Association of Coaching Institutes

Paper Contributor : SNEHA Tuition Classes

Time : 3:00 Hrs. **Max. Marks : 70**

General Instruction:

(1) **Section A: Q.** No. 1 contains **10** multiple choice type of questions carrying **one mark** each.
Q. No. 2 contains **8** very short answer type of questions carrying **one mark** each.

(2) **Section B:** Q.No. 3 to Q. No. 14 are **12** short answer-I type questions carrying **two marks** each.
Attempt any **eight** questions.

(3) **Section C:** Q. No. 15 to Q. No. 26 are **12** short answer-II type questions carrying **three marks** each.

(4) **Section D:** Q. No. 27 to Q. No. 31 are **5** long answer type questions carrying **four marks** each.
Attempt any **three** questions.

2. Use of Logarithm Tables is allowed. Use of a calculator is **not** allowed.

3. Figures to the right indicate full marks.

4. For each MCQ, the correct answer must be written along with its alphabet:
e.g., (a)...../ (b)...../ (c)...../ (d)….

SECTION - A

Q.1. Select and write the correct answers : **(10 Marks)**

(i) Which of the following compound acts as lewis base?

(a) $AlCl_3$ (b) NH_3

(c) HCl (d) H_2O

(ii) Which of the following is an condensation polymer?

(a) Buna-S (b) Teflon (c)Terylene (d) Natural rubber

(iii) Which one of the following is correct order for boiling point of isomeric alkyl amines

(a) $1^o > 2^o > 3^o$ (b) $1^o > 2^o < 3^o$ (c) $1^o < 2^o < 3^o$ (d) $1^o < 2^o > 3^o$

(iv) Formalin is 40% aqueous solution of -

(a) Methanoic acid (b) Methanamine

(c) Methanal (d) Methanol

(v) $A \rightarrow B$ is a first order reaction with rate $6.6 \times 10^{-5} ms^{-1}$ when [A] is 0.6 M, rate constant of the reaction is

(a) $1.1 \times 10^{-5} s^{-1}$ (b) $1.1 \times 10^{-4} s^{-1}$ (c) $9 \times 10^{-5} s^{-1}$ (d) $9 \times 10^{-4} s^{-1}$

(vi) For the reaction: $O_{2(g)} \rightarrow 2O_{2(g)}$

(a) ΔH is positive , ΔS is positive (b) ΔH is positive, ΔS is negative

(c) ΔH is negative, ΔS is negative (d) ΔH is negative, ΔS is positive

(vii) As per Raoult's law, the relative lowering of vapour pressure is equal to the

(a) Mole fraction of solute (b) Mole fraction of solvent

(c) Mole fraction of water (d) None of these

(viii) The radius of A^+ is $0.90A^\circ$ & B^- is $1.80A^\circ$. The coordination number of A^+ is

(a) 4 (b) 6 (c) 8 (d) 2

(ix) which of the following is an Network solid-

(a) Glass (b) CO_2 (c) Graphite (d) NaCl

(x) Which of the following ion has least size

(a) La^{3+} (b) Eu^{3+} (c) Lu^{3+} (d) Gd^{3+}

Q.2 Answer the following **(8 Mark)**

(i) Given the standard electrode potentials

$K^+ / K = -2.93v,\ Ag^+ / Ag = 0.80v, Hg^{2+} / Hg = 0.79v\ Mg^{2+} / Mg = -2.37v, Cr^{3+} / Cr = -0.74v$

Arrange these metals in their increasing order of reducing power.

(ii) Give formuls of dibasic oxyacid of phosphorous?

(iii) Give composition Brass?

(iv) Draw the structure of complex $[Ni(CN)_4]^{2-}$

(v) Complete the following reaction $CH_3 - COOH \xrightarrow{Br_2 / P} ?$

(vi) What is the name of polymer which is also known as orlon?

(vii) Give the mathematical relation between osmotic pressure and molecular mass.

(viii) Give monomers of.

Nylon –6,6, Buna – S,

SECTION – B

Attempt Any Eight **(16 Mark)**

Q.3 Distinguish between crystalline solids &Amorphous solids.

Q.4 Define boiling point. Write the formula to determine molar mass of a solute using freezing point depression method.

Q.5 Write the chemical formula of rust. Calculate ΔG° for the reaction

$Mg_{(s)} + + cu^{2+}{}_{(aq)} \rightarrow Mg^{2+}_{(aq)} + Cu_{(s)}$

Given $E^\circ_{cell} = +2.7v,\ 1F = 96500 C mol^{-1}$

Q.6 The rate constant for a first order reaction is $60s^{-1}$. How much time will it take to reduce the

concentration of the reactant to $\frac{1}{10}$th of it's initial value?

Q.7 Calculate magnetic moments of $Fe^{2+}_{(aq)}$ ion$(Z = 26)$

Q.8 Draw a structure of (i) Permanganate ion & (ii) Dichromate ion .

Q.9 Prepare Ethoxy ethane from (a) Ethyl iodide (b) Ethanol.

Q.10 Write two uses of formaldehyde. Explain the structure of carbonyl functional group.

Q.11 How is ethyl amine prepared from propanamide?

Q.12 Draw structures of (a) Nucleoside (b) Nucleotide

Q.13 What is pH of HCl solution of concentration 10^{-3}M.

Q.14 Draw the structure of Picric acid&Cumene.

SECTION – C

Answer the following questions (Attempt any Eight) (24 Mark)

Q.15 Silver crystallises in FCC structure. If density of silver is $10.51 g cm^{-3}$. Calculate the volume of the unit cell. (Atomic mass of silver (Ag) $= 108 g mol^{-1}$)

Q.16 Calculate ΔH^o for the following reaction

$$2H_3PO_{3(aq)} \longrightarrow B_2O_{3(S)} + 3H_2O_{(l)}$$

Given that,

(a) $H_3PO_{3(aq)} \longrightarrow HBO_{2_{(aq)}} + H_2O_{(l)}, \Delta H^o_1 = -0.02KJ$

(b) $H_2B_4O_{7(s)} \longrightarrow 2B_2O_{3_{(s)}} + H_2O_{(l)}, \Delta H^o_2 = 17.3KJ$

(c) $H_2B_4O_{7(s)} + H_2O_{(l)} \longrightarrow 4HBO_{2_{(aq)}}, \Delta H^o_3 = -11.58KJ$

Q.17 Distinguish between order & molecularity of reaction. Define average rate of reaction.

Q.18 a) Five different forms of iron.

b) Which elements in 3d & 4d series has highest Melting point.

Q.19 Write molecular formulae & structure of the following compounds

(a) Dithionic Acid (b) Dithionous acid (c) Pyrosulphuric acid

Q.20 What is the action of the following reagent on Ethanol?

(a) Conc. H_2SO_4 at 413K (b) Conc. H_2SO_4 at 463K

(c) Na. metal

Q.21 Write the formulae of the following compounds.

(a) Sodium hexanitrito –N- Cobaltate (III)

(b) Tetraaquodichlorochromium (III) chloride

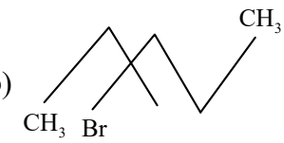
(c) Potassium tetracyanoaurate (III) ion

Q.22 Explain the mechanism of alkaline hydrolysis of tert-butyl bromide.

Q.23 Identify A& B in the following

(a) $CH_3COOH \xrightarrow{Ag} A \xrightarrow{C_2H_5Br} B$

(b)  $\xrightarrow{dry\ ether} A \xrightarrow{H_2O} B$

Identify chiral and achiral molecule – (a) $CH_3 - \underset{\underset{Br}{|}}{CH} - CH_2 - CH_3$ (b) 

Q.24 Predict the products of the following reactions.

(i) $CH_3 - \underset{\underset{CH_3}{|}}{C} = O \xrightarrow[(ii)KOH/\ Glycol\ \Delta]{(i)NH_2-NH_2} ?$

(ii) $C_6H_5 - CO - CH_3 \xrightarrow{NaOH/\ I_2} ?$

(iii) $CH_3COONa \xrightarrow[\Delta]{NaOH/\ CaO} ?$

Q.25 What is the action of Benzene sulphonyl chloride on primary, secondary & tertiary amines?

Q.26 Explain the following terms

(1) Glycoside Linkage (2) Invert sugar (3) Oligosaccharides

SECTION – D

Attempt any Three **(12 Mark)**

Q.27 State Henry's law. Write its one application

Calculate the mass of compound (molar mass $= 256 g mol^{-1}$) to be dissolved in 75 g of benzene to lower its freezing point by 0.48 k ($K_f = 0.512 k\ kg mol^{-1}$) ww

Q.28 Derive an expression for maximum work in isothermal reversible expansion of two moles of an ideal gas.

State third law of thermodynamics. Write application of standard molar entropy.

Q.29 The Ksp of AgCl(4×10^{-10}) is greater than that of $Mg(OH)_2$ (4×10^{-12}). But $Mg(OH)_2$ is more soluble than AgCl why.

Q.30 Give the order of a) Boiling point & b) Acidic nature of hydrides of group 17

Q.31 How is diethyl ether prepared by continuous etherification process? What is metamerism? Write the structure & IUPAC name of methyl- n- propyl ether.

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