M.Sc.- I (Chemistry) (NEP Pattern) Semester-I

NEP-14-1 / 01MSCCH04 - Chemistry Paper-IV : Analytical Chemistry-I

P. Pages : 2 **GUG/W/23/15073**

Time : Three Hours * 7 9 9 9 * Max. Marks : 80

Notes : 1. All questions are compulsory.
2. All questions carry equal marks.
3. Use of calculator is permitted.

1. a) Explain classification of analytical methods with suitable example. **8**

b) Define following terms: **8**
i) Systematic error & random error.
ii) Accuracy and precision

OR

c) Explain T-test & F-test in details. **4**

d) What is significant figures and write the rules to determine significant figures. How many significant figures are present in 0.10310. **4**

e) Explain the term certified reference materials. Name various agencies that provide CRMs. **4**

f) How newly developed analytical method is validated? **4**

2. a) Write the classification of chromatography. Explain the techniques used in thin layer chromatography? **8**

b) i) Discuss the zeolites as ion exchanger. **8**
ii) A certain solvent extraction has D value of 10. Find out the amount left behind after two extractions with 25 ml each of ether. Given the volume of aqueous layer = 50 ml and concentration is 0.3g/100ml.

OR

c) Discuss the principle of solvent extraction. **4**

d) Role of chelating ligands, calixarenes & cryptands in solvent extraction. **4**

e) Three compounds P, Q, R have Rf values 0.05, 0.32 and 0.54 respectively. If an unknown compound moves 4.9m cm when the solvent moves 15.4 cm. Identify if it is P, Q or R. **4**

f) Write the techniques used in paper chromatography. **4**

3. a) Explain following in detail. **8**
i) Complexometric titration.
ii) Redox titration.

b) Explain in details the general steps involved in gravimetric analysis. **8**

OR

c) Calculate the concentration of KCl solution required to just initiate the precipitation of 0.01 M AgNO3 solution if the solubility product of AgCl is 1.0 x 10-10 M. **4**

d) Discuss Acid base titration in detail. **4**

e) Explain masking & demasking agent. **4**

f) What is primary standard? What are it's characteristics. Find out the Normality of solution obtained by dissolving 0.0126g of oxalic acid in 100ml distilled water. (eq. wt. of oxalic acid = 63.0). **4**

4. a) Write the principle of colorimetry & state Beer's law & How it can be verified. **8**

b) Explain determination of stability constant of complex by mole ratio method. **8**

OR

c) The absorbance of KMnO4 solution at it's λmax is 0.62 in a 2.0 cm cell. The molar absorptivity of permanganate at same λmax is 2235. Calculate the concentration of KMnO4 solution. **4**

d) Explain analytical significance of molar extinction coefficient & λmax **4**

e) Explain role of ligand in spectrophotometric analysis of metal ion. **4**

f) Explain simultaneous determination with examples. **4**

5. a) Define mean and average deviation. **2**

b) What is confidence limit? **2**

c) What is ion exchange capacity? **2**

d) Write the application of paper chromatography. **2**

e) What are indicators? Mention names of External and internal indicator. **2**

f) Explain 'Ash treatment'. **2**

g) Define photometric titrations. **2**

h) Name of any two organic ligands used in colorimetric analysis. **2**

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