UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Fifth Semester – Spring 2022

Roll No. .....

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

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: **(15x2=30)**

I. What are Eigen functions? Explain with one example.
II. What is Orthogonality of wave function?
III. How do you compare the meaning of Ψ and Ψ^2?
IV. What is Weston standard cell?
V. Explain Hamiltonian Operator..
VI. Explain Concentration Cells with types.
VII. How specific Conductance vary with temperature?
VIII. Explain significance of Activity Coefficient.
IX. Describe Faraday's second law of electrolysis.
X. What is purpose of Salt Bridge in Electrochemical cells?
XI. Give various steps involved in thermal decomposition of Acetaldehyde.
XII. Derive the half-life ($t_{1/2}$) from the following equation.
XIII. $(k_1 + k_2)t = \ln \frac{a}{a-x}$
XIV. How can order of reaction is measured by half life method?
XV. What are parallel reactions?

Answer the following questions.

Q.2. (a) (a) Briefly introduce Debye-Huckle theory of strong electrolyte. Derive expression (5)

(b) Derive expression for Hittorf migration theory (5)

Q.3. (a) What are Rigid Rotators? Derive expression for energy of Rigid Rotators (05)

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

Q.4. (a) Derive equation for k for 3rd Order Reaction when initial concentration of all the reactants is same? 07

(b) What is physical significance of Probability factor in the collision theory of reaction rate? (3)