MANIPAL
ACADEMY of HIGHER EDUCATION
(Institution of Eminence Deemed to be University)

Reg.No.										

DEPARTMENT OF SCIENCES, III SEMESTER M.Sc. (Chemistry)
END SEMESTER EXAMINATIONS, NOVEMBER 2023
Principles and Practice of Analytical Chemistry [CHM 6161]
(CHOICE BASED CREDIT SYSTEM - 2020)

Time: 3 Hours | Date: 30/11/2022 | MAX. MARKS: 50

Note : (i) Answer **ALL** questions

(ii) Draw diagrams, and write equations wherever necessary

Q No	Question	Marks	CO	BL
1A	Discuss the importance of separation techniques based on phase equilibria in the elimination of interferences from the sample	4	2	2
1B	A new procedure for the determination of anionic detergents (mg/L) in water samples (Method A) is to be compared to the established method (Method B). The results of both methods are given below. Compare the standard deviation and mean values of 2 methods at 95 % confidence level. (Given $F_{tab} = 5.41$ and $t_{tab} = 2.37$ at 95 % confidence level) Method A – 25.54, 25.48, 25.87, 25.85 Method B – 25.19, 25.29, 25.83, 25.54, 25.44	3	1	3
1C	Discuss any 3 types of systematic errors that might occur during chemical analysis using appropriate examples.	3	1	2
2A	Explain the use of any four mineral acids for the decomposition and dissolution of samples.	4	2	2
2B	Differentiate between the following; i) Electrodialysis and Electrophoresis ii) Centrifugation and Ultracentrifugation iii) Coprecipitation and Post precipitation	3	2	2
2C	Write the significance of steam distillation in the elimination of impurities from sample. Chlorobenzene is steam distilled at 734 mm Hg and 363 K. The vapour pressure of chlorobenzene and water at 363 K are 208 and 526 mm Hg respectively. Calculate the mass of steam required to distill 0.5 kg of chlorobenzene.	3	2	2
3A	Define confidence limit. Calculate 95% confidence limit for following readings for absorbance in spectrophotometric analysis of iron with phenanthroline? 0.087, 0.067, 0.098 [Given 't' value for three readings = 4.20]. Explain the sampling procedure used for the extraction of sample from a metal sheet.	4	1	3
3B	Provide theoretical proof that the effectiveness of solvent extraction of a material from the aqueous to the organic phase is improved by increasing the number of extractions. Write the significance of reverse osmosis in purification.	3	2	2
3C	Illustrate the construction and working of glass membrane electrode.	3	3	2

4A	Write the role of following terms in voltammetry measurements i) Supporting electrolyte, ii) Residual current.	4	3	2
4B	Explain the effect of dissolved oxygen and cause for current maxima in polarographic experiment	3	3	3
4C	Write a note on following electrochemical methods i) Stripping analysis, ii) Electrogravimetry	3	3	3
5A	Explain the following methods of water analysis i) COD ii) Turbidity	4	3	2
5B	Discuss the principle and procedure for the analysis of i) Fluorides, ii) Sulphate	3	3	2
5C	Describe any two analysis of atmospheric samples.	3	3	3

***