

MASTER OF SCIENCE (CHEMISTRY) (CBCS - 2018 COURSE)
M.Sc. (Chemistry) Sem-III :SUMMER- 2022
SUBJECT : RECENT ANALYTICAL TECHNIQUES

Day : Wednesday
Date : 13-07-2022

S-20161-2022

Time : 03:00 PM-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 section should be written in **SEPARATE** answer books.
- 4) Draw neat and labelled diagrams **WHEREVER** necessary.
- 5) Graph papers are supplied with the answer sheet.

SECTION – I

Q. 1 Attempt **ANY THREE** of the following: **(15)**

- a) Explain LASER enhanced ionization process in detail.
- b) Describe with suitable diagram, atomic absorption spectroscopy.
- c) Define:
 - i) Chemical interference
 - ii) Molar absorptivity
 - iii) Beer's law
 - iv) Transmittance
 - v) Wavelength
- d) Describe types of monochromators and explain them in detail.
- e) Describe in brief construction and working of hollow cathode lamp. Give its advantages and disadvantages.

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

- i) Explain different types of plasma sources used in emission spectroscopy.
- ii) Describe in brief different mass analyzers used in mass spectroscopy.
- iii) Explain tandem mass spectroscopy in detail and give its application in industry.

B) Solve **ANY ONE** of the following: **(05)**

- i) Calculate the concentration of a given compound using the data given below:
 $T = 1.25\%$, $b = 1.5\text{ cm}$, $\epsilon = 2.75 \times 10^5\text{ L cm}^{-1}\text{mol}^{-1}$.
- ii) The sample of hard water was analyzed for calcium contents by AAS at 455.7 nm in nitrous oxide acetylene flame. It gives following data:

Conc.(ppm)	1.0	2.2	3.1	3.9	5.0	6.0	unknown
Absorbance	0.091	0.2002	0.2819	0.3555	0.455	0.540	0.395

Calculate the concentration of Ca in the given sample by graph.

P. T. O.

SECTION – II

Q. 3 Attempt **ANY THREE** of the following: **(15)**

- a) Why do you need fluoride for determination of plasma glucose?
- b) Explain applications of flow injection analysis.
- c) Write the procedure for the determination of active ingredients and combined SO_3 from the given detergent.
- d) What are lipids? Describe nutritional significance of lipids.
- e) Draw a sketch of CHNO analyser for organic compounds and explain it in brief.

Q. 4 A) Answer **ANY TWO** of the following: **(10)**

- i) Describe merits and demerits of automatic analyzer.
- ii) Explain suitable method used to determine alcohol materials in detergent.
- iii) Explain microbiological technique for analysis of proteins.

B) Solve **ANY ONE** of the following: **(05)**

- i) A blood serum sample is analysed for sodium ion by emission spectroscopy. A 1:100 diluted sample gave an emission signal of 25 units on the scale. The standard NaCl solution gave the following data:

Con. of Na^+ meq/L	80	90	100	110	120	130
Emission signal	9	14	19	24	29	34

ii) Calculate the energy of the following wave length in Joules:

- a) 10 \AA
- b) 25 nm
- c) 340 nm
- d) $2.5 \mu\text{m}$
- e) 3.7 cm

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