Code: A-C223123-M	**I Semester Exam – 2024-25**	4 x 790
Std.: XII	Sub: Chemistry	Marks: 70
Date:	Roll No.: _____	Time: 3 hr.

General Introduction :

The question paper is divided into 4 section.

1. Section-A : Q.No. 1 contains Ten multiple choice type of questions carrying one mark each.
   Q.No. 2 contains Eight very short answer type of questions carrying one mark each.
2. Section-B : Q.No. 3 to Q.No. 14 are Twelve short answer type of questions carrying Two marks each. (Attempt any Eight).
3. Section-C : Q.No.15 to Q.No. 26 are Twelve short answer type of questions carrying Three marks each. (Attempt any Eight).
4. Section-D : Q.No. 27 to Q.No.31 are Five long answer type of questions carrying Four marks each. (Attempt any Three).
5. Use of log table is allowed. Use of calculator is not allowed.
6. Figures to the right indicate full marks.
7. For each Multiple Choice type Question, it is mandatory to write the correct answer along with its alphabet.
   e.g. (a) ...../ (b) ...../ (c) ...../ (d) ....., etc.
   No marks shall be given, if ONLY the correct answer or the alphabet of the correct answer is written.
   Only the first attempt will be considered for evaluation.

Section A

Q.1. Select and write the correct answer for the following multiple choice type of questions. **(10)**

i) _____ is an extensive property among the following.
   A) Viscosity B) Pressure
   D) Melting point C) Heat Capacity

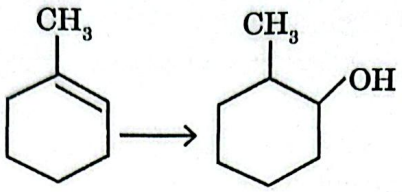
ii) Units of Henry's law constant are _____ .
   A) bar dm^3 mol^{-1} B) mol L^{-1} bar $^{-1}$
   C) L mol^{-1} bar^{-1} D) bar L^{-1} mol^{-1}

iii) The conjugate base of $[Zn(H_2O)_4]^{2(+)}$ is _____
   A) $[Zn(H_2O)_4]^{2(-)}NH_3$ B) $[Zn(H_2O)_3]^{2(-)}$
   C) $[Zn(H_2O)_3OH]^{(+)}$ D) $[Zn(H_2O)H]^{3(+)}$

iv) Two solutions have the ratio of their concentrations 0.4 and ratio of their conductivities 0.216. The ratio of their molar conductivities will be _____
   A) 0.54 B) 11.574
   C) 0.0864 D) 1.852

P.T.O.

v) _____ is the best reagent for carrying out the following conversion.



A) $LiAlH_4$ B) Conc. H_2SO_4, H_2O

C) H_2 / Pd D) B_2H_6, H_2O_2, NaOH

vi) The best method for preparation of alkl fluorides is _____

A) Finkelstein reaction B) Swartz reaction

C) Free radical fluorination D) Sandmeyer's reaction

vii) Diborane reduces _____

A) ester group B) nitro group

C) halo group D) acid group

viii) _____ among the following has highest basic strength.

A) Trimethylamine B) Methylamine

C) Ammonia D) Dimethylamine

ix) Benzaldehyde does NOT show positive test with _____ .

A) Schiff reagent B) Tollen's reagent

C) Sodium bisulphite solution D) Fehling solution

x) Bond Enthalpies of H – H, Cl – Cl and H – Cl bond are 434 KJ mol^{-1}, 242 KJ mol^{-1} and 431 KJ mol^{-1} respectively. Enthalpy of formation of HCl is _____ .

A) 245 KJ mol^{-1} B) –93 KJ mol^{-1}

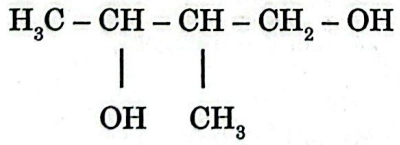
C) –245 KJ mol^{-1} D) 93 K J mol^{-1}

Q.2 Answer the following questions. (8)

i) State Raolt's law for a solution containing a non volatile solute.

ii) Write an expression which defines Gibb's energy.

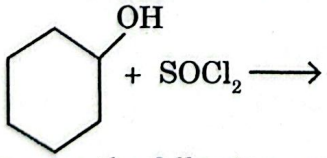
iii) Write IUPAC name of the following



iv) The dissociation of H_2S is suppressed in presence of HCl. Name the phenomenon.

v) What is a cell constant ?

vi) Write structure and IUPAC name of product in the following reaction.



vii) Arrange the following amines in increasing order of boiling points. n-propylamine ethylmethyl amine and trimethyl amine.

viii) Draw the structure of 2–Hydroxy benzoic acid.

Section B

Attempt any Eight of the following questions. **(16)**

Q.3 Derive the mathematical expression between molar mass of a non-volatile solute and elevation of boiling point.

Q.4 Distinguish between isothermal process and adiabatic process giving 4 points of difference.

Q.5 Derive the relation pH +POH = 14

Q.6 Explain preparation of phenol from chlorobenzene.

Q.7 Write a note on Williamson's Synthesis.

Q.8 What is diazotisation ? Write diazotisation reaction of Aniline.

Q.9 Define i) Enthalpy of fusion ii) Enthalpy of Ionization.

Q.10 Draw neat & labelled diagram of SHE.

Q.11 State and explain Saytzeff's rule with suitable example.

Q.12 Write the following reactions.

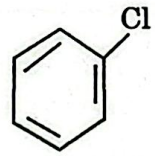
i) Gatterman – koch formylation of arene

ii) Clemmensen reduction of Acetone

Q.13 The solubility product of AgBr is 5.2×10^{-13}. Calculate its solubility in mol dm^{-3}.

Q.14 Complete the following reactions giving major product.

i) $CH_3 - CH = CH_2 \xrightarrow[\text{Peroxide}]{HBr} A \xrightarrow{\text{alc.KOH}} B$

ii)  $\xrightarrow[\textit{dry ether}]{Mg} A \xrightarrow{H_2O} B$

Section C

Attempt any Eight of the following questions. **(24)**

Q.15 Define : i) Isotonic solution

ii) Reverse Osmosis

iii) Van't Hoff factor

Q.16 What is Entropy ? State second law of thermodynamics in terms of Entropy ! State whether Δs is positive, negative or zero for the following reaction.

$2H_2(g) + O_2(g) \longrightarrow 2H_2O_{(l)}$

Q.17 State Hess's law of constant heat summation. Calculate the standard enthalpy of the reaction $SiO_{2(s)} + 3C(\text{graphite}) \longrightarrow SiC(s) + 2CO_{(g)}$ from the following reactions.

i) $Si_{(s)} + O_{2(g)} \longrightarrow SiO_{2(s)}$ $\Delta_r H° = -911$ KJ

ii) $2C(\text{graphite}) + O_{2(g)} \longrightarrow 2CO_{(g)}$, $\Delta_r H° = -221$ kJ

iii) $Si_{(s)} + C(\text{graphite}) \longrightarrow SiC(s)$, $\Delta_r H° = -65.3$ kJ

Q.18 Give the reactions when vapours of primary secondary and tertiary alcohols are passed over hot copper.

Q.19 Explain Gabriel pthalimide synthesis.

Q.20 1.02 g of urea when dissolved in 98.5 g of certain solvent decreases its freezing point by 0.211 k, 1.609 g of unknown compound when dissolved in 86 g of the same solvent depresses the freezing point by 0.34 K. Calculate the molar mass of unknown compound.

Q.21 Derive the relationship between degree of dissociation and dissociation constant in weak electrolytes.

Q.22 Calculate emf of the following cell of 25°C.

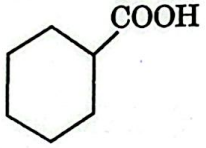
$Zn(s) \mid Zn^{2+}$ (0.08M) $\mid\mid Cr^{3+}$ (0.1M) Cr

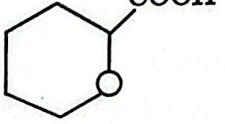
$E°zn = -0.76$ v, $E°cr = -0.74$ v

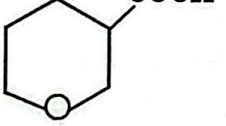
Q.23 Discuss SN^2 Mechanism of methyl bromide using aqueous KOH.

Q.24 What are anode and cathode of $H_2 - O_2$ fuel cell ? Name the electrolyte used in it. Write electrical reactions and net cell reaction taking place in the fuel cell.

Q.25 Arrange the following carboxylic acids with increasing order of their acidic strength and justify your answer.

i) 

ii) 

iii) 

Q.26 Write a note on aldol condensation

Section D

Attempt any Three of the following questions. **(12)**

Q.27 Derive expression for maximum work. Why are colligative properties of electrolyte solutions greater than those of non electrolyte solutions of the same concentration.

Q.28 Give reaction : When phenol is treated with aqueous solution of Bromine.

Give name of electrophile used in Kolbe's reaction.

Give two uses of ether.

Which amide produces ethanamine by

Hofmann Bromamide degradation reaction.

Q.29 i) What is Kohlrausch law of independent migration of ions ? How is it useful in obtaining molar conductivity at zero concentration of weak electrolyte ? Explain with an example.

ii) Write one property of a buffer solution.

Q.30 i) Complete the following reaction sequences by writing the structural formulae of the organic compounds 'A', 'B' & 'C;.

2 – Bromobutane $\xrightarrow{\text{alc. KOH}}$ A $\xrightarrow{Br_2}$ B $\xrightarrow{NaNH_2}$ C

$CH_3-CH(Br)-CH_2-CH_3 \rightarrow CH_3-CH=CH-CH_3 \rightarrow CH_3-CH(Br)-CH(Br)-CH_3 \rightarrow CH_3-C\equiv C-CH_3$

ii) State any two environmental effect of DDT.

Q.31 i) What is the action of the following reagents on toluene ?

a. Alkaline $KMnO_4$, dil.HCl & heat

b. CrO_2Cl_2 in CS_2

c. A cetyl chloride in presence of anhydrous $AlCl_3$

ii) Why cations are Lewis acids ?