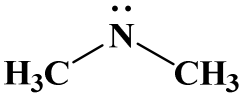
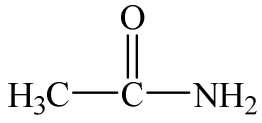
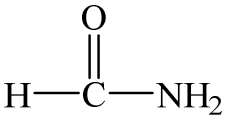
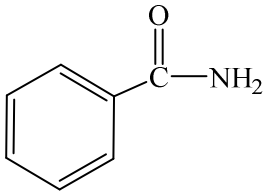
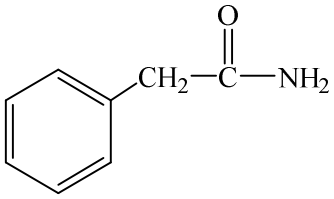
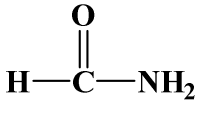
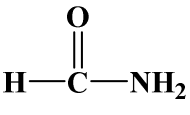
KARNATAKA SCHOOL EXAMINATION & ASSESSMENT BOARD

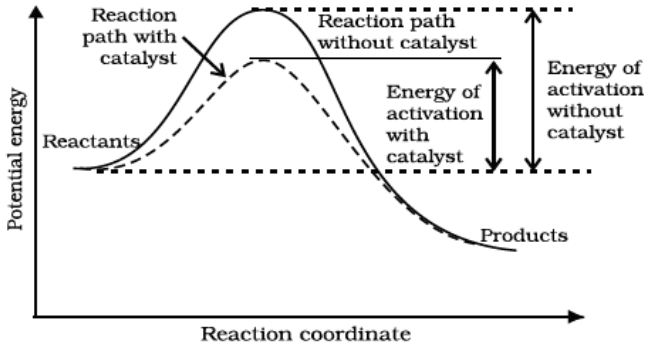
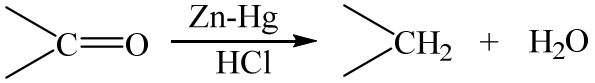
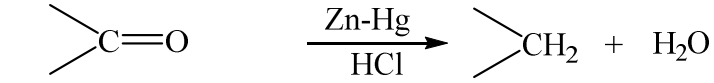
II PUC EXAMINATION – 2; MAY – 2024

SUBJECT: CHEMISTRY **MODEL ANSWERS** **SUBJECT CODE: 34**

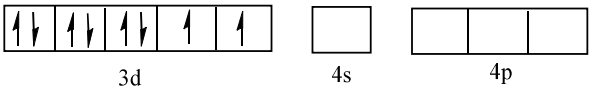
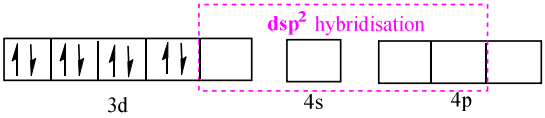
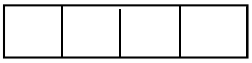
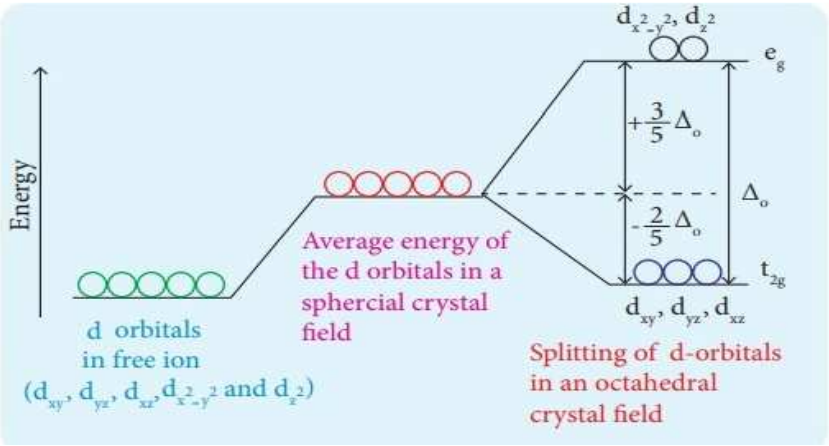
	PART-A	
I.	**Select the correct option from the given choices:** **15 × 1=15**	
1)	To determine molar mass of Biomolecules and Polymers, which Colligative property based method has advantage over other methods? (a) Relative lowering of vapour pressure (b) Elevation of Boiling point (c) Depression in freezing point (d) Osmotic pressure	
Ans:	**(d) Osmotic pressure (or) (d) (or) Osmotic pressure**	**1**
2)	The S.I. unit of conductivity is (a) Sm^{-1} (b) ms^{-1} (c) Sm^{-2} (d) Sm^{2}	
Ans:	**(a) Sm^{-1} (or) (a) (or) Sm^{-1}**	**1**
3)	Which of the following electrolytes limiting molar conductivity (λ_m°) cannot be determined by extrapolation of λ_m to Zero Concentration in the graph of λ_m v/s $\sqrt{c}$? (a) NaCl (b) $CaCl_2$ (c) CH_3COOH (d) $MgSO_4$	
Ans:	**(c) CH_3COOH (or) (c) (or) CH_3COOH**	**1**
4)	In a zero order reaction, the rate of reaction is (a) Independent on reactant concentration (b) Depends on concentration of reactants (c) Inversely proportional to reactant concentration (d) Depends on concentration of product	
Ans:	**(a) Independent on reactant concentration (or) (a) (or) Independent on reactant concentration**	**1**
5)	Which is less stable among the following? (a) WO_3 (b) MoO_3 (c) CrO_3 (d) WO_3 and MoO_3	
Ans:	**(c) CrO_3 (or) (c) (or) CrO_3**	**1**
6)	The correct IUPAC name of $K_2[Zn(OH)_4]$ (a) Potassium tetrahydroxidozincate (II) (b) Dipotassium tetrahydroxyzinc (II) (c) Potassium tetrahydroxyzinc (IV) (d) Potassium tetrahydroxyzincate (II)	
Ans:	**(a) Potassium tetrahydroxidozincate (II) (or) (a) (or) Potassium tetrahydroxidozincate (II)**	**1**

7)	The reagent used in Sandmeyer's reaction is (a) CrO_2Cl_2 (b) Zn – Hg (c) Cu_2Cl_2 (d) $H_2/Pd - BaSO_4$	
Ans:	**(c) Cu_2Cl_2 (or) (c) (or) Cu_2Cl_2**	**1**
8)	Catechol is (a)Benzene-1,2-diol (b) Benzene-1,3-diol (c) Benzene-1,4-diol (d) Benzene-1,5-diol	
Ans:	**(a)Benzene-1,2-diol (or) (a) (or) Benzene-1,2-diol**	**1**
9)	$H_2C{=}CH{-}CH_2{-}OH$ is an example of (a) Allylic alcohol (b) Vinyl alcohol (c) Benzylic alcohol (d) Phenols	
Ans:	**(a) Allylic alcohol (or) (a) (or) Allylic alcohol**	**1**
10)	Rochelle salt is (a) Alkaline sodium potassium tartrate (b) Acidic sodium potassium tartrate (c) Neutral sodium potassium tartrate (d) Aqueous potassium tartrate	
Ans:	**(a) Alkaline sodium potassium tartrate (or) (a)** **(or) Alkaline sodium potassium tartrate**	**1**
11)	Carboxylic acids are more acidic than phenols because (a) Carboxylate ion has non-equivalent resonance structure (b) Carboxylate ion is more stabilized than phenoxide ion (c) Phenoxide ion is more stabilized than carboxylate ion (d) Phenol has less pKa than Carboxylic acid	
Ans:	**(b) Carboxylate ion is more stabilized than phenoxide ion (or) (b)** **(or) Carboxylate ion is more stabilized than phenoxide ion**	**1**
12)	The bond angle in  is less than 109.5^o due to (a) sp^2 hybridisation of N-atom (b) Presence of unshared pair electrons in 4th orbital of N-atom (c) dsp^2 hybridization of N-atom (d) unpaired electrons of N-atom	
Ans:	**(b) Presence of unshared pair electrons in 4th orbital of N-atom (or) (b)** **(or) Presence of unshared pair electrons in 4th orbital of N-atom** **<u>(Mark should be awarded, if the candidate attempted this question due to missing of a methyl group)</u>**	**1**

13)	Which of the following amides cannot give primary amines by Hoffmann – Bromamide degradation reaction? (a)  (b)  (c)  (d) 	
Ans:	**(b)**  **(or) (b)** **(or)** 	**1**
14)	Which of the following Carbohydrates is also known as invert sugar? (a) Maltose (b) Lactose (c) Sucrose (d) Glucose	
Ans:	**(c) Sucrose (or) (c) (or) Sucrose**	**1**
15)	The vitamin that cannot be stored in our body is (a) Vitamin – A (b) Vitamin – D (c) Vitamin – C (d) Vitamin – K	
Ans:	**(c) Vitamin – C (or) (c) (or) Vitamin – C**	**1**
II.	**Fill in the blanks by choosing the appropriate word from those given in the brackets: [Collision frequency, Methanol, Molarity, Hydrocarbon, Sc^{+3}, Cu]**	**5×1=5**
16)	_____ is number of moles of solute dissolved in one litre of solution.	
Ans:	**Molarity**	**1**
17)	The number of Collisions per second per unit volume of the reaction mixture is called _____.	
Ans:	**Collision frequency**	**1**
18)	Due to the absence of unpaired electron _____ ion is diamagnetic.	
Ans:	**Sc^{+3}**	**1**
19)	In Wurtz reaction, Alkyl halides react with sodium in dry ether to give _____.	
Ans:	**Hydrocarbon**	**1**
20)	When Methylamine reacts with nitrous acid, it produces _____ with liberation of nitrogen gas.	
Ans:	**Methanol**	**1**

	PART - B	
III.	**Answer any three of the following. Each question carries two marks.**	**3 × 2 = 6**
21) **(i)** **(ii)**	**What happens to solubility of gas in liquid when;** **Pressure is increased** **Temperature is increased**	
Ans (i) (ii)	Solubility increases Solubility decreases	**1** **1**
22)	**Draw a graph of Potential energy Vs reaction Coordinate showing the effect of Catalyst on activation energy.**	
Ans:	 Effect of catalyst on activation energy	**2**
23)	**Write the structures of cis and trans isomers of $[Pt(NH_3)_2Cl_2]$.**	
Ans:		**1+1**
24) **(i)** (ii)	**Complete the following equations:** **$CH_3Br + KCN \longrightarrow$** **$C_2H_5Br + CoF_2 \longrightarrow$**	
Ans:(i) (ii)	CH_3CN **(or)** Methyl cyanide **(or)** Cyanomethane **(or)** acetonitrile **(or)** ethanenitrile C_2H_5F **(or)** Ethyl Fluoride **(or)** Fluoroethane **(Consider only organic product)**	**1** **1**
25)	**Explain Clemmensen reduction reaction.**	
Ans:	The carbonyl group of aldehydes or ketones is reduced to CH_2 group on treatment with zinc-amalgam and concentrated hydrochloric acid.  **(or)**  Aldehyde or Ketone Alkane **(Any Suitable example OR Self-explanatory equation: 2M)**	**1** **1** **(or)** **2**

26)	**Write any two nitrogeneous base commonly found in both RNA and DNA.**	
Ans:	adenine **(or)** (A) **(or)** A guanine **(or)** (G) **(or)** G cytosine **(or)** (C) **(or)** C **(Any Two; 1 mark for each)**	**2**
	PART - C	
IV.	**Answer any three of the following. Each question carries three marks.**	**3 × 3 = 9**
27)	**Write any 3 characteristic properties of interstitial compounds.**	
Ans:	1. They have high melting points than those of pure metals. 2. They are very hard. 3. They retain metallic conductivity. 4. They are chemically inert. **(Any Three; 1 mark for each)**	**3**
28)(a) **(b)** **(i)** **(ii)**	**Name the ore used in the preparation of Potassium dichromate** **Complete the following equations:** $\mathbf{Cr_2O_7^{2-} + 14\,H^+ + 6\,Fe^{2+} \longrightarrow}$ $\mathbf{10\,I^- + 2\,MnO_4^- + 16\,H^+ \longrightarrow}$	
Ans:(a) (b) (i) (ii)	Chromite ore **(or)** $FeCr_2O_4$ **(or)** $FeO.Cr_2O_3$ **(or)** Chrome iron $2\,Cr^{3+} + 6\,Fe^{3+} + 7\,H_2O$ $2\,Mn^{2+} + 8\,H_2O + 5\,I_2$ **(All products should be mentioned with balance)**	**1** **1** **1**
29)(a) **(b)**	**Among Lanthanoids and Actinoids series which series has more radioactive elements?** **Write any two consequences of Lanthanoid contraction.**	
Ans:(a) (b)	Actinoids Consequences: 1. The separation of lanthanoids in pure state becomes difficult. **(or)** Difficulty in separation of lanthanoids due to similar chemical properties. 2. The atomic radii of 3rd row transition series elements are almost similar to that of 2nd row transition series elements. **(or)** The identical radii of Zirconium (Zr) and Hafnium (Hf). 3. The covalent character increases. 4. Basicity decreases. **(Any correct consequences: 1 mark for each)**	**1** **2**
30)	**Write any three postulates of Werner theory of Coordination compounds.**	
Ans:	1. In coordination compounds metals show two types of linkages (valences)-primary and secondary. 2. The primary valences are normally ionisable and are satisfied by negative ions. 3. The secondary valences are non-ionisable. These are satisfied by neutral molecules or negative ions. The secondary valence is equal to the coordination number and is fixed for a metal. 4. The ions/groups bound by the secondary linkages to the metal have characteristic spatial arrangements corresponding to different coordination numbers. **(Any Three; 1 mark for each)**	**3**

31)	**On the basis of Valence Bond Theory (VBT), explain geometry, hybridisation and Magnetic property of $[Ni(CN)_4]^{2-}$ ion [Atomic number of Ni is 28].**	
Ans:	In $[Ni(CN)_4]^{2-}$; the Nickel ion is in +2 oxidation state. Electronic configuration of Ni^{2+}: [Ar] $3d^8\ 4s^0$  When four CN^- ligands approaching central metal ion, rearrangement of electrons takes place.  One d-orbital, one s-orbital and two p-orbitals undergo hybridization to form four dsp^2 hybrid orbitals of Nickel.  Four dsp^2 hybrid orbitals These four hybridised orbitals of Ni^{2+} form four coordinate bonds with cyanide ligands.  Four dsp^2 hybrid orbitals four pair of electrons of cyanide ligand The complex has square planar geometry. diamagnetic because of the absence of unpaired electron. **(or)** **Hybridisation:** dsp^2. **Magnetic property:** Diamagnetic. **Geometry:** Square planar.	**Geometry:** one-mark, **Magnetic property:** one mark; **Explanation:** one mark
32) a) **b)**	**Draw the energy level diagram for the crystal field splitting of d-orbitals in an octahedral crystal field.** **According to crystal field theory, subscript 'g' is not used in energy levels of tetrahedral complexes. Why?**	
Ans: a)	 	**2**
b)	Because tetrahedral complexes lack symmetry (no symmetry **(or)** absence of symmetry) 'g' subscript is not used with energy levels**.**	**1**

V	**Answer any two of the folowing. Each question carries three marks:**	**2 × 3 = 6**
33)	**Write any three differences between ideal and non-ideal solutions.**	

Ans:

	Ideal-solutions	Non-ideal solutions
1	They Obey Raoult's law at all temperature and pressure.	They do not obey Raoult's law.
2	$\Delta H_{mix} = 0$.	$\Delta H_{mix} \neq 0$
3	$\Delta V_{mix} = 0$.	$\Delta V_{mix} \neq 0$.
4	$P_{total} = P_A^0 \chi_A + P_B^0 \chi_B$	$P_{total} \neq P_A^0 \chi_A + P_B^0 \chi_B$
5	Intermolecular attractive forces between A-A, B-B and A-B are same.	Intermolecular attractive forces between A-A, B-B and A-B are not same.
		(Any three; for each 1 mark)

3

34)	**Mention any 3 factors which affect electrolytic (ionic) conductivity.**	

Ans:

1. the nature of the electrolyte added
2. size of the ions produced
3. size of solvated ions
4. the nature of the solvent
5. viscosity of solvent
6. concentration of the electrolyte
7. temperature.

(Any Three; 1 mark for each)

3

35)	**Explain the construction and working of Standard Hydrogen Electrode [SHE].**	

Ans:

Construction: It consists of a platinum foil fitted into a glass tube containing mercury.

The inner glass tube is enclosed in an outer jar that contains an inlet at the top to pass hydrogen gas. The whole apparatus is placed in 1M HCl solution.

1

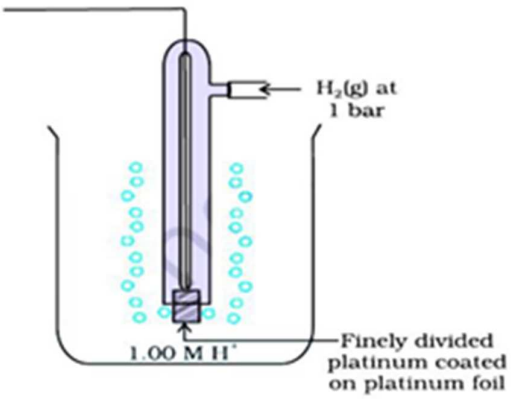
Working: Hydrogen gas passed is adsorbed on platinum surface.

At anode: $\frac{1}{2}H_{2\,(g)} \rightarrow H^+_{(aq)} + e^-$

(or)

At cathode: $H^+_{(aq)} + e^- \rightarrow \frac{1}{2}H_{2\,(g)}$

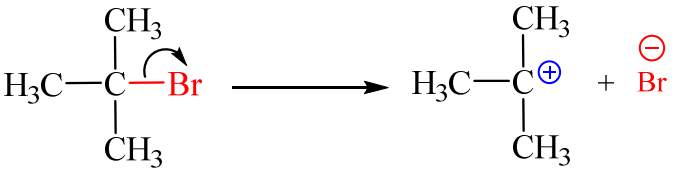
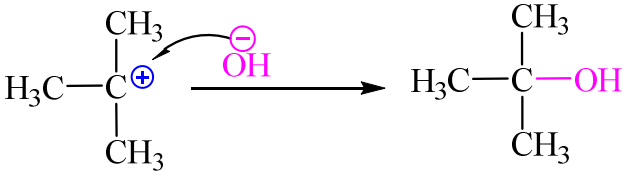
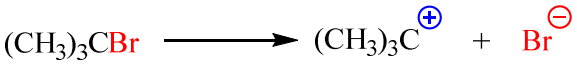
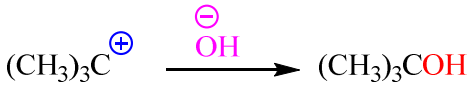
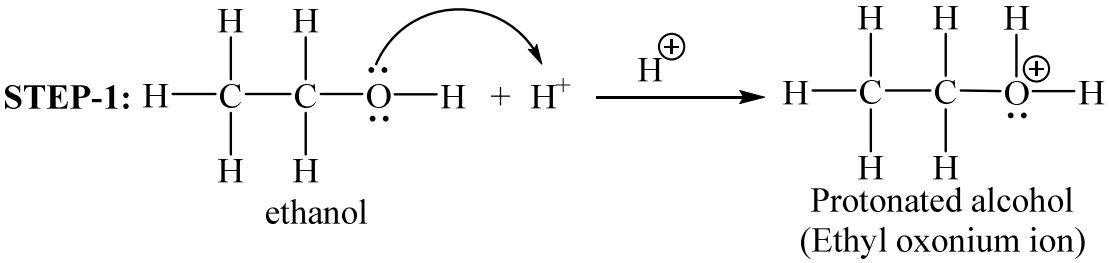
1



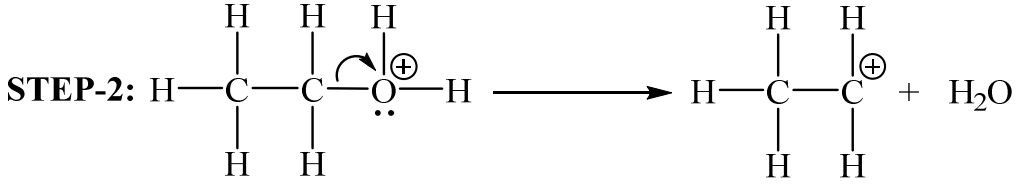
(Any two labelling 1 mark)

1

36)	**Derive Integrated rate equation for the rate constant of first order reaction.**	
Ans:	Consider the general first order reaction R $\rightarrow$ Products $\text{Rate} = \frac{-d[R]}{dt} = k[R]$ (or) $\frac{d[R]}{[R]} = -k.dt$ Integrate on both sides, we get $\ln [R] = -k\,t + I$ When, $t = 0$, then **R** = $[R]_0$ is the initial concentration of the reactant. $\ln [R]_0 = -k \times 0 + I$ $\ln [R]_0 = I$ Substitute the value of I in the above equation. $\ln [R] = -k\,t + \ln [R]_0$ Rearrange, $\ln \frac{[R]}{[R]_0} = -k\,t$ $k = \frac{1}{t} \ln \frac{[R]_0}{[R]}$ **(or)** $k = \frac{2.303}{t} \log \frac{[R]_0}{[R]}$ **(or)** Consider the general first order reaction A $\rightarrow$ Products $\text{Rate} = \frac{-d[A]}{dt} = k[A]$ (or) $\frac{d[A]}{[A]} = -k.dt$ Integrate on both sides, we get Integrate on both sides, we get $\ln [A] = -k\,t + I$ When, $t = 0$, then **A** = $[A]_0$ is the initial concentration of the reactant. $\ln [A]_0 = -k \times 0 + I$ $\ln [A]_0 = I$ Substitute the value of I in above equation. $\ln [A] = -k\,t + \ln [A]_0$ Rearrange, $\ln \frac{[A]}{[A]_0} = -k\,t$ $k = \frac{1}{t} \ln \frac{[A]_0}{[A]}$ **(or)** $k = \frac{2.303}{t} \log \frac{[A]_0}{[A]}$ **(Any correct alternate derivations marks should be awarded)**	**1** **1** **1** **(or)** **1** **1**

	PART - D	
VI.	**Answer any four of the following. Each question carries five marks.**	**4 × 5 = 20**
37)a) **b)**	**Explain the mechanism involved in the conversion of tertiary butyl bromide into tertiary butyl alcohol.** **Haloarenes are less reactive towards nucleophilic substitution reaction. Give any two reasons.**	
Ans: a)	The reaction between tert-butyl bromide and hydroxide ion yields tert-butyl alcohol and follows the first order kinetics (S_N1 mechanism).  **1** **1**  **1** **(or)** **(or)** The reaction between tert-butyl bromide and hydroxide ion yields tert-butyl alcohol and follows the first order kinetics (S_N1 mechanism). **1**  **1**  **1**	
b)	1. Partial double bond character between **C—X**. 2. **X** is bonded to sp^2 hybridized carbon atom. 3. Instability of phenyl carbocation. 4. Because of the possible repulsion, it is less likely for the electron rich nucleophile to approach electron rich arenes. **(Any Two; 1 mark for each)** **2**	
38) a) **b)**	**Explain the mechanism of acid catalysed dehydration of ethanol to ethene.** **Explain Riemer-Tiemann reaction.**	
Ans: a)	**STEP-1:**  ethanol Protonated alcohol (Ethyl oxonium ion) **1**	

STEP-2:



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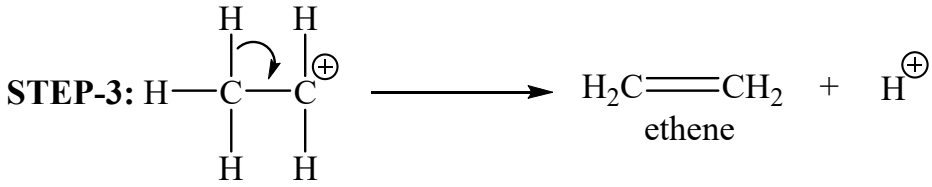
STEP-3:



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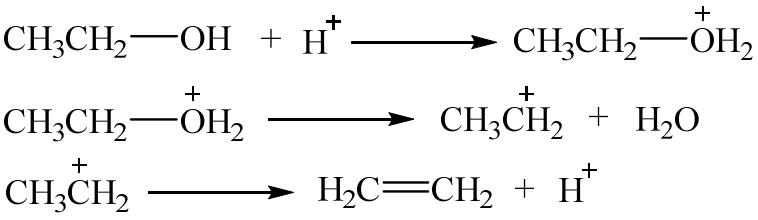
(One mark for each step)

(or)



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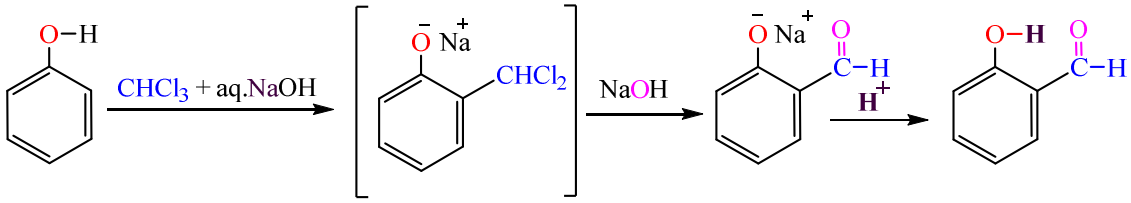
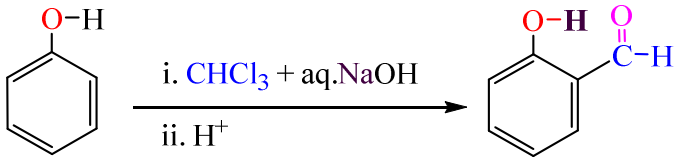
1

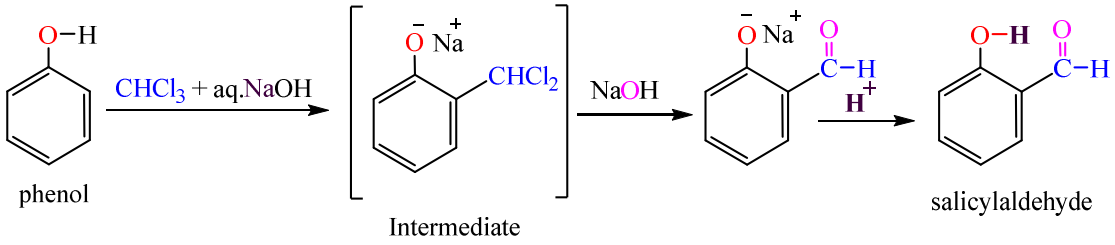
b) On treating phenol with chloroform in the presence of sodium hydroxide, a –CHO group is introduced at ortho position of benzene ring. This reaction is known as Reimer - Tiemann reaction. **1**



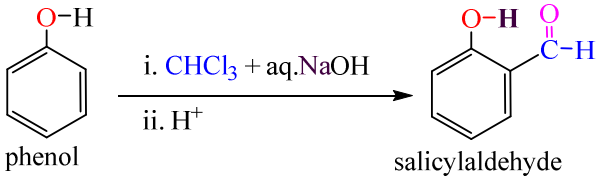
(or) **1**

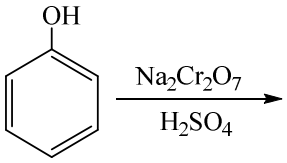
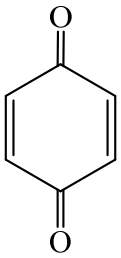


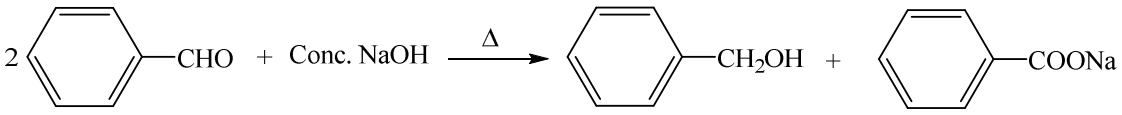
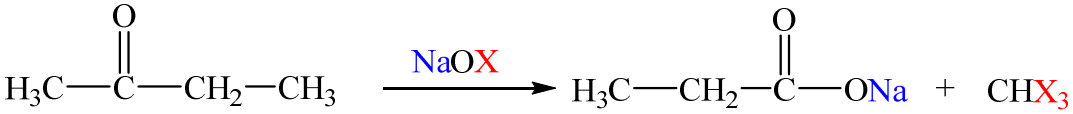
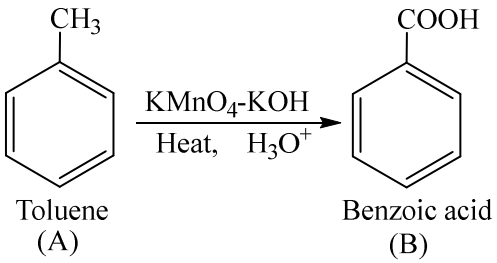
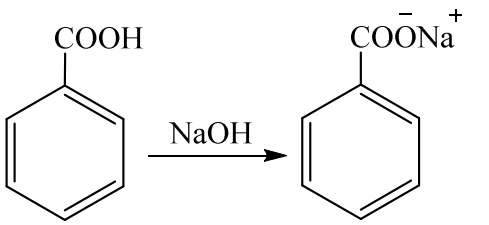
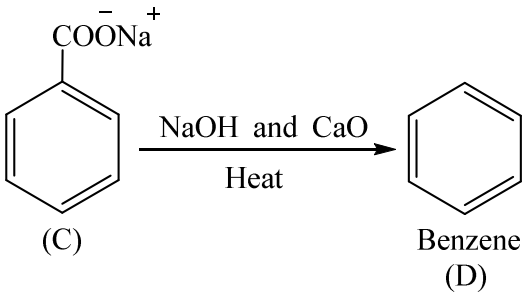
(or) **(or)**

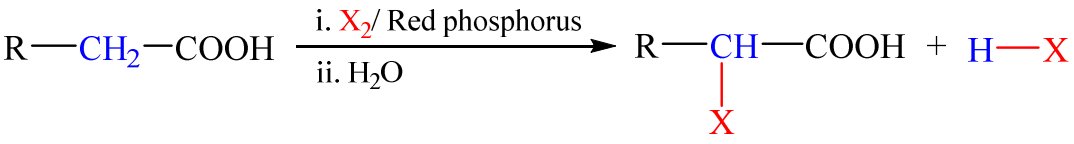
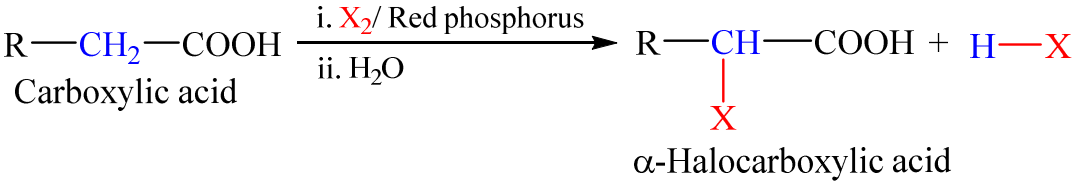
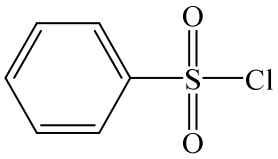
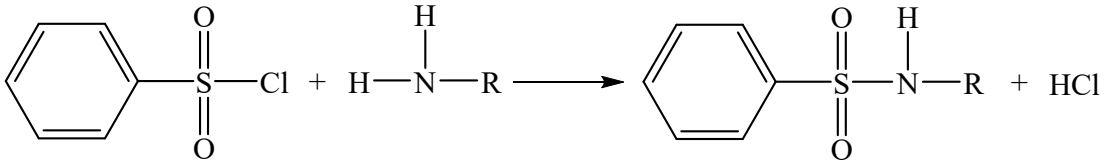
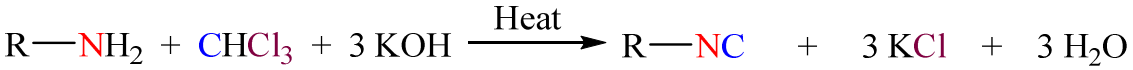
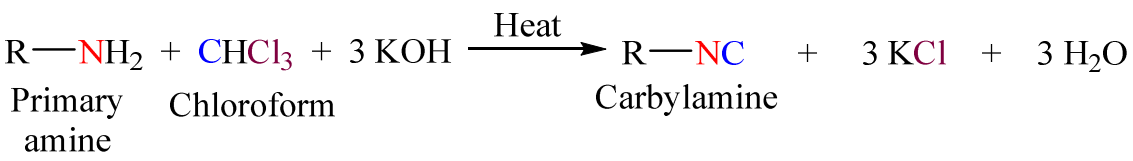


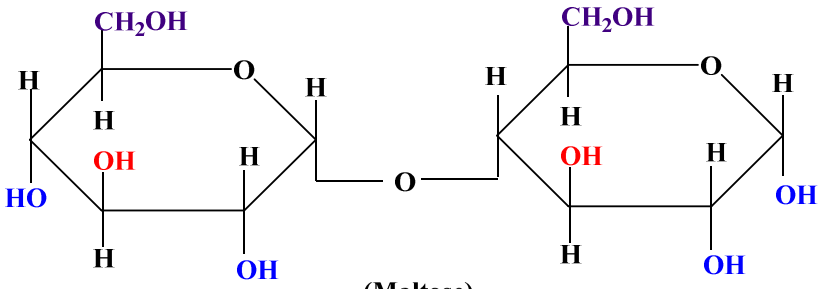
(or) **2**



39) (a)	**Complete the following equations:**	
(i)		
(ii)	$H_3C-CH=CH-CH_2-OH \xrightarrow{PCC}$	
(iii)	$H_3C-C(CH_3)_2-OCH_3 + HI \longrightarrow$	
(b)	**Explain Williamson's reaction for Ether.**	
Ans: (a) (i)	 **(or)** Benzoquinone	**1**
(ii)	$H_3C-CH=CH-C(=O)-H$ **(or)** but-2-enal	**1**
(iii)	$H_3C-C(CH_3)_2-I + CH_3OH$ **(or)** 2-iodo-2-methylpropane (tertiary butyl iodide) and Methanol	**1**
(b)	Alkyl halide and sodium alkoxide react to gives ether. This reaction is called Williamson's ether synthesis.	**1**
	$R-X + R'-ONa \longrightarrow R-O-R' + NaX$	**1**
	(or)	**(or)**
	$R-X + R'-ONa \longrightarrow R-O-R' + NaX$	**2**
	Alkyl halide Sodium alkoxide Ether	
	(or)	
	(Any suitable example; statement 1 mark and equation 1 mark (or) self-explanatory equation 2 mark)	
40) (a)	**Write the chemical equation for the reaction, when benzaldehyde is heated with concentrated alkali. Name the reaction.**	
(b)	**Among butan-2-one and Pentan-3-one which compound is oxidised by sodium hypohalite? Write its chemical equation.**	

Ans: (a)		**2**
	Reaction name: Cannizzaro reaction	**1**
(b)	Butan-2-one is oxidised by sodium hypohalite	**1**
	 (X = Cl, Br and I)	**1**
41 (a)	**An organic compound 'A' (molecular formula C_7H_8) is heated with acidic $KMnO_4$ gives compound 'B' (molecular formula $C_7H_6O_2$). Compound 'B' on reaction with NaOH gives compound 'C'. When compound 'C' is heated with mixture of NaOH and CaO, it gives compound 'D'.** **Write the chemical reactions with names of A, B, C and D.**	
(b)	**Explain Hell-Volhard-Zelinsky (HVZ) reaction with an example.**	
Ans:(a)	 Toluene (A) Benzoic acid (B)	**1**
	 (B) sodium benzoate (C)	**1**
	 (C) Benzene (D) **(Consider only organic product)**	**1**
	(Either reaction (or) name of the product is enough; 1 mark for each reaction (or) 1 mark for each name of the compound)	

(b)	Carboxylic acids having an α-hydrogen are halogenated at the α -position on treatment with halogen in the presence red phosphorus to give α -halocarboxylic acids. This reaction is known as Hell-Volhard Zelinsky (HVZ) reaction.  **(or)**  **(Any suitable example (X=Cl, Br) ; statement 1 mark and equation 1 mark (or) self-explanatory equation 2 mark)**	**1** **1** **(or)** **2**
42) a) **b)** **c)**	**Write the structure of Hinsberg reagent.** **Which type of amines reacts with Hinsberg reagent to give precipitate, which is soluble in NaOH? Write its chemical reaction.** **Explain Carbylamine reaction.**	
Ans:(a)	 	**1**
(b)	Primary amines react with Hinsberg reagent to give precipitate and soluble in NaOH  **(or) (Any suitable example 1 mark)**	**1** **1**
(c)	Aliphatic and aromatic primary amines on heating with chloroform and ethanolic potassium hydroxide form isocyanides or carbylamines This reaction is known as carbylamine reaction.  **(or)**  **(Any suitable example; statement 1 mark and equation 1 mark (or) self-explanatory equation 2 mark)**	**1** **1** **(or)** **2**

43) a)	**Write the Haworth structure of Maltose.**	
b)	**What is denaturation of protein? Which structure of proteins remains intact during denaturation?**	
c)	**Name the iodinated derivative hormone produced in thyroid gland.**	
Ans: a)	 (Maltose)	**2**
b)	The process of loss of biological activity of a protein by heating (changing temperature) or by adding chemical (changing pH) is called denaturation of protein.	**1**
	Primary structure remains intact during denaturation.	**1**
c)	Thyroxine	**1**
	PART – E (Problems)	
VII.	**Answer any three of the following. Each question carries three marks.**	**3 × 3 = 9**
44)	**The boiling point of benzene is 353.23 K when 1.80 g of a non-volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11 K. Calculate the molar mass of the solute (K_b for benzene is 2.53 K Kg mol^{-1}).**	
Ans:	$\Delta T_b = \frac{K_b \times w_2 \times 1000}{w_1 \times M_2}$ (or) $M_2 = \frac{K_b \times w_2 \times 1000}{w_1 \times \Delta T_b}$	**1**
	$= \frac{2.53 \times 1.80 \times 1000}{90 \times 0.88}$	**1**
	$= 57.5 g/mol$ (or) $57.5 g mol^{-1}$	**1**
45)	**Vapour pressure of compound 'A' (molar mass 120 g/mol) and compound 'B' (molar mass 85g/mol) at 298 K are 200 mm Hg and 415 mm Hg respectively. Calculate the vapour pressure of the solution prepared by mixing 26.0 g of compound 'A' and 40 g of compound 'B' at 298 K.**	
Ans:	Mole fraction of compound B$(\chi_B) = \frac{n_B}{n_A + n_B} = \frac{\frac{40}{85}}{\frac{26}{120} + \frac{40}{85}} = \frac{0.47}{0.216 + 0.47} = 0.685$	**1**
	$P_{total} = p_A^0 + (p_B^0 - p_A^0)\chi_B$	**1**
	$= 200 + (415 - 200)\,0.685 = 347.27$ mm Hg	**1**
	(Any alternative method with correct answer and unit marks should be awarded)	

46)	**For a cell in which the following reaction takes place:** **$Mg_{(s)} + 2Ag^{+}_{(0.0001M)} \rightarrow Mg^{2+}_{(0.130M)} + 2Ag_{(s)}$ at 298 K.** **Calculate its E_{cell} if E^{o}_{cell} = 3.17 V and the cell can be written as $Mg|Mg^{2+}_{(0.130M)}||\ Ag^{+}_{(0.0001M)}|Ag$.**	
Ans:	$E_{cell} = E^{o}_{cell} - \frac{0\cdot0591}{n}\log\frac{[Mg^{+2}]}{[Ag^{+}]^2}$ **(or)** $E_{cell} = E^{0}_{cell} - \frac{2.303RT}{nF}\log\frac{\left[Mg^{+2}\right]}{\left[Ag^{+}\right]^2}$ $E_{cell} = 3.17 - \frac{0.059}{2}\log\frac{[0.130]}{[0.0001]^2}$ **(or)** $E_{cell} = 3.17 - \frac{2.303\times8.314\times298}{2\times96487}\log\frac{[0.130]}{[0.0001]^2}$ $E_{cell} = 3.17 - 0.21 = 2.96\,V$	**1** **1** **1**
47)	**The conductivity of 0.001 mol L^{-1} acetic acid is 4.95×10^{-5} S cm^{-1}. Calculate its degree of dissociation. λ_m^{o} for acetic acid is 390.5 S cm^2 mol^{-1}.**	
Ans:	$\lambda_m = \frac{K\times1000}{C}$ $= \frac{4.95\times10^{-5}\times1000}{0.001} = 49.5\ S\,cm^2\,mol^{-1}$ $\alpha = \frac{\lambda_m}{\lambda_m^{0}} = \frac{49.5}{390.5} = 0.1267$	**1** **1** **1**
48)	**A first order reaction takes 40min for 30% decomposition. Calculate $t_{½}$ (half-life period).**	
Ans:	$t = \frac{2.303}{k}\log\frac{[R]_0}{[R]}$ (or) $k = \frac{2.303}{t}\log\frac{[R]_0}{[R]}$ $k = \frac{2.303}{40}\times\log\left[\frac{100}{100-30}\right] = \frac{2.303}{40}\times\log\left[\frac{10}{7}\right] = 8.918\times10^{-3}\,min^{-1}$ **(or)** $1.4\times10^{-4}\ s^{-1}$ $t_{\frac{1}{2}} = \frac{0.693}{k}$ $= \frac{0.693}{8.918\times10^{-3}} = 77.7\,min$ (or) $\cong 4662$ seconds **(Any alternative method with correct answer and unit marks should be awarded)**	**1** **1** **1**

49)	**The rate constants of a reaction at 500K and 700K are $0.02S^{-1}$ and $0.07S^{-1}$ respectively. Calculate the value of E_a.**	
Ans:	$$\log\frac{k_2}{k_1}=\frac{E_a}{2.303R}\left[\frac{T_2-T_1}{T_1T_2}\right]$$	**1**
	$$\log\frac{0.07}{0.02}=\frac{E_a}{2.303\times 8.314}\left[\frac{700-500}{700\times 500}\right] \text{ (or) } E_a=\frac{2.303\times 8.314\times 0.5441\times 700\times 500}{200}$$	**1**
	E_a = 18231 J **(or)** E_a=18.231 kJ **(or)** E_a=18.231 kJ/mol **(Any alternative method with correct answer and unit marks should be awarded)**	**1**

*********END*********