

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: MSc  
BRANCH: CHEMISTRY

SEMESTER : IV  
SESSION : SP/2023

SUBJECT: CH217 PHYSICAL CHEMISTRY-IV

TIME: 3 Hours

FULL MARKS: 50

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) What is Kohlrausch Law of Independent migration of ions? How will you determine  $\Lambda^{\circ}_m$  CH<sub>3</sub>COOH and  $\Lambda^{\circ}_m$  AgCl by Kohlrausch's Law? [5]
- Q.1(b) What is Transport number? Explain Debye-Huckel-Onsager equation and Wien effect. [5]
- Q.2(a) What is Quantum efficiency and Quantum Yield? Show the apparatus for determination of quantum yield of a photochemical reaction. What is the role of different parts of the apparatus? [5]
- Q.2(b) Explain the mechanism of photochemical reaction between H<sub>2</sub> (g) + Cl<sub>2</sub> (g)  $h\nu$  2HCl. Why quantum yield of this reaction is extremely high? [5]
- Q.3(a) What is Adsorption? Explain with examples. Differentiate physisorption and Chemisorption with respect to intermolecular van der Waals forces, specificity,  $\Delta H$  values, layers with suitable examples. [5]
- Q.3(b) Explain Freundlich adsorption isotherm at different temperatures. [5]
- Q.4(a) Derive the rate expression for the kinetics of parallel reactions. Write the two examples of parallel reactions. [5]
- Q.4(b) Discuss the collision theory of bimolecular reactions. What are the limitations of collision theory? [5]
- Q.5(a) Discuss the intermediate compound formation theory with an example. [5]
- Q.5(b) Discuss the mechanism and kinetics of enzyme catalysed reaction. [5]

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