Total Pages : 3 **Roll No. ----------**

MCH-503

Physical Chenistry-1

M.Sc. Chemistry (MSCCH-20)

1st Semester Examination June 2022

Time: 2 Hours Max. Marks: 40

Note : This paper is of Forty (40) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section – A

(Long Answer – type questions)

Note: Section 'A' contains Five (05) long-answer-type questions of Ten (10) marks each. Learners are required to answer any two (02) questions only.

[2 x 10 = 20]

Q.1. (a) What is Hamiltonious operator?

(b) Discuss the important postulates of Quantum mechanism.

Q.2. Derive the Hamiltanian operator for a one dimensional Harmonic Oscillator.

P.T.O.

Q.3. (a) Discuss the shape of various orbitals.

(b) What are Quantum number? Give its types.

Q.4. Describe the first order perturbation theory.

Q.5. What is Born-oppenheimer approximation?

Section – B

(Short-answer-type questions)

Note: Section 'B' contains Eight (08) short-answer-type questions of Five (05) marks each. Learners are required to answer any Four (04) questions only.

[4 x 5 = 20]

Q.1. States the second law of thermodynamics in its various forms.

Q.2. What do you understand the term "Fugacity"?

Q.3. What are ideal and non-ideal solutions? Give their examples.

Q.4. Write a short note on

(a) Nernst Heat Theorem

(b) Third law of Thermodynamics

P.T.O.

Q.5. Give the derivation of Schrodinger Wave equation.

Q.6. Give the solution of wave equation for a particle in one dimensional box.

Q.7. Give the solution of wave equation for Hydrogen like atom.

Q.8. Give the MO theory of H_2^+ ion.
