

**2021**  
**B.A./B.Sc.**  
**Fifth Semester**  
**DSE – 1**  
**CHEMISTRY**  
*Course Code: CHD 5.11*  
 (Analytical Methods in Chemistry)

Total Mark: 70

Pass Mark: 28

Time: 3 hours

Answer five questions, taking one from each unit.

**UNIT-I**

1. (a) Define significant number. Round off 26.994 to five and four significant figures. 1+2=3
- (b) Explain different types of determinate errors. 5
- (c) Write notes on 2×3=6
  - (i) F-test
  - (ii) Q-test
  - (iii) t-test
2. (a) Give comparisons between precision and accuracy. 4
- (b) Explain the terms 2×3=6
  - (i) Average deviation
  - (ii) Standard deviation
  - (iii) Relative standard deviation
- (c) Explain relative error. Round off the following numbers to three significant figures. 2+2=4
  - (i) 75.8437
  - (ii) 59.873

**UNIT-II**

3. (a) What is spectrum? What are the two types of spectrum? 1+4=5
- (b) What are the absorption laws? Derive the Beer-Lambert's law. 2+4=6
- (c) What are forbidden transitions? 3

4. (a) Discuss the basic principles of UV-spectrometry. 5  
 (b) What are the types of electronic transitions? 4  
 (c) Discuss what happens inside the nebulizer in flame atomic absorption spectrometry. 5

### UNIT-III

5. (a) Describe the basic principle of instrumentation of thermogravimetry. 5  
 (b) Describe with thermogram the separation of Ca and Mg oxalate from their mixture. 6  
 (c) What is thermogravimetry? 3  
 6. (a) Give the classification of electroanalytical methods. 4  
 (b) Write the basic principle involved in pH metry. 3  
 (c) What is conductometric titration? Describe the conductometric titration of: 2+5=7  
 (i) strong acid vs strong base  
 (ii) strong base vs weak acid

### UNIT-IV

7. (a) Define the classification of solvent extraction. 4  
 (b) Explain absorption chromatography and gas chromatography.  $2\frac{1}{2}\times 2=5$   
 (c) What is enantiomeric excess? Discuss how it can be determined. 1+4=5  
 8. (a) Write short notes on continuous extraction and batch extraction.  $2\frac{1}{2}\times 2=5$   
 (b) What is a polarimeter? Draw its optical arrangement and discuss the different parts. 1+4=5  
 (c) Discuss homotopic and enantiotopic hydrogen atoms with suitable examples. 4

### UNIT-V

9. (a) Explain the mechanism of solvent extraction by solvation process. 5  
 (b) Discuss the use of shift reagents in NMR. 5  
 (c) Write notes on the extraction of organic species from the non-aqueous media. 4

10. (a) Write a short note on flame atomizer. 5
- (b) Discuss the quantitative estimation of trace metal ions from water sample. 5
- (c) What is HPLC? Discuss. 4
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