UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program : Fifth Semester – Fall 2021

Roll No. .....

Paper: Physical Chemistry **Course Code: CHEM-301** **Time: 3 Hrs.** **Marks: 60**

Q.1. Give short answers of the following: **(15x2=30)**

I. Explain the physical significance of Wave function Ψ.
II. Why the energy level spacing for a proton moving in one dimensional box is very small as compared to that of proton in the same box.
III. What is a normalized wave function.
IV. What is importance of operator in Quantum Chemistry?
V. Prove Relationship between wave and particle by Schrodinger wave equation.
VI. Explain Activity and Activity Coefficient of strong electrolyte.
VII. Why ionic conductance decreases with temperature?
VIII. What is Kohlraush law.
IX. Explain the term IONIC STRENGTH.
X. Explain Concentration Cells without Transport.
XI. How Rate Law Equation relate with order of reaction?
XII. What are Opposing Reactions?
XIII. How Half Life method can be used to determine order of reaction?
XIV. Give various steps involved in thermal decomposition of Ozone.
XV. How can you prove Half Life period for 3^{rd} Order Reaction is inversely proportional to square of the initial concentration of the reactant.

Answer the following questions.

Q.2. (a) How Nernst equation is used to derive an equation for measurement of pH of the solution (5

(b) What are electrochemical series? Give its application (5)

Q.3. (a) What is degeneracy? Give example (05)

(b) Apply Schrodinger wave equation on Hydrogen atom, Derive an expression for Principle quantum number. (5)

Q.4. (a) Derive equation for k for 2^{rd} Order Reaction when initial concentration of all the reactants is different? 07

(b) Justify that thermal decomposition of N_2O_5 is a first order reaction? (03)