

Section D

8. (a) Discuss the applications of NMR-spectroscopy in identification of organic compounds with any suitable example. 7
(b) Define chemical shift and spin-spin coupling. 7
9. Explain the effect of changing solvents and hydrogen bonding on chemical shifts. Also, discuss the application in structure determination. 14



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EXAMINATION, 2025

(Fourth Semester)

GENERAL CHEMISTRY-I

B-23-CHE-403

Time : 3 Hours]

[Maximum Marks : 70

Before answering the question-paper, candidates must ensure that they have been supplied with correct and complete question-paper. No complaint, in this regard will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. 1 is compulsory. All questions carry equal marks.

(Compulsory Question)

1. (a) What is symmetric top polyatomic molecules ? 2
- (b) Define non-equivalence protons. 2
- (c) Define dissociation energy. 2
- (d) Explain simple harmonic vibrations. 2
- (e) Discuss polarization of light. 2
- (f) Differentiate UV and IR spectra. 2
- (g) Define spin active nuclei. 2

Section A

2. Define electromagnetic radiation. Also explain the interaction of electromagnetic radiation with matter. 14
3. (a) Explain the rotational spectra of diatomic molecules in detail. 7
- (b) Discuss the regions of the spectrum width and intensity of spectral transitions. 7

Section B

4. (a) Discuss Vibrational-Rotational Spectra of diatomic vibrating rotator. 7
- (b) Define Franck-Condon principle. Also discuss intensity of vibrational- electronic band. 7
5. Explain the interaction of rotations and vibrations of polyatomic molecules with suitable example. 14

Section C

6. (a) Discuss Quantum and Classical theory of Raman effect. 7
- (b) Explain pure rotational Raman spectra and vibrational Raman spectra in detail. 7
7. Discuss the principle and applications of UV and IR spectra in the structure elucidation of organic compounds. 14