7/2/23

* Total No. of printed pages = 2

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The figures in the margin indicate full marks for the questions.

1. Answer all:

Full Marks - 75

 $(10 \times 2 = 20)$

Time - Three hours

- (a) Explain the wave properties of Electromagnetic radiation and how it interacts with the matter?
- (b) Why UV spectroscopy is called electronic spectroscopy? Explain suitably.
- (c) Write a note on Chromophore and Auxochrome
- (d) Differentiate absorption and emission spectroscopy with suitable example.
- (e) Write about the solvent requirement in NMR Spectroscopy.
- (f) Discuss on Iso electric focusing.
- (g) Enlist the application of flame photometry.
- (h) List out the applications of Atomic Absorption Spectroscopy.
- (i) Write in brief Ion selective Electrodes and Application of potentiometry.
- (j) Write short notes on affinity chromatography.

2. Answer any seven:

 $(7 \times 5 = 35)$

- (a) Write a note on Instrumental Deviations from Beer's Law.
- (b) Explain the principle involved in fluorescence spectroscopy.
- (c) Write a note on the modes of molecular vibrations.
- (d) Discuss about the factors affecting chemical shift.
- (e) Explain the sample handling techniques used in IR spectra.

- (f) Write a note on ¹³C-NMR.
- (g) Explain about rotating crystal technique.

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- (h) Discuss the principle and working of zone electrophoresis.
- (i) Give an account on principle and methodology of thermogravimetric analysis.
- (j) Explain the applications of potentiometry.

3. Answer any two:

 $(2 \times 10 = 20)$

- (a) Explain in details about the construction and working of double beam UV-Visible spectroscopy and give its application.
- (b) Explain the principle and instrumentation of Nuclear magnetic spectroscopy.
- (c) Explain the principle of Mass spectrometry. With proper diagram explain the instrumentation of Mass Spectrometer.

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