

(Common for Analytical, Organic & Inorganic)

MASTER OF SCIENCE (CHEMISTRY) (CBCS - 2018 COURSE)

M.Sc. (Chemistry) Sem-II : WINTER :- 2021

SUBJECT: FUNDAMENTALS OF ANALYTICAL CHEMISTRY

Day : Tuesday

Date 8/2/2022

W-20147-2021

Time : 02:00 PM-05:00 PM

Max. Marks: 60

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Attempt both the sections in **SEPARATE** answer books.

SECTION – I

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

- a) What is Van Deemter equation? Explain clearly the terms involved in it.
- b) Give a schematic diagram for HPLC set up and explain the functions of each component.
- c) Describe the equilibrium process involved in the solvent extraction of metal chelates.
- d) Explain the flame ionization detector in detail.
- e) Write a note on match-box model and its applications to chromatography.

Q.2 A) Attempt any **ONE** of the following: **(05)**

- a) Describe any one method for the extraction of solute from aqueous phase.
- b) Discuss the various steps involved in paper chromatography.

B) Solve any **TWO** of the following: **(10)**

- a) Following data was obtained for chromatographic separation on a column having the length 30 cm.

Substance	T_R (min)	W(min)
X	0.45	0.48
Y	1.26	1.54
Z	2.14	2.84

- Calculate **a)** No. of plates **b)** Plate height and **c)** Resolution.
- b) If the distribution ratio for the solvent extraction of I_2 from water in CCl_4 is 65.7. Calculate the % E from 50 ml of water after three extractions with 10 ml portions of CCl_4 .
 - c) In the TLC of aromatic compounds the solvent front was 19.5 cm while the front due to compounds A, B, C was 10, 11.2 and 15.6 cm respectively. When the R_f value of unknown compound was 0.80 cm. Identify the unknown compound.

P.T.O.

SECTION – II

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

- a) Discuss any one instrumental method for the analysis of carbon monoxide.
- b) Describe the hydrological cycle in detail.
- c) Write a note on ozone hole and its effects.
- d) Give an account of inorganic particulate matter and how they differ from organic particulate matter.
- e) Define Smog. How does photochemistry play a role in formation for photochemical smog

Q.4 Attempt any **THREE** of the following: **(15)**

- a) Explain in detail about pre concentration techniques for the water sample.
- b) Give a concise account of the chemical speciation of mercury.
- c) Write a note on marine pollution of water bodies.
- d) Describe the measurements of BOD and COD. Explain the differences between the two tests.
- e) Explain the following terms:
 - i) Eutrophication
 - ii) El NINO

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