

M.Sc. (Chemistry) (CBCS Pattern) Sem-I
PSCCHT04 - Analytical Chemistry Paper-IV

P. Pages : 2

Time : Three Hours



GUG/W/22/11186

Max. Marks : 80

- Notes : 1. All question are compulsory.
2. Draw diagram where necessary.

1. a) Give the classification of instrumental methods of Analysis? Discuss different types of Molecular Analysis in qualitative and quantitative applications? **8**
- b) What is meant by significant figures? Write rules to calculate significant figures? A sample of soda ash is analysed by titrating with Std. HCl The analysis gave 93.50, 92.58, and 93.43 % Na_2CO_3 . Find out standard deviation and confidence limit in range 95% Given:- confidence level with 2 degree of freedom = 4.303. **8**

OR

- c) Explain Q-test in details with example. **4**
- d) What are errors? Discuss determinate and indeterminate errors with examples? **4**
- e) Following values are obtained for concentration of iron (Fe) in water Sample: 11.2, 11.6, 11.0, 11.1 ppm. Predict whether the results 11.6 be rejected using Q-test, and 2.5 d rule. Given : Q 90% value for 4 observations is 0.765? **4**
- f) What is confidence limit? Explain with example. **4**
2. a) Explain the principle of Thin layer Chromatography. Discuss its applications in separation of Amino-Acids and Vitamins. **8**
- b) Explain the principle of solvent extraction? Discuss Batch, stripping and continuous extraction with diagram? **8**

OR

- c) Explain the principle of Ion-Exchange Chromatography? **4**
- d) Discuss the applications of zeolite ion exchange. **4**
- e) Describe extraction of solids with diagram of Soxhlet extractor? **4**
- f) A mixture containing two components 'A' and 'B' is to be separated chromatographically. If R_f values of the two components are 0.75 and 0.70 respectively. What distance should solvent travel in order to achieve resolution of 1cm. **4**
3. a) What is Redox Titration, explain with example? What are the different Indicators used in redox titrations? Calculate the equivalent weight of $\text{K}_2\text{Cr}_2\text{O}_7$ and KMnO_4 in acidic medium using reactions? **8**

b) Explain in details the general steps involved in Gravimetric Analysis? 8

OR

c) What are Indicators? Discuss Ostwald's theory of indicator with suitable examples. 4

d) Explain the principle of complexometric titration with the role of indicators used? 4

e) Discuss precipitation titration with example. 4

f) Explain the terms Post-Precipitation and co-precipitation in details? 4

4. a) Draw and explain instrumentation of Double beam spectrophotometer. 8

b) Discuss the application of UV-Visible spectrometer in determination of PK-value of an Indicator. 8

OR

c) Describe the different types of Spectrophotometric Titrations. 4

d) Discuss relative errors in spectrophotometry with the help of Ringbom Plot. 4

e) Discuss the factors responsible for deviations from the Beer's Law. 4

f) The molar absorptivity of a particular solute is 2.1×10^4 . Calculate transmittance through a cuvette with a 5.00 cm light path for a 2.00×10^{-6} M. solution. 4

5. a) Distinguish between accuracy & Precision. 2

b) Discuss absolute error & relative error. 2

c) How chelating agents helps in extraction of metal ions? 2

d) Define Chromatographic Parameter R_f , R_x & R_m . 2

e) Write any two examples of Primary standards for Redox & Neutralization titration. 2

f) Write note on masking and demasking agent. 2

g) What are Photomultiplier tubes. 2

h) State Beer's law and Lambert's law 2
