Second Year Higher Secondary Model Examination 2024

Chemistry Answer Key

Qn No		Value Points	Scores	Total
		Qn No 1 to 5 (Answer Any 4) 4 × 1 = 4		
1		3	1	
2		Mercury cell / Dry cell	1	
3		Linkage Isomerism	1	4
4		$SOCl_2$	1	
5		Vitamin C	1	
		Qn No 6 to 15 (Answer Any 8) 8 × 2 = 16		
6	i	van't Hoff factor: It is the correction factor introduced for abnormal molar mass calculated by colligative property methods. OR $i = \frac{\text{normal molar mass}}{\text{abnormal molar mass}}$ OR $i = \frac{\text{observed colligative property}}{\text{calculated colligative property}}$ OR $i = \frac{\text{total no. of moles after association or dissociation}}{\text{total no. of moles before association or dissociation}}$	1	2
	ii	$KCl \rightarrow K^+ + Cl^-$ i = 2	1	
7	i	A device which converts chemical energy to electrical energy	1	2
	ii	$Zn|Zn^{2+}|| Cu^{2+}|Cu$	1	
8		Reactions which appear to be of higher order but actually follows first order kinetics are called pseudo first order reactions.	1	2
		eg. Acid hydrolysis of ester, inversion of cane sugar./ equations.	1	
9	i	Concentration of reactants, Temperature, Catalyst(Any two factors)	½+½	2
	ii	Rate equation $r = k[NH_3]^0$ or $r = k$	1	
10	i	Alkyl chlorides or bromides + sodium iodide in dry acetone gives alkyl iodide. Or chemical equation	1	2
	ii	Arylhalides + sodium in the presence of dry ether gives diphenyl or chemical equation	1	
11		Any two differences of S_N1 and S_N2 mechanism	1+1	2
12		On exposure to air in presence of light, chloroform undergoes oxidation to form poisonous carbonyl chloride or phosgene.	2	2
13		step 1: Dilution of molasses- water and enzymes are added for conversion of molasses into fermentable sugar or eqn	1	2
		step 2: molasses is fermented using yeast whereby sugar is converted to ethanol and CO_2 or eqn	1	
		Fermentation of Molasses	1	
14		A- CH_3-OH (Methanol)	1	2
		B- H-COONa(sodium formate)	1	
15	i	Benzene sulphonyl chloride ($C_6H_5SO_2Cl$)	1	2
	ii	Primary amines react with Hinsberg reagent to form alkyl benzene sulphonamide which is soluble in alkali.	1	

Qn No		Value Points	Scores	Total
		Qn No 16 to 26 (Answer Any 8) 8 × 3 = 24		
16	i	The extra pressure that must be applied on the solution side to just stop osmosis.	1	3
	ii	When a pressure greater than osmotic pressure is applied on the solution side, the direction of osmosis is reversed. Application :Desalination of seawater.	1 / 1	
17	i	The conductivity of all ions produced by dissolving 1 mole of an electrolyte in water. $\Lambda_m = \frac{1000K}{M}$	1	3
	ii		1	
	iii	Debye-Huckel-Onsager equation $\Lambda_m = \Lambda_m^0 - A\sqrt{C}$	1	
18	i	$t_{1/2} = \frac{0.693}{k} = \frac{0.693}{5.5 \times 10^{-14}} = 1.26 \times 10^{13}$	½+1+½	3
	ii	$mol^{1-n} L^{n-1} s^{-1}$ $mol^{-1} L s^{-1}$	½ / 1	
19	i	Due to d- d transition	1	3
	ii	$\mu = \sqrt{n(n+2)}$ $\mu = \sqrt{5(5+2)} = 5.92 BM$	1 / 1	
20		Step1:Chromite ore + Na_2CO_3 + $O_2 \rightarrow$ sodium chromate	1	3
		Step 2: Sodium chromate + $H_2SO_4 \rightarrow$ sodium dichromate	1	
		Step 3: Sodium dichromate + KCl $\rightarrow$ potassium dichromate	1	
21	i	Tetraamminedichloridocobalt(III) chloride	1	3
	ii		1	
	iii	cis isomer	1	
22	i	Double salt dissociate completely into component salts or ions in solutions. While in coordination compounds,the complex ion almost does not dissociate.or any one example of each	1	3
	ii	A bidentate or polydentate ligand having two or more donor atoms attached to the same central metal ion and forms ring structure.	1	
	iii	Ethane-1,2-diamine(ethylene diamine/ en), oxalate ion or any two examples for bidentate ligand	1	
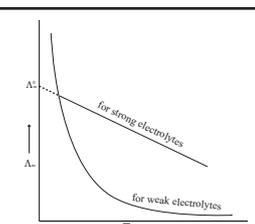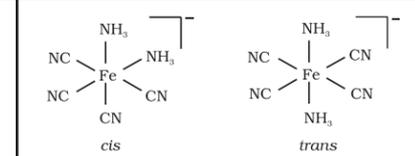
Qn No		Value Points	Scores	Total
23	i	Higher boiling point of alcohol is due to their ability to form inter molecular hydrogen bond.	1	3
	ii	Phenols ionise in aqueous solution to give phenoxide ions. Both phenol and phenoxide ions are resonance stabilized, but phenoxide ion is more stabilized than phenol. Or sp^2 hybridized state of carbon in phenols.	1 1	
	iii	Alkoxy group in ethers increases the electron density at ortho and para positions of the benzene ring due to +R effect.	1	
24	i	Presence of two alkyl groups on ketone decreases the positive charge on carbonyl group due to +I effect. In aldehyde there is +I effect of one alkyl group only. OR It is due to electronic and steric factors which is favourable for aldehyde	1	3
	ii	Clemmensen reduction OR Wolff-Kishner reduction	1	
	iii	Alcohols react with carboxylic acids and their derivatives in presence of a few drops mineral acid to form esters $CH_3COOH + C_2H_5OH \xrightarrow{H_3O^+}$ $CH_3COOC_2H_5 + H_2O$	1 1	
25	i	Aniline is subjected to diazotisation. Then Sandmeyer's reaction or Gattermann reaction is carried on benzene diazonium chloride. Or chemical equations	2	3
	ii	Acid amides on reaction with bromine in presence of alkali gives primary amine having one carbon atom less than the parent amide or equation or chemical equation.	1	
26	i	Amino acids which the human body cannot synthesise are called essential amino acids and these must be supplied through diet. eg: valine,leucine or any two	1 ½+½	3
	ii	Globular Protein: Insulin,albumin (any one) Fibrous Protein : keratin,myosin (any one)	½ ½	

Qn No 27 to 31 (Answer Any 4) 4 × 4 = 16

| 27 | i | Solutions which do not obey Raoult's law for all concentration and temperature ranges. | 1 | 4 |
| | ii | Solvent-solute(A-B)interactions are stronger than solvent-solvent(A-A) and solute-solute(B-B) interactions.Example: Ethanol and acetone , Acetone and carbondisulphide etc (any one)
 | 1

1 | |

28	iii	Solutions which boil at lower temperature than the boiling point of either component. It is shown by non-ideal solutions with positive deviation. Eg. for minimum boiling azeotrope	1	
	i	The limiting molar conductivity of an electrolyte is the sum of the limiting molar conductivity of anion and cation. Applications a) Calculation of degree of dissociation, b) Calculation of dissociation constant. c) Calculation of molar conductivity of weak electrolytes. (any one)	1 1	4
	ii	$\Lambda_M = \dfrac{1000\kappa}{M}$ $\Lambda_M = \dfrac{1000 \times 0.01148}{0.05} = 229.6 Scm^2mol^{-1}$	1 1	
29	i	Ni is in the +2 oxidation state i.e., in d^8 configuration. There are four CN^- ions. Thus, it can either have a tetrahedral geometry or square planar geometry. Since CN^- ion is a strong field ligand, it causes the pairing of unpaired 3d electrons. It now undergoes dsp^2 hybridization. Since all electrons are paired, it is diamagnetic. In case of $[NiCl_4]^{2-}$, Cl^- ion is a weak field ligand. Therefore, it does not lead to the pairing of unpaired 3d electrons. Therefore, it undergoes sp^3 hybridization. Since there are 2 unpaired electrons in this case, it is paramagnetic in nature.	1 ½ 1 ½	4
	ii		1	
30	i	Lucas Test: Anhydrous $ZnCl_2$ in HCl is called Lucas reagent. With Lucas reagent, Tertiary alcohol gives sudden turbidity Secondary alcohol gives turbidity in few minutes. Primary alcohol gives turbidity only on heating	1 ½	4
	ii		1 ½	
	iii	Benzoquinone or structure	1	
31	i	CH_3-CHCl-COOH (2- chloropropanoic acid)	1	4
	ii	CH_3-CHCl-COOH is more acidic than CH_3-CH_2-COOH. It is due to electron withdrawing effect of Cl.	1	
	iii	Reaction of ethanal/acetaldehyde with Grignard reagent followed by hydrolysis 	2	