

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2024)

CLASS: IMSc
BRANCH: CHEMISTRY

SEMESTER : 4
SESSION : SP/2024

SUBJECT: CH217 PHYSICAL CHEMISTRY IV

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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| Q.1(a) Derive an expression for rate constant of first order reaction rate. write the expression for half life period. | [2] | |
| Q.1(b) Derive the rate expression for the kinetics of parallel reactions. Write the two examples of parallel reactions. | [3] | |
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| Q.2(a) Discuss the collision theory of bimolecular reactions. What are the limitations of collision theory. | [2] | |
| Q.2(b) At 300 K a first order reaction is 50% completed in 20 minutes. At 350 K the same reaction is 50% completed in 5 minutes. Calculate the energy of activation of the reaction. | [3] | |
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| Q.3(a) Explain the main points of Arrhenius theory of electrolytic theory of dissociation. Write down the factors controlling the degree of dissociation. | [2] | |
| Q.3(b) What is catalysis ? Describe the adsorption or contact theory in detail. | [3] | |
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| Q.4(a) Define equivalent conductance and molar conductance with appropriate units. Explain giving plots for Λ_m and \sqrt{C} and with dilution for weak and strong electrolytes. | [2] | |
| Q.4(b) What is Kohlrausch's law ? Calculate Λ_m° for CH_3COOH , AgCl and NH_4OH . | [3] | |
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| Q.5(a) Define Transport no. Establish the relation between transport no. and molar ionic conductance and molar conductance at infinite dilution. | [2] | |
| Q.5(b) Explain Ionic atmosphere, Assymetry effect, Electrophoretic effect and Viscous effect. | [3] | |

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