

Chemistry (Hons.) Paper-IV

Answer five questions, selecting at least one from each Group, in which Q.No. 1 is compulsory.

1. Explain any four of the following :
 - (a) The equilibrium constant of a chemical reaction is related to standard free energy.
 - (b) The formation of ammonia by Haber's process decreases with increases in temperature.
 - (c) Phenol is stronger acid than ethanol.
 - (d) Methyl amine is stronger base than aniline.
 - (e) The methylene group of ethyl acetoacetate is active.
 - (f) The specific conductance of an electrolyte solution decreases but equivalent conductance increases with dilution.

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Group-A

2.
 - (a) Explain the term transport number of an ion.
 - (b) How is transport number related to equivalent conductance of an ion ?
 - (c) Explain the term specific, equivalent and molar conductance.
3.
 - (a) Derive Clausius-Clapeyron equation and explain its two applications.
 - (b) Explain thermodynamic criterion of equilibrium of a reaction.
4.
 - (a) State and explain Kohlrausch's law of independent migration of ions.
 - (b) How is this law used for calculating molar ionic conductance of weak electrolyte at infinite dilution ?
5. Write short notes on the following :
 - (a) Application of concentration cell
 - (b) Van't Hoff reaction isotherm
 - (c) Solubility product

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Group-B

6.
 - (a) How is diethyl malonate prepared ?
 - (b) Explain keto-enol tautomerism.
 - (c) How are the following synthesised from diethyl malonate ?
 - (i) Pentanoic acid
 - (ii) Barbituric acid
7. Write short notes of the following :
 - (a) Riemer Tiemann reaction
 - (b) Perkin reaction
 - (c) Knoevenagel reaction
8.
 - (a) How is benzene diazonium chloride prepared ?
 - (b) How will you synthesise the following from diazonium compound ?
 - (i) Phenol
 - (ii) Methyl orange
 - (iii) Chlorobenzene
9. Explain :
 - (a) Nitro group in nitrobenzene is meta directing.
 - (b) Aldehyde is more reactive than ketone.
 - (c) Cyclooctatetraene is not aromatic.
10.
 - (a) Lactic acid is optically active while citric acid is not, explain.
 - (b) Discuss the method of synthesis of citric acid.
 - (c) What happens when citric acid is strongly heated ?

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