

Five Year Integrated M.Sc. Examination 2023

Semester - V

Course: CH-3-5-5

(Analytical Chemistry-I)

Time: Three Hours

Full Marks: 40

Questions are of value as indicated in the margin

Group-A

1. Answer **any five** questions: 5 × 2 = 10
- (a) What are the advantages of gravimetric analysis?
 - (b) Why a small amount of Mg-salt is added to EDTA solution in the titration of Ca using Eriochrome Black-T indicator?
 - (c) What is an adsorption indicator? Give example.
 - (d) What are the two important sources of error in titrations involving iodine and how they can be overcome?
 - (e) Amounts of Fe in a sample are found in replicate measurements as 50.3, 49.9, 50.1, 50.3, 50.4 and 49.9 ppm. Calculate mean and median.
 - (f) What do you understand by self-indicating reagent? Give example.

Group-B

Answer **any six** questions

2. Distinguish between
- (a) Equivalence point and end point of a titration 1.5
 - (b) Accuracy and precision 1.5
 - (c) Post-precipitation and co-precipitation 2
3. (a) What do you understand by stepwise and overall stability constant? Establish the relationship between them. 3
- (b) What do you understand by homogeneous precipitation? Give example. 2
4. (a) What are the principles of volatilization method in gravimetric analysis? 2
- (b) Discuss briefly about different types of chromatography based on the interaction of the analyte with stationary phase. 3
5. (a) Draw the various species of EDTA in an aqueous solution showing their electron donating sites. 2
- (b) Explain how you can monitor the progress of a chemical reaction by thin layer chromatography 2+1

(TLC). State two visualization methods of spots in TLC.

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| 6. | (a) Explain briefly the three sources of systematic error. | 3 |
| | (b) What is Zimmermann-Reinhardt solution? State the functions of the components present in it. | 2 |
| 7. | (a) Explain with appropriate example, what do you understand by masking and demasking. | 3 |
| | (b) What is chiral separation? Explain its importance in drug industry. | 2 |
| 8. | (a) Show the effect of concentration on the titration curves for two acid-base titrations, one with concentration of HCl and NaOH as 0.1 N and the other with 0.01 N, from the values of pH obtained when 49.8 mL, 50 mL and 50.2 mL of NaOH has been added to 50 mL solution of HCl. | 3 |
| | (b) Write briefly about the Mohr Method of precipitation titration using chromate ion indicator. | 2 |