

This question paper contains **3** printed pages]

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S. No. of Question Paper : **2955**

Unique Paper Code : **2173522008**

Name of the Paper : **DSE : Analytical Methods in Chemistry**

Name of the Course : **B.Sc. (Prog.)**

Semester : **IV/VI**

Duration : **2 Hours**

Maximum Marks : **60**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any *four* questions.

Each question carries **15** marks.

1.
 - (a) Define accuracy and precision. What are the various ways of expressing accuracy and precision ?
 - (b) Explain the preparation of TLC plates and give its analytical applications.
 - (c) Explain the various processes involved in Flame Emissions Spectroscopy (FES). 5,5,5
2.
 - (a) What are different types of wavelength selectors used in UV/VIS spectrophotometer. Explain any *one*.

P.T.O.

- (b) How does adsorption chromatography differ from partition chromatography ?
- (c) Explain the concept of Gaussian distribution and its importance in analytical chemistry. 5,5,5
3. (a) Derive the relationship between absolute uncertainty and relative uncertainty for a general measured quantity.
- (b) State and explain the Beer-Lambert Law and its limitations.
- (c) Explain the mole ratio method for determining composition of metal complexes. 5,5,5
4. (a) Explain the concept of selection rules in spectroscopy. Discuss the selection rules for the electronic transitions and vibrational transitions.
- (b) Discuss the mechanism of chelation extraction. Why are chelates more easily extracted into organic solvents ?
- (c) Discuss different modes of interaction of radiation with matter : absorption, emission, fluorescence, phosphorescence and scattering. Explain each with energy transitions. 5,5,5
5. (a) A solution shows absorbance of 0.80 at concentration 2×10^{-4} M in a 1 cm cell. Calculate molar absorptivity.
- (b) Compare Job's method and mole ratio method in terms of principle, procedure and accuracy. When would you prefer one over the other ?

- (c) In Thin Layer Chromatography, a compound travels 4.0 cm while the solvent front moves 8.0 cm. Calculate R_f and comment on separation efficiency. 5,5,5
6. Distinguish between the following (any *three*) :
- (a) Paper chromatography and thin layer chromatography
 - (b) Random Errors and Gross Errors
 - (c) Extraction by solvation and extraction by chelation
 - (d) Atomic spectra and molecular spectra. 5,5,5