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Total No. of Printed Pages: [01]

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M.Sc. (Chemistry) (Semester – 3rd)
MOLECULAR SPECTROSCOPY-II
Subject Code: MCHMS1301
Paper ID: [20220216]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It carries 16 marks. It consists of 4 questions of 4 marks each.
2. Section B consist of 4 questions of 8 marks each. The student has to attempt any 3 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(4 marks each)

- Q1. Why TMS used as a standard reference?
- Q2. White a short note on Base peak and molecular ion peak.
- Q3. Draw the low and high resolution NMR spectra of ethyl alcohol (C_2H_5OH).
- Q4. Describe the MALDI in mass spectroscopy

Section – B

(8 marks each)

- Q5. Predict the structure of an organic compound with molecular formula $C_6H_5NO_3$ that has the following 1H NMR spectral data: δ 7.88 (4H, Complicated pattern), δ 4.2 (1H, Singlet)
- Q6. What is FAB technique for ionization in mass spectroscopy
- Q7. What is shielding and deshielding effect shielding and deshielding effect? Explain with suitable examples
- Q8. (a) Write the Factors affecting g values in ESR Spectroscopy.
(b) Explain hyperfine splitting with suitable example in ESR spectroscopy.

Section – C

(10 marks each)

- Q9. (a) What is meant by the term chemical shift? Name the various factors on which the value of chemical shift depend and discuss in detail.
(b) Discuss advanced NMR techniques- COSY.
- Q10. (a) Write a short note on McLafferty rearrangement
(b) The various m/z values for a hydrocarbon are given as below: 100, 85, 71, 57, 43(100%), 41 and 29. Tell the structure, its various fragmentation mode and draw spectra of the compound.
- Q11. Write note on
(a) Triplet states-zero field splitting
(b) Kramer's degeneracy,