25025232

QP CODE: 25025232

Reg No : .....

Name : .....

M.Sc DEGREE (CSS) EXAMINATION, MAY 2025

Second Semester

CORE - CH500204 - MOLECULAR SPECTROSCOPY

M Sc CHEMISTRY, M Sc POLYMER CHEMISTRY, M Sc ANALYTICAL CHEMISTRY, M Sc APPLIED CHEMISTRY, M Sc PHARMACEUTICAL CHEMISTRY

2019 ADMISSION ONWARDS

CFC5753B

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What are the main factors that influence the intensity of a spectra?
2. Write a note on Lamp-Dip spectroscopy.
3. What is meant by Stark effect?
4. Explain combination and difference bands.
5. Represent the term symbol for nitrogen molecule.
6. What is meant by shielding and deshielding of a nucleus?
7. Which is the commonly used reference standard in H-NMR? Why is it preferred?
8. How signal to noise ratio is calculated in FT NMR spectroscopy?
9. Explain the applications of solid state NMR.
10. How many peaks will be there in the EPR spectra of Napthyl radical? Explain.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Determine the rotational energy of CO on the quantum levels J = 1 and 2. If the equilibrium nuclear distance of CO is 1.131 A^0.
12. Describe the origin of rotational spectra in a Non-rigid rotator.
13. Briefly discuss Resonance Raman scattering and Raman flourescence.

14. Write a note on gas lasers and solid state lasers

15. Explain relaxation methods in NMR spectroscopy.

16. Discuss the various factors influencing the coupling constant in NMR.

17. Explain the spin-spin relaxation in multiple pulse FT NMR.

18. Write a note on isomer shift and quadrapole splitting in Mossbauer spectroscopy.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Draw and explain the Morse potential energy curve. With the help of the curve explain the origin of fundamentals, overtones and hot bands.

20. Explain the various transitions involved in the electronic spectra of polyatomic molecules giving emphasise to the transitions occuring in a functional group and in a bond.

21. Explain the pulse sequences in FT NMR with pulse width and the relaxation methods.

22. Briefly explain the theory and important applications of NQR spectroscopy.

(2×5=10 weightage)