# M.Sc. DEGREE EXAMINATION,NOVEMBER 2019
## II Year III Semester
## Physical Chemistry - III

**Time : 3 Hours** **Max.marks :75**

### Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. What is signal to noise ratio?
2. Define Einstein absorption coefficient.
3. What do you mean by anharmonicity?
4. State rule of mutual exclusion.
5. Define hyperfine interaction.
6. What is isomer shift?
7. Give the expression for Hermite polynomial.
8. What is angular momentum?
9. What is R-S coupling?
10. Write down the secular determinant for benzene.
11. What are Slater orbitals?
12. What do you mean by chemical shift?

### Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. State and explain Franck-Condon principle.
14. Discuss the factors affecting the width of spectral lines.
15. Discuss the origin of P,Q and R branches.
16. Explain the NMR of simple AX and AMX type molecules?
17. Write note on McLaffetry rearrangement.
18. Discuss the origin of quantum numbers.
19. Explain Born – Heimer approximation.

## **Section C** $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. (a) Discuss the types of transition in saturated and unsaturated hydrocarbons. (5)
    (b) Explain the effect of conjugation and solvent effects in the electronic Spectrum of polyatomic molecules.(5)
21. Explain the Vibrational spectra of polyatomic molecules.
22. Briefly explain the theory and instrumentation of Mass spectra.
23. Write down the Schrodinger equation for harmonic oscillator and solve it .
24. Apply HMO theory for butadiene and find the expression for wave functions.

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