

[This question paper contains 4 printed pages.]

5142

Your Roll No.

B.Sc. Prog. / II

B

AC - 202 - Quantitative Methods of Analysis

(Admissions of 2005 and onwards)

Time : 3 Hours

Maximum Marks : 75

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Attempt six questions in all.

Question No. 1 is compulsory.

1. Explain the following in brief :

- (a) Explain the difference between end point and equivalence point.
- (b) Dilute solution of a strong electrolytes is more conducting in comparison to a concentrated solution.
- (c) Explain the term 'super saturation'.
- (d) What are primary standards and how are they different from secondary standards in volumetric titration ?
- (e) The conductivity of HCl is greater than NaCl.

(3×5=15)

P.T.O.

2. (a) What is volumetric analysis? What are the advantages of volumetric analysis? (6)
- (b) The basicity constant K_b for ammonia is 1.75×10^{-5} at 25°C . Calculate the pH and pOH for a $1 \times 10^{-3}\text{M}$ solution of ammonia. (6)
3. (a) Explain Volhard method for precipitation of silver. What is the indicator used? (4)
- (b) Discuss the role of solubility product in the precipitation of analytes? (4)
- (c) The K_{sp} of AgCl at 25°C is 1.0×10^{-10} . Calculate the concentrations of Ag^+ and Cl^- in a saturated solution of AgCl , and the molar solubility of AgCl . (4)
4. (a) Explain the principle of iodometric titrations. Also explain why is starch not added in the beginning of the titration? (6)
- (b) 5.0 ml of a 0.10 M Ce^{4+} solution is added to 5.0 ml of 0.30 M Fe^{2+} solution. Calculate the potential of a platinum electrode dipping in the solution. (3)
- (c) Explain the function of a salt bridge. (3)

5. (a) Explain the conductometric titration and the curve obtained for the titration of the mixture of strong acid & weak acid (HCl & CH_3COOH) against a strong base (NaOH). (6)
- (b) Explain the variation in specific conductivity and molar conductivity on dilution. (3)
- (c) The specific conductivity of 0.01N KCl solution is $0.0014106 \text{ Scm}^{-1}$ at 25°C . When a conductivity cell was filled up with the same solution, it offered a resistance of 484Ω at 25°C . The same cell was then filled with 0.001N solution at 25°C which gave a resistance of 5194Ω . Calculate the value of equivalent conductivity of 0.001N solution of NaCl . (3)
6. (a) Potentiometric titration is more precise as compared to volumetric titration. Explain. (4)
- (b) Calculate the pH at 0, 10.0 and 25.0 ml titrant in the titration of 50 ml of 0.1M acetic acid with 0.1M NaOH . (4)
- (c) Define liquid junction potential. How can it be minimized? (4)
7. (a) How would you distinguish between co-precipitation and post precipitation. (3)

- (b) Explain the conditions needed for the precipitation of Barium ions. Why is the precipitation performed in presence of HCl? (3)
- (c) Illustrate the basic steps involved in gravimetric analysis. (6)
8. Write short notes on any **three** :
- (a) Digestion
- (b) Reference electrodes
- (c) Mohr Method of Precipitation
- (d) Thiocyanate method for the determination of silver (4×3=12)