PG – 124

III Semester M.Sc. Degree Examination, December 2014
(2010-11 Onwards Scheme) (NS)
CHEMISTRY
Analytical Chemistry
C – 301-AC : Principles of Chemical Analysis

Time : 3 Hours Max. Marks : 80

Instruction : *Answer question No.**1** and **any five** of the following.*

Answer **any ten** of the following. **(2×10=20)**

1. a) What are titration curves in acid base titrations ? Give an example.

   b) Why is it some times necessary to adjust the oxidation state of the analyte in redox-titrations ?

   c) What are precipitation titrations ? Write their limitations.

   d) Why is EDTA called remarkable titrant in complexometric titrations ?

   e) Write the composition of Karl-Fieser reagent and indicate its uses.

   f) What are amphioprotic, acidic, aprotic and basic solvents ? Give an example for each of the above solvents.

   g) Write the equation (formula) which is used to determine the percentage of the analyse from the weight of the precipitate in gravimetric analysis.

   h) Define the terms “Kinetic method of analysis” and “rate law”.

   i) Write different types of non selective membrane electrodes.

   j) How is stability constant different from conditional stability constant ?

   k) Indicate the difference between indicator electrode and a reference electrode.

   l) Write the requirements that should be met in order that a gravimetric method be successful.

2. a) 50 ml of 0.100 M HCl is titrated with 0.100 M NaOH. Calculate the pH at the start of the titration and after the addition of 10, 50, and 60 ml of titrant.

b) Write a note on structural chemistry of redox indicators with suitable examples.

c) Illustrate with suitable examples the role of masking and demasking agents in EDTA titrations. **(4+4+4 = 12)**

3. a) How is Karl-Fieser reagent standardised ? Explain its utility in the determination of water in samples.

b) Write a note on differentiating ability of solvents as applied to non aqueous titrations.

c) Discuss the factors that must be considered in choosing a proper adsorption indicator for a precipitation titration. **(4+4+4=12)**

4. a) Describe with a neat diagram, the construction of glass electrode for pH measurement and explain its working.

b) Explain catalytic kinetic method of determining mercury ion.

c) Illustrate the application of precipitation titration in the determination of oxalates. **(4+4+4=12)**

5. a) How is the colour-change (pH range) in acid-base titration determined ? Explain with an example.

b) Illustrate the application of permanganate as titrant in the determination of iron in iron ores.

c) 50 ml of a solution containing 0.0100 M of Ca^{2+} ions buffered at pH 10.0 is titrated with 0.0100 M EDTA solution. Calculate values of PCa at starting of titration, after the addition of 10ml of titrant, at equivalence point and after adding 60 ml of titrant. **(4+4+4=12)**

6. a) Describe the gas-sensing probe for carbon monoxide with a schematic diagram.

b) Discuss methods of minimising Co-precipitation in gravimetry.

c) Explain uncatalyzed kinetic method of determining thiocyanate ion by spectroscopic measurement. **(4+4+4=12)**

7. a) Illustrate a non-aqueous titration in glacial acetic acid medium.

b) Classify and describe the properties of ion selective membranes.

c) Discuss a complexometric titration involving monodental ligand. **(4+4+4=12)**