Reg. No.										

MANIPAL
ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

DEPARTMENT OF SCIENCES, IV SEMESTER M.Sc. CHEMISTRY
END SEMESTER EXAMINATIONS, MAY 2022

SUBJECT: Principles and Practice of Analytical Chemistry [CHM 6008]
(CHOICE BASED CREDIT SYSTEM 2020)

Time: 3 Hours | Date: 04 May 2022 | MAX. MARKS: 50

Note: (i) Answer **ALL** questions
(ii) Draw diagrams, and write equations wherever necessary

1A. Discuss the importance and one application each of following techniques in analytical chemistry
- i) Reverse osmosis
- ii) Electrolytic precipitation
- iii) High frequency titration

1B. Explain the method of determination of dissolved oxygen in a sample using polarography. **[6+4]**

2A. Explain the following methods used for the dissolution of sample
- i) Microwave digestion
- ii) Oxygen flask Combustion
- iii) Cool plasma ashing

2B. Explain the principle and applications of cyclic voltammetry. **[6+4]**

3A. What are the various sources of error in analytical chemistry? Explain with examples.

3B. State whether the following statements are true or false with appropriate reasons;
- i) Azeotrope is a chemical compound not a mixture.
- ii) Gelatin is used in high concentration during polarographic analysis to reduce migration current. **[6+4]**

4A. Differentiate between the following;
- i) Coulometry and Voltammetry
- ii) Anodic and cathodic stripping analysis
- iii) Random and systematic error

4B. An immiscible liquid A when steam distilled with water gave a distillate of 200 mL which contained 57.2 mLof A. The observed boiling point for the distillation was 98.2° C and the atmospheric pressure was 758 mm Hg. The vapour pressure of water at 98.2° C was 712 mm Hg. The relative density of liquid was found to be 1.83 g/mL. Calculate the molar mass of the unknown liquid. (The density of water = 1 g/mL). Write any two advantages of steam distillation. **[6+4]**

5A. Explain a case of quantitative analysis, which could be conveniently carried out with potentiometry but not with conductometry.

5B. Define confidence interval. A new method (Method A) for the determination of copper in sea water of 6 different regions were compared with the existing method (Method B). Do the following results confirm a difference in the two methods at the 95 % confidence level? ($t_{tab} = 2.57$ and $F_{tab} = 2.3$ at 95% confidence level) **[6+4]**

Samples	Method A (Cu in mg/L)	Method B (Cu in mg/L)
1	1045	1038
2	730	722
3	850	835
4	800	789
5	950	934
6	650	635

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