



QP CODE: 20000783

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Reg No :

Name :

MSc DEGREE (CSS) EXAMINATION , NOVEMBER 2020

Second Semester

CORE - CH500204 - MOLECULAR SPECTROSCOPY

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

2019 Admission Onwards

B5CFB7CC

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

Answer any **eight** questions.

Weight **1** each.

1. Discuss the term Doppler Broadening.
2. Write a note on Lamp-Dip spectroscopy?
3. Comment on the rotational spectra of symmetric top molecules.
4. Explain the terms anharmonic oscillator and zero point energy.
5. What are the localized electronic transitions occurring in a functional group?
6. Explain Karplus relations.
7. Explain the advantages of FT NMR spectroscopy.
8. What is meant by a pulse sequence in NMR?
9. Explain the applications of solid state NMR.
10. Explain Kramers degeneracy.

(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 \AA .
12. Explain Stark effect and its applications.
13. Explain the principle and application of FTIR.





14. Discuss the Frank Condon principle.
15. Explain the theory of NMR spectroscopy.
16. What is meant by chemical shift? Explain the factors affecting chemical shift?
17. Discuss FT Technique in spectroscopy and explain its advantages.
18. Discuss some important applications of Mossbauer spectroscopy with suitable examples.

(6×2=12 weightage)

Part C (Essay Type Questions)

Answer any two questions.

Weight 5 each.

19. Discuss in detail the classical and quantum theory for Raman spectroscopy.
20. What are lasers? Discuss about different types of lasers? Explain the use of lasers.
21. a) What are the relaxation methods in NMR spectroscopy b) Describe Larmor precession in NMR spectroscopy.
22. Discuss the theory and important applications of NQR spectroscopy.

(2×5=10 weightage)

