

A-0558

Total Pages : 3

Roll No.

MSCCH-602

M.Sc. CHEMISTRY (MSCCH)

(Spectroscopy-II)

3rd Semester Examination, 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. What is coupling constant ? Discuss the factors affecting the coupling constant.
2. What information does a COSY spectrum provide, and how can it be used to deduce molecular structure ?
3. Discuss the types of compounds that undergo the McLafferty rearrangement and how the molecular structure influences the fragmentation pattern.
4. Write the principle of Mossbauer Spectroscopy and discuss the Quadrupole splitting and hyperfine interaction with special reference to Fe⁵⁷.
5. Differentiate the first and second order ¹H-NMR spectra taking the suitable example.

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. Discuss the quadrupole splitting in the Mossbauer spectroscopy.

2. Differentiate between the COSY and HETCOR 2D NMR techniques.
3. What is ionisation process in mass spectrometry ? Write short note on the ion production methods FD and FAB.
4. Discuss the principle of Mossbauer spectroscopy.
5. Write a note on the long range coupling occurs and its application to analysis of ^1H -NMR spectrum.
6. Write a note on molecular ion peak and metastable ion peak in mass spectrum.
7. Discuss the mass fragmentation in carbonyl compounds.
8. Write the number of peaks and spin-spin splitting in the following molecules :
 - (a) 1 -Butanol
 - (b) Chlorobenzene
 - (c) Cyclopropane
 - (d) Acetone
