INSTRUMENTAL METHODS OF ANALYSIS – GUESS PAPER 2025–26

SECTION A (10 × 2 = 20)
1. Define chromophore and auxochrome with example.
2. Explain Beer-Lambert's law.
3. What is electrophoretic mobility?
4. Differentiate between fluorescence and phosphorescence.
5. Define HETP and its significance.
6. What are vibrational modes in IR spectroscopy?
7. Define isocratic and gradient elution.
8. What is quenching?
9. Principle of flame photometry.
10. What is nephelo-turbidometry?

SECTION B (Attempt any TWO – 2 × 10 = 20)
1. Explain principle, instrumentation and applications of UV-Visible spectroscopy.
2. Discuss IR spectroscopy – principle and instrumentation.
3. Explain instrumentation of HPLC with Van Deemter equation.
4. Explain principle and applications of fluorescence spectroscopy.

SECTION C (Attempt any FIVE – 5 × 7 = 35)
1. Explain Beer-Lambert's law with deviations.
2. Explain FT-IR spectroscopy with interferogram.
3. Describe ion exchange chromatography – principle and factors.
4. Explain gel electrophoresis with principle and applications.
5. Describe flame photometry and atomic absorption spectroscopy with interferences.
6. Explain plate theory and rate theory in chromatography.
7. Explain TLC – principle, method and applications.

■ QUESTION FREQUENCY ANALYSIS (2019–2025)

Topic	Times Asked	Weight
Beer-Lambert's Law	6 / 7	■■■■■
UV-Visible Spectroscopy	6 / 7	■■■■■
HPLC Instrumentation	6 / 7	■■■■■
IR / FT-IR Spectroscopy	5 / 7	■■■■
Fluorescence Spectroscopy	5 / 7	■■■■
Ion Exchange Chromatography	5 / 7	■■■■
Gel Electrophoresis	4 / 7	■■■
Flame Photometry / AAS	4 / 7	■■■
TLC	4 / 7	■■■