

A-0556

Total Pages : 3

Roll No.

MSCCH-509

M.Sc. CHEMISTRY (MSCCH)

(Spectroscopy-I)

2nd Semester Examination, Session December 2024

Time : 2:00 Hrs.

Max. Marks : 70

Note :- This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section-A

Long Answer Type Questions 2×19=38

Note :- Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any two (02) questions only.

1. Define microstates. Calculate the number of microstates for P_1 configuration and P_2 configuration.
2. Write short notes on the following :
 - (a) Light source in IR-Spectroscopy
 - (b) Classification of IR Band
 - (c) Asymmetric top molecules
 - (d) Nuclear spin effect
3. Explain Raman scattering in details with respect to pure vibrational and pure rotational Raman spectra of a diatomic molecules.
4. What do you mean by the number of fundamental vibrations ? How will you detect the type of hydrogen bonding involved in a particular compound by infrared spectrum.
5. Describe the Woodward- fieser rules for calculating the absorption maximum in dienes. Do these rules obey strictly on all dienes ? If not Why.

Section–B

Short Answer Type Questions 4×8=32

Note :– Section ‘B’ contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Define electromagnetic spectrum and explain the characteristics of electromagnetic radiations.
2. Discuss the rotational spectrum of Diatomic rigid rotator.
3. Explain the overtone and fundamental bands,
4. How will you distinguish primary, secondary, tertiary amines with the help of IR-Spectroscopy ? Discuss with suitable example.
5. What are stoke and antistoke’s line ? Explain.
6. Write short notes on the following :
 - (a) Classification of IR-bands
 - (b) Applications of IR-spectroscopy
7. How bond angle and ring strain influence the vibrational frequency ? Discuss with examples.
8. Discuss effect of nuclear spin in vibrational spectroscopy.
