LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FIRST SEMESTER – **APRIL 2025**

CH 1505 – ANALYTICAL CHEMISTRY

Date: 23-04-2025 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

Section-A

Answer any FOUR questions. **(4 × 10 = 40)**

1. Illustrate the general rules to be observed in the storage and handling of chemicals.
2. Explain the first aid procedures to be followed in the laboratory.
3. a) Describe the various steps involved in recrystallization.
   b) Differentiate column and paper chromatographic techniques. (5+5)
4. a) Write the characteristics of a primary standard substance. Cite examples.
   b) Calculate the pH of the following. (i) 0.001 N HCl (ii) 0.1 N NaOH (6+4)
5. Discuss the theory of acid-base indicators with suitable examples.
6. a) What are metal ion indicators? Explain their characteristics.
   b) Deduce the relationship between solubility and solubility product. (5+5)
7. a) Outline the various factors affecting the solubility of a compound.
   b) Explain Von-Weimarn ratio. (6+4)
8. Describe the principle and instrumentation involved in the TGA technique.

Section-B

Answer any THREE questions. **(3 × 20 = 60)**

9. a) Calculate the mean, median, standard deviation, average deviation and coefficient of variation for the following set of observations, 29.0, 22.8, 23.1, 24.5, 25.5, and 20.1.
   b) Write a note on determinate and indeterminate errors. How can they be minimised? (10+10)
10. Explain the principle, experimental procedure and any one application of the following chromatographic techniques.
    (i) Thin layer (ii) Column
11. a) Describe the simple distillation method of purifying the impure liquids with a neat diagram.
    b) Derive Henderson equation for an acidic buffer and mention its significances. (10+10)
12. a) Explain the different types of titrations with an example.
    b) Calculate the normality of a solution containing 6.3 g of oxalic acid dihydrate crystals in 500 mL of water.
    c) The solubility of silver chloride at 25^0C is 1.05 x 10^{-5} mol/L. Calculate the solubility product. (10+5+5)
13. a) Write the principle and procedure involved in the estimation of chloride ions by Volhard's method.
    b) Distinguish between co-precipitation and post precipitation. Discuss the various mechanisms by which co precipitation can occur. (10+10)
14. a) Summarize the principle and instrumentation involved in the DTA technique.
    b) Explain the TGA curve of calcium oxalate monohydrate and silver nitrate. (10+10)
