

4. (a) Discuss the types of errors that can occur in chemical analysis.
- (b) Provide an explanation of absolute and relative uncertainty.
- (c) Provide a detailed explanation of the mean and standard deviation. (5,5,5)
5. (a) Explain the interaction of radiation with matter and how it leads to the origin of spectra.
- (b) How is the concentration of unknown compounds determined using UV-Vis Spectrophotometry?
- (c) Discuss the principles of Atomic Emission Spectroscopy. (5,5,5)
6. (a) Give the classification of chromatographic techniques.
- (b) What factors affect the resolution in chromatography?
- (c) Describe the mechanism of solvent extraction by chelation. (5,5,5)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1487

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Unique Paper Code : 2173522008

Name of the Paper : DSE – Analytical Methods
in Chemistry

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

Semester : V

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **four** questions in all.
3. Each Question carries equal marks.

1. A. Answer the following multiple-choice questions :

(i) Which of the following is NOT a type of error in chemical analysis?

- (a) Systematic error
- (b) Random error
- (c) Gross error
- (d) Relative error

(ii) Accuracy refers to :

- (a) The degree to which a measurement conforms to the correct value
- (b) The consistency of repeated measurements
- (c) The variability of measurement values
- (d) The uncertainty in a single measurement

(iii) Relative uncertainty is expressed as

- (a) The same units as the measurement
- (b) A percentage of the measurement
- (c) An absolute value
- (d) A probability distribution

(iv) Which of the following best describes the Gaussian distribution?

- (a) A uniform distribution
- (b) A skewed distribution
- (c) A bell-shaped distribution
- (d) A binomial distribution

(v) The standard deviation is a measure of :

- (a) The average value of a data set
- (b) The central tendency of data

(c) The spread or dispersion of data

(d) The median value of a data set

B. Explain the difference between accuracy and precision with examples.

C. Write short notes on (any two)

(i) Types of errors

(ii) Absolute and relative uncertainty

(iii) Propagation of uncertainty (5,5,5)

2. (a) Describe the fundamental laws of spectroscopy and their importance in optical methods of analysis. (9)

(b) What is Beer X-Lambert's Law, and how is it applied in quantitative analysis?

(c) Discuss the principles of Flame Atomic Absorption Spectroscopy (5,5,5)

3. (a) Explain the principle of chromatographic separation.

(b) Describe the difference between Thin Layer Chromatography (TLC) and Column Chromatography.

(c) Explain the concept of plate height and its significance in chromatography. (5,5,5)