**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI**
**(MID SEMESTER EXAMINATION SP/2025)**

**CLASS: BSc** **SEMESTER: IV**
**BRANCH: CHEMISTRY** **SESSION: SP/2025**

**SUBJECT: CH225 BASIC CHEMISTRY V**

**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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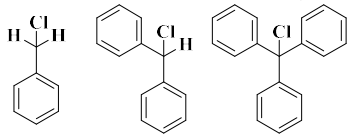
|---|---|---|---|---|
| Q.1(a) | What do you mean by 'true' and 'potential' electrolytes. Give examples of each. | [2] | | II |
| Q.1(b) | Derive 'Oswald's dilution law' from Arrhenius theory of electrolytic dissociation. How 'Oswald's dilution law' forms the theoretical basis of Kohlrausch law? | [3] | | III |
| Q.2(a) | How to determine the equivalent conductance of strong electrolytes at infinite dilution? Why this method is not applicable for weak electrolytes? | [2] | | III |
| Q.2(b) | Elaborate Hittorf's law with appropriate schematics. How this law forms the basis of practical determination of transport number of ions? | [3] | | II |
| Q.3(a) | What is Hammond's postulate? Compare the $S_N1$ and $S_N2$ reactions with respect to their energy profile diagrams. | [2] | 2 | II |
| Q.3(b) | Prove that $S_N2$ reaction proceeds with inversion in configuration. | [3] | 2 | III |
| Q.4(a) | Compare the reactivity of $S_N1$ reaction for the following molecules | [2] | 2 | III |




(I) (II) (III)

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| Q.4(b) | Explain the phenomenon of retention of configuration with a suitable example in a nucleophilic substitution reaction in case of $S_Ni$ mechanism. | [3] | 2 | III |
| Q.5(a) | Elaborate the 1st period of transition metals. | [2] | | II |
| Q.5(b) | Discuss the electronic configuration of elements of 1st period transition metals. | [3] | | II |

**::::::24/02/2025::::::E**