



M.Sc. II Semester Degree Examination, September/October - 2022

21CHE2C8L : Spectroscopic and Thermal Methods

Time : 3 Hours

Maximum Marks :70

Note : Answer **any five** of the following questions with question No.1 **Compulsory**. Each question carries **equal** marks.

1. (a) Explain the 4 symmetry operations. 5
(b) How do you determine the group of symmetry ? Explain. 4
(c) What is C₄ and D₄ symmetry ? Explain with examples. 5

2. (a) Explain the interactions of electromagnetic radiations ? Give its properties. 5
(b) What is photoelectric effect ? Explain the mechanism with suitable diagram. 5
(c) State Beer - Lamber's law and mention its limitations. 4

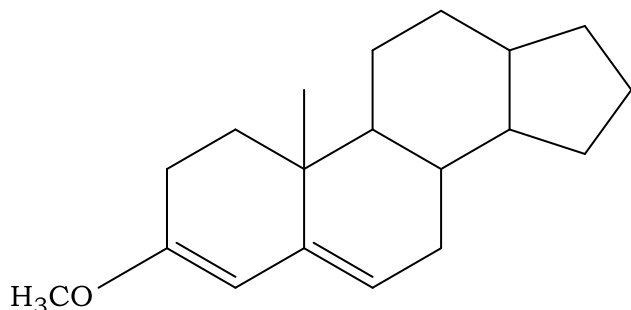
3. (a) Explain the applications of UV- Visible spectroscopy in determination of stoichiometry of the complexes by Mole ratio method. 5
(b) Explain the theory of chromophore auxochrome. 5
(c) Explain the effect of solvent in the absorption spectrum. 4

4. (a) Explain the instrumentation of Atomic Absorption Spectroscopy. 5
(b) Discuss the working principle of flame photometry. 5
(c) What is plasma ? Mention its properties. 4

5. (a) Describe the instrumentation of DSC. 5
(b) Discuss the theory of DTA and mention the variables affecting the DTA curve. 5
(c) Differentiate DSC and DTA. 4



6. (a) Predict of λ_{\max} value of the following structure by using Wood-Ward and Fieser rules. **5**



- (b) Discuss rotational-vibrational spectra of diatomic molecule. **5**
- (c) What are the criteria for spectrophotometric determination for Mo and Ni ? Explain. **4**
7. (a) List the analytical applications of atomic absorption spectroscopy. **5**
- (b) Discuss the limitations of Atomic Emission Spectrometry. Explain the effect of organic solvents. **5**
- (c) Explain the differences in instrumental design for atomic absorption spectroscopy and flame photometry. **4**
8. (a) Explain the different types of transitions observed in UV-Vis. spectroscopy. **5**
- (b) Explain the theory of TGA. Discuss the factors affecting TGA results. **5**
- (c) List out the differences between Nephelometer and Turbidimeter. **4**

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