Roll No.							

24-CH-24

M.Sc. II SEMESTER [MAIN/ATKT] EXAMINATION
JUNE - JULY 2024

CHEMISTRY
Paper - IV
[Spectroscopy - II and Diffraction Method]

[Max. Marks : 75] *[Time : 3:00 Hrs.]* *[Min. Marks : 26]*

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt five questions. Each question carries an internal choice.
Each question carries **15 marks.**

Q. 1 a) What do you understand by shielding and deshielding of magnetic nuclei ? Explain

b) Calculate the chemical shift in ppm (δ) for a proton that has resonance at 126 Hz downfield from TMS on spectrometer that operates at 60 MHz

c) Predict the number of signals in the high resolution NMR spectrum of CH_3CHO **(8+5+2 Marks)**

OR

a) What do you understand by classification of spin systems in NMR spectroscopy ? Explain.

b) Give a brief account of ^{13}C NMR Spectroscopy. **(8+7 Marks)**

Q. 2 Discuss the following -

i) Quadrupole Nuclei.

ii) Quadrupole moment.

iii) Electric field gradient. **(5+5+5 Marks)**

OR

Discuss splitting in NQR spectra taking examples (assuming $\eta = 0$) **(15 Marks)**

Q. 3 What do you mean by Hyperfine Coupling ? Explain isotropic and anisotropic hyperfine coupling constants. **(15 Marks)**

OR

P.T.O.

Explain **any two** of the following -

i) Basic principle of ESR spectroscopy.

ii) Measurement techniques in ESR spectroscopy.

iii) Spin densities and Mc Connell relationship. **(8+7 Marks)**

Q. 4 Describe any two methods of x - ray structural analysis of crystals. **(15 Marks)**

OR

a) What do you mean by Phase problem ? Explain.

b) Write a short note on structure factor and its relation to electron density. **(8+7 Marks)**

Q. 5 Describe the measurement technique in Electron diffraction studies and explain how the structure of simple gas phase molecules can be studied using electron diffraction studies. **(15 Marks)**

OR

Write an essay on Neutron diffraction and its application for the elucidation of structure of magnetically ordered unit cells. **(15 Marks)**

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