M.Sc. DEGREE EXAMINATION,APRIL 2020
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. State Heisenberg uncertainty principle.
2. State Franck Condon principle.
3. Write the expression for the rotational energy of diatomic molecule assuming it to be non-rigid rotor.
4. Give the rule of mutual exclusion.
5. Define chemical shift.
6. What is meant by isomer shift?
7. What is a harmonic oscillator?
8. What is meant by term symbol?
9. Mention the concept of hybridization.
10. State Born-Heimer approximation.
11. What is meant by Doppler broadening.
12. Define Zeeman effect.

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

Answer any **FIVE** questions

13. Write a note on the solvent effects on UV spectra.
14. Write a short note on Fermi resonance.
15. Explain McLafferty rearrangement.
16. Explain the model of a rigid rotor.
17. Explain the variation method as applied to helium atom.
18. Discuss the quadurpole interactions and magnetic interactions.
19. Explain the origin of quantum numbers.

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

Answer any **THREE** questions

20. Give an account of various energy levels and transitions in molecules.
21. Give the highlights of Raman spectra.
22. (a)Explain NMR spectra of AX and AMX molecules with suitable examples. (5)
    (b)Write a note on McConnell relation in ESR spectroscopy. (5)
23. Write down the Schrodinger equation for hydrogen atom and show it can be solved.
24. Explain the Huckel theory of bonding in benzene.

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