

M.Sc. (Chemistry) (Old and C.B.C.S. Pattern) Sem-I
CHE-104 / PSCCHT04 - Analytical Chemistry-IV

P. Pages : 2

Time : Three Hours



GUG/S/19/11186

Max. Marks : 80

-
- Notes : 1. Attempt all questions.
2. All questions carry equal marks.

1. a) Give the classification and an account of Errors in chemical analysis with suitable examples. 8
- b) Discuss in detail about qualitative and quantitative aspect to chemical analysis, what is the role of wet-classical and instrumental methods in quantitative analysis. 8

OR

- c) Write about the importance of confidence limit in determining true - value in analysis. 4
- d) Give the importance and method of 'Validation' of developed analytical method. 4
- e) What is accuracy and precision in chemical analysis. 4
- f) Calculate mean, median and average deviation for the following set of data : 9.990, 9.982, 9.980 and 9.997. 4
2. a) What is ion-exchange chromatography? Elaborate on different types of ion-exchangers used for separation. 8
- b) Write about role of chelating ligands and crown ethers in solvent extraction give suitable examples. 8

OR

- c) Discuss the methodology and application of paper chromatography. 4
- d) Write an account of removal of hardness of water as an application of ion exchange chromatography. 4
- e) Write in brief about solid phase and microwave assisted extraction. 4
- f) What is percentage of extraction of iron (III) from 100 ml of a 6 M hydrochloric acid with 20 ml of diethyl ether assuming the distribution ratio is 100? 4
3. a) Give an account of various reactions used in titrimetric analysis. Discuss the role of primary and secondary standards in neutralization titration. 8
- b) What are the steps involved in gravimetric analysis, discuss with suitable examples. 8

OR

- c) Draw a titration curve for monoprotic acid and base (50 ml each, 0.1 M each) versus pH. Explain in brief. 4
 - d) Explain the indicators used in precipitation titration. 4
 - e) Discuss the purity of precipitate with reference to co-precipitation and post-precipitation. 4
 - f) What is solubility product? Discuss the concept and precipitation equilibria in gravimetric analysis. 4
4. a) Derive Beer's law. Explain colorimetry on the basis of Beer's law. 8
- b) Draw a well-labelled block diagram of a double beam spectrophotometer and explain the various components. 8

OR

- c) Give the analytical significance of molar extinction coefficient and λ_{\max} 4
 - d) Write a brief account of spectrophotometric analysis of metal ions using organic ligands. 4
 - e) What are photometric titrations? Discuss. 4
 - f) Write a note on Ringbom plot. 4
5. Attempt following questions.
- a) What is certified reference materials? 2
 - b) Define 2
 - i) Average deviation.
 - ii) Standard deviation.
 - c) What are Zeolites? 2
 - d) Explain the term synergistic extraction. 2
 - e) Explain masking and demasking agent. 2
 - f) What do you mean by peptization? 2
 - g) What is Sandell's sensitivity? 2
 - h) Explain the term λ_{\max} . 2
