B–9–X

Roll No. .....

Total No. of Questions : **4**]

[Total No. of Printed Pages : **8**

12th ARM(SZ)JKUT2024

1109–X

CHEMISTRY

Time : 3 Hours]

[Maximum Marks : 70

General Instructions :

(i) There are total four Sections in the question paper. All questions are compulsory.

(ii) **Section–A** contains 10 Objective Type Questions (Multiple Choice Questions) of **1** mark each. $1 \times 10 = 10$ marks

(iii) **Section–B** contains 9 Very Short Answer Type Questions of **2** marks each to be answered in **20–30** words. $2 \times 9 = 18$ marks

(iv) **Section–C** contains 9 Short Answer Type Questions of **3** marks each to be answered in **100–150** words. $3 \times 9 = 27$ marks

(v) **Section–D** contains 3 Long Answer Type Questions of **5** marks each to be answered in **150–200** words. $5 \times 3 = 15$ marks

(vi) Use log table if necessary. Use of scientific calculators is not allowed.

SECTION–A

1 each

OBJECTIVE TYPE QUESTIONS
(MULTIPLE CHOICE QUESTIONS)

1. Select the correct one :

(i) In which mode of expression the concentration of solution remain independent of temperature ?

(A) Molarity

(B) Normality

(C) Formality

(D) Molality

(ii) If an aqueous solution of glucose is allowed to freeze, then crystals of which will be separated out first ?

(A) Glucose

(B) Water

(C) Both of these

(D) None of these

(iii) The amount of an ion liberated on an electrode during electrolysis does not depend upon :

(A) Current strength

(B) Conductance of the solution

(C) Time

(D) Electrochemical equivalent of the element

(iv) Collision theory is applicable to :

(A) First order reaction

(B) Zero order reaction

(C) Bimolecular reaction

(D) Intramolecular reaction

(v) Alkyl halides undergoing nucleophilic bimolecular substitution involve :

(A) Formation of carbocation

(B) Racemic mixture

(C) Inversion of configuration

(D) Retention of configuration

(vi) Among the following compounds strongest acid is :

(A) $HC \equiv CH$

(B) C_6H_6

(C) C_2H_6

(D) CH_3OH

(vii) The weakest base among the following is :

(A) Dimethylamine

(B) Aniline

(C) Methylamine

(D) Ethylamine

(viii) A transition metal exists in its highest oxidation state. It is expected to behave as :

(A) A chelating agent

(B) A central metal in a coordination compound

(C) An oxidising agent

(D) A reducing agent

(ix) The human body does not produce :

(A) Enzymes

(B) DNA

(C) Vitamins

(D) Hormones

(x) Adenosine is an example of :

(A) Nucleotide

(B) Nucleoside

(C) Purine base

(D) Pyrimidine base

SECTION–B

2 each

VERY SHORT ANSWER TYPE QUESTIONS

2. (i) What is the difference between Rate Law and Law of Mass Action ?

(ii) What is meant by didentate and ambidendate ligands ?

(iii) Why are alcohols less acidic than water ?

(iv) What is diazotisation ?

(v) Write *two* main functions of carbohydrates in plants.

(vi) Write IUPAC names of :

(a) $[CrCl_2(en)(NH_3)_2]^+$

(b) $K_3[Fe(CN)_6]$

(vii) Why molecularity is applicable only for elementary reactions and order is applicable for elementary and as well as complex reactions ?

(viii) How does average rate of reaction differ from instantaneous reaction rate ?

(ix) Why are haloarenes less reactive than haloalkanes towards nucleophilic substitution reactions ?

SECTION–C

3 each

SHORT ANSWER TYPE QUESTIONS

3. (i) Formic acid (methanoic acid) is stronger acid than acetic acid (ethanoic acid). Explain.

(ii) Define conductivity and molar conductivity for the solution of an electrolyte.

(iii) Explain the following about transition metals :

(a) Magnetic behaviour

(b) Oxidation states

(iv) How is potassium dichromate prepared from chromite ore ? Give its three oxidising properties.

(v) Discuss briefly giving an example in each case the role of co-ordination compounds in :

(a) Biological system

(b) Medicinal chemistry

(vi) How will you convert ethyl bromide to :

(a) Ethane

(b) Ethoxyethane

(c) Ethanenitrile ?

(vii) What are phenols ? How do they differ structurally from aromatic alcohols ?

(viii) What is Hinsberg's reagent ? How will you distinguish between primary, secondary and tertiary amines by it ?

(ix) What are α-amino acids ? How are they related to proteins ? Give the structure of two amino acids ?

SECTION–D

5 each

LONG ANSWER TYPE QUESTIONS

4. (i) Define :

(a) Mole fraction

(b) Molality

(c) Molarity

Calculate the mole fraction of ethylene glycol ($C_2H_6O_2$) in a solution containing 20% of $C_2H_6O_2$ by mass.

Or

Define and explain elevation in boiling point. How can you calculate the molecular mass of a non-volatile solute with it ?

(ii) Define Kohlrausch's law. How does it help in :

(a) Calculation of λ° for a weak electrolyte

(b) Degree of dissociation of a weak electrolyte ?

Or

What are fuel cells ? Describe $H_2 - O_2$ fuel cell.

(iii) Describe the following :

(a) Esterification

(b) Cannizzaro reaction

(c) Cross aldol condensation

(d) Decarboxylation

Or

(a) Write *five* methods for the preparation of aldehydes.

(b) How are aldehydes distinguished from ketones using Tollen and Fehling's reagents ? Give chemical reactions.