

**RAN-2303080202040004****M. Sc. (Sem.-II) Examination September - 2025****Chemistry Analytical Chemistry (Elective Paper-C) (Paper-IV)****[Total Marks: 70****સૂચના : / Instructions**

- (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book

Seat No.:

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Student's Signature

Q.1. Answer any three of the following [18]

- Name the different IR regions and discuss the fingerprint region with its significance. Convert 4.7μ (micron) wavelength into wave number.
- What is FT-IR? Describe the applications of IR spectroscopy.
- Explain the fundamental vibrations in IR spectroscopy. How will you differentiate acetophenone and benzaldehyde by IR?
- Explain effect of fermiresonance and hydrogen bonding on the vibrational frequencies in IR.

Q.2. Answer any three of the following [18]

- How are bonded phase supports prepared? Differentiate between the normal and reverse phase chromatography? Name two stationary phases used in each of these.
- Give characteristics of an ideal detector. Describe the RI detector.
- What difficulties were encountered in conventional LC? How are they overcome in HPLC? Compare GC and LC.
- Discuss the working of UV absorption detector. Compare it with other detectors. Give the criteria to select mobile phase in HPLC.

Q.3. Answer any three of the following [18]

- Give basic principle of scintillation detector. Explain inorganic scintillators and organic scintillators.
- Explain gas ionization detector in detail.
- Explain radiometric titration. Write a note on application of neutron activation analysis.
- What is a 'Tracer'? Explain isotopic dilution method.

Q.4. Answer any three of the following [16]

- Explain the thermobalance. Explain the effect of furnace atmosphere on thermal gravimetric analysis results giving one example.
- Discuss the thermograms of calcium oxalate and magnesium oxalate. How TGA can be used to analyze mixture of these two oxalates.
- Discuss the application of thermometric titration in complexometric titration with examples.
- Discuss the factors affecting TGA results. Explain with one example how TGA is useful to find suitable drying of precipitate?