

21ICH1C4L**M.Sc. I Semester Degree Examination, April/May - 2023****INDUSTRIAL CHEMISTRY****Paper No. : DSC 4 : Analytical Chemistry**

Time : 3 Hours

Maximum Marks : 70

Note : Answer **any five** of the following questions with question No.1 (Q. 1) **compulsory**.
Each question carries **equal** marks.

1. (a) Distinguish between determinate and indeterminate errors. Give an account of their minimization. **5+5+4=14**
- (b) Define t-test. Explain the significance of the test in statistical evaluation of analytical data.
- (c) The normality of the solution is determined by four separate titrations, the results being 0.2041, 0.2049, 0.2039 and 0.2043. Calculate the standard deviation and coefficient of variation from the above data.
2. (a) What is a titration curve ? Construct the titration curve for strong acid vs strong base. **5+5+4=14**
- (b) Discuss the application of EDTA titration in determining the hardness of water.
- (c) Explain precipitation from homogeneous solution with suitable example. What are its advantages ?
3. (a) Explain Beer's law, give its mathematical equation. Also mention the limitations of the law. **5+5+4=14**
- (b) What is nephelometry ? Explain the principle and instrumentation of nephelometer.
- (c) Explain the important factors affecting the intensity and width of spectral lines.
4. (a) What is solvent extraction ? Distinguish between batch and continuous extraction. **5+5+4=14**
- (b) Give the inter relation between - capacity factor, selectivity factor and column resolution.
- (c) Write the principle and advantages of thin layer chromatography.

5. (a) Draw the schematic of a DTA apparatus, label the components and explain their role in brief. **5+5+4=14**
- (b) Explain the application of TGA in determining the purity and thermal stability of a substance.
- (c) Describe the instrumentation of power compensated DSC.
6. (a) Discuss the determination of different forms of nitrogen in a sample by acid-base titration. **5+5+4=14**
- (b) What is co-precipitation ? Discuss the procedure that is routinely used to minimize co-precipitation in gravimetric estimations.
- (c) Explain the determination of Fe in a water sample by colorimetry.
7. (a) State and explain Nernst distribution law. Give the conditions for applicability of the law. **5+5+4=14**
- (b) List the varying factors in DTA. Explain how DTA is useful in analysis of physical mixtures and thermal behaviour of a sample ?
- (c) Write the principle and instrumentation of thermometric titrimetry.
8. (a) What is a redox indicator ? Taking a suitable example explain the working of redox indicator. **5+5+4=14**
- (b) Explain the application of Turbidimetry and Nephelometry.
- (c) What is chromatography ? In details give its classification.

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