B–9–Y

Roll No .....

Total No of Questions : 4] [Total No. of Printed Pages : 8

12th ARM(SZ)JKUT2024

1109–Y

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) Molarity of the liquid HCl if density of the solution is 1.17 g/cc is :

(A) 36.5

(B) 18.5

(C) 32.05

(D) 42.10

(ii) Which of the following is a colligative property ?

(A) Boiling point

(B) Freezing point

(C) Osmotic pressure

(D) Vapour pressure

(iii) The potential of hydrogen electrode at pH = 10 is :

(A) 0.59 V

(B) 0.00 V

(C) –0.59 V

(D) –0.059 V

(iv) Rate constant of a reaction (K) is 175 litre^2 mol^{-2} sec^{-1}. What is the order of the reaction ?

(A) First

(B) Second

(C) Third

(D) Zero

(v) The ease of dehydrohalogenation of alkyl halides with alchoholic KOH is :

(A) $3° < 2° < 1°$

(B) $3° > 2° > 1°$

(C) $3° < 2° > 1°$

(D) $3° > 2° < 1°$

(vi) Which of the following compounds can be used as anti-freeze in automobile radiators ?

(A) Methyl alcohol

(B) Ethylene glycol

(C) Nitrophenol

(D) Ethyl alcohol

(vii) Which of the following is the strongest base in aqueous solution ?

(A) Methylamine

(B) Trimethylamine

(C) Aniline

(D) Dimethylamine

(viii) Antibodies are :

(A) Carbohydrate

(B) Proteins

(C) Lipids

(D) Enzymes

(ix) Vitamin A is :

(A) Ascorbic acid

(B) Retinol

(C) Calciferol

(D) Thiamine

(x) The maximum oxidation state of osmium is :

(A) +6

(B) +7

(C) +8

(D) +5

SECTION–B

2 each

VERY SHORT ANSWER TYPE QUESTIONS

2. (i) Activation energy of a reaction is zero. Will the rate constant of the reaction depends on temperature ? Give reason.

(ii) Explain with *two* examples each of the following :

(a) Coordination entity

(b) Coordination number

(iii) Why 1° alcohols are more acidic than 2° alcohols ?

(iv) What is Sandmeyers reaction ?

(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.