphonated and unsulphonated materials in detergents.
- ii) Explain method for the analysis of urine and blood.
- iii) Draw a sketch of C, H, N and O analysis apparatus for organic compound and explain each part of it.

B) Solve **ANY ONE** of the following: **[05]**

- i) The sample of blood serum was analysed for the calcium contents by AAS at 455.7 nm in nitrous oxide acetylene flame. It gave the following data:

Conc .(ppm)	1.0	2.5	4.0	5.0	6.0	Unknown
Absorbance	0.090	0.231	0.367	0.460	0.551	0.328

Calculate the concentration of calcium (Ca) in given blood serum.

- ii) A 0.4050g of sample of commercial phosphate detergent was ignited at red hot to destroy the organic matter. The residue is converted into  $H_3PO_4$  by adding HCl. Then phosphate was precipitated by adding magnesium salt followed by addition of ammonia. On heating at  $1000^{\circ}C$ , the phosphate was converted into  $MgP_2O_7$ . The weight of residue was 0.25619. calculate the percentage of phosphorus in the given sample.

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