C. ABDUL HAKEEM COLLEGE (AUTONOMOUS),
MELVISHARAM - 632 509.
SEMESTER EXAMINATIONS, NOVEMBER - 2018

M.Sc., CHEMISTRY **SEMESTER III**

P15MCH303 – PHYSICAL CHEMISTRY - III

Time: Three Hours Maximum: 75 Marks

SECTION - A (5 X 6 = 30 Marks)

Answer **ALL** Questions.

1. a) Explain the NMR of AMX molecules.

(Or)

b) Discuss spin-spin coupling with examples.

2. a) Write Schrodinger wave equation for hydrogen atom and discuss the origin of angular momentum quantum number.

(Or)

b) Derive Hamiltonian operator for rigid rotator.

3. a) Discuss the Stern model of double layer.

(Or)

b) Explain Lipmann equation and Fick's law.

4. a) Explain Franck-Condon principle.

(Or)

b) Discuss the salient kinetic features of the unimolecular photophysical processes.

5. a) How will you distribute distinguishable and indistinguishable particles.?

(Or)

b) Calculate rotational partition function for CO at 27°C if $I=14.5x10^{-47}$ $Kg.m^2$.

SECTION - B (3 X 15 = 45 Marks)

Answer **ANY THREE** Questions.

6. a) Explain the factors affecting chemical shift.

b) Give an account of FT-NMR spectra and its applications.

7. a) Derive Schrodinger equation for one dimensional box.

b) Derive Schrodinger wave equation for simple harmonic oscillator and find the first three energy levels and wave functions.

8. a) Describe the electro kinetic phenomena.

b) Give an account of the Helmholtz-Perrin and Guoy-Chapmann models.

9. a) Explain the Singlet-Singlet and Singlet-Triplet energy transfer processes.

b) Discuss the Kinetics of bimolecular photophysical process.

10. a) Derive an expression for translational partition function.

b) Derive Maxwell-Boltzmann distribution law.

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