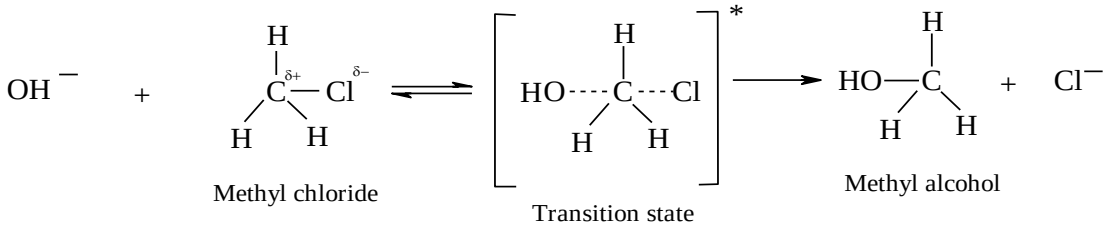
GOVERNMENT OF KARNATAKA
KARNATAKA STATE PRE-UNIVERSITY EDUCATION EXAMINATION BOARD
II YEAR PUC ANNUAL EXAMINATION APRIL/ MAY – 2022

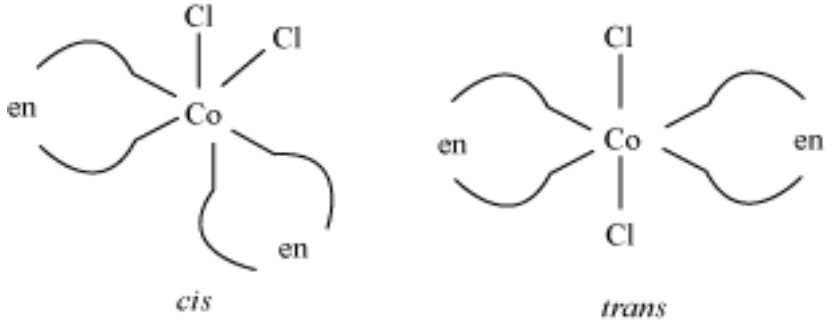
SUBJECT CODE: 34 ***SCHEME OF EVALUATION*** **SUBJECT:** CHEMISTRY

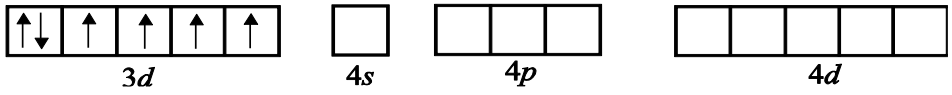
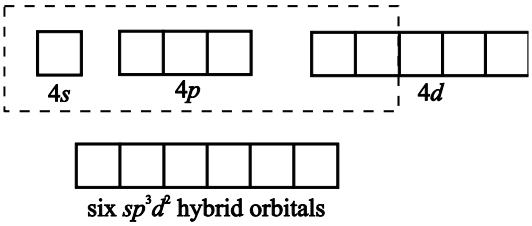
	PART-A	
I.	**ANSWER ANY TEN OF THE FOLLOWING. EACH QUESTION CARRIES 1 MARK.**	**10X1=10**
1)	**Name the type of crystalline solid, which is electrical insulator in solid state but conduct electricity in aqueous solution.**	
Ans:	Ionic Solid **OR** Ionic Crystalline Solid	1
2)	**Mention one practical utility of reverse osmosis.**	
Ans:	Desalination of Sea water.	**1**
3)	**At constant temperature, different gases have different K_H – value. What does this statement suggest?**	
Ans:	K_H is function of the nature of the gas OR K_H depends on the nature of the gas OR Solubility of gas in liquid OR Different gases will have different solubility	**1**
4)	**Give an example for inert electrode.**	
Ans:	Platinum (Pt) electrode **OR** Gold (Au) electrode	**1**
5)	**What is the order of reaction which has rate expression Rate=$K[A]^{-1}[B]^{5/3}$?**	
Ans:	Order = 2/3 or 0.66	**1**
6)	**What is meant by selectivity of a catalyst?**	
Ans:	The ability of a catalyst to direct a reaction to give a particular product is called selectivity of a catalyst.	**1**
7)	**Give an example for heterogeneous catalysis.**	
Ans:	1. Manufacture of ammonia by Haber's process: $N_{2(g)} + 3H_{2(g)} \xrightarrow{Fe\ (s)} 2NH_{3(g)}$ 2. Manufacture of sulphuric acid by Contact process: $2SO_{2\,(g)} + O_{2(g)} \xrightarrow{V_2O_5\ (s)} 2SO_{3\,(g)}$ 3. Manufacture of nitric acid by Ostwald's process. $4NH_{3(g)} + 5O_{2(g)} \xrightarrow[500K,\ 9bar]{Pt/Rh\ gauge\ catalyst} 4NO_{(g)} + 6H_2O_{(g)}$ 4. Manufacture of Sulphuryl chloride: $SO_{2\,(g)} + Cl_{2\,(g)} \xrightarrow{Char\ coal\ (s)} SO_2Cl_{2\,(g)}$ 5. Vegetable $Oil_{(l)} + nH_{2(g)} \xrightarrow{Ni\ (s)}$ Vanaspathi OR Fat OR Vegetable Ghee (Either name or Reaction; For reactions, physical state should be specified).	(Any one correct answer) 1
8)	**Name the method used for concentration of sulphide ore?**	
Ans:	Froth flotation method	**1**

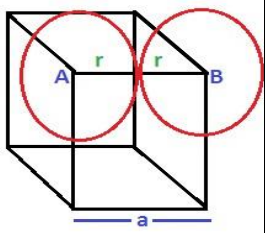
9)	**Which noble gas has lowest boiling point?**	
Ans:	Helium **OR** He	**1**
10)	**Name the transition metal present in bronze alloy?**	
Ans:	Copper **OR** Cu	**1**
11)	**Define the term racemic mixture.**	
Ans:	Equimolar (1:1) mixture of dextrorotatory (d) and leavorotatory (l) isomers. **OR** A mixture containing two enantiomers in equal proportions will have zero optical rotation are known as racemic mixture.	**1**
12)	**Write IUPAC name of $CH_3 – O - C_2H_5$.**	
Ans:	Methoxyethane	**1**
13)	**Aldehydes are more reactive than ketones towards Nucleophilic addition reaction. Give reason.**	
Ans:	Due to steric effect (hindrance) **OR** Electronic effect **OR** Due to steric effect (hindrance) of alkyl groups and decreased electrophilicity of carbonyl carbon due to (+I) inductive effect.	**1**
14)	**What are copolymers?**	
Ans:	Polymers formed by addition polymerisation of more than one type of monomers.	**1**
15)	**Mention the role of Sodium benzoate in food.**	
Ans:	Food preservative OR To avoid spoilage of food.	**1**
	PART - B	
II.	**ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 2 MARKS.**	**5X2=10**
16)	**An element crystallises in Face Centered Cubic (FCC) lattice. The edge length of unit cell is 556pm and density is $1.55 gcm^{-3}$, Calculate the Atomic mass (M) of the element. ($N_A = 6.022 \times 10^{23}$ atoms mol^{-1}).**	
Ans:	$d = \frac{z \cdot M}{a^3 \cdot N_A}$ **OR** $M = \frac{d \times a^3 \times N_A}{Z}$ $= \frac{1.55 \times (556 \times 10^{-10})^3 \times 6.022 \times 10^{23}}{4} = 40.1 gmol^{-1}$ or $40 gmol^{-1}$	**1** **1**
17)	**Define molarity (M). How does molarity vary with temperature?**	
Ans:	The number of moles of solute dissolved in 1 liter (1 dm^3) or 1000 cm^3 of a solution is called molarity. Molarity varies inversely with temperature. **OR** $M \alpha 1/T$ **OR** As the temperature increases, molarity of the solution decreases.	**1** **1**
18)	**Mention any two of applications of Kohlrausch's law.**	
Ans:	1. In the Calculation of molar conductivity at infinite dilution (Λ_0) for weak electrolytes. 2. In the Calculation of Degree of Dissociation (α). 3. In the Calculation of Dissociation Constant (K). (Any Two)	ONE MARK EACH

19)	**What is molar conductance? How is it related to concentration 'C' mol m^{-3} and conductivity 'K' Sm^{-1}?**	
Ans:	Molar conductance is the conductance of all the ions produced in the entire solution which contains one mole of an electrolyte. **OR** Molar conductance is the conductance of the volume of solution containing one mole of electrolyte kept between two electrodes with area of cross section A and distance of unit length. $\Lambda_m = \frac{\kappa}{c}$	**1** **1**
20)	**What is the role of coke in the extraction of zinc from zinc oxide? Write the chemical equation.**	
Ans:	Reducing agent **OR** Coke acts as Reducing agent $ZnO + C \xrightarrow[1673K]{coke} Zn + CO$	**1** **1**
21)	**How do xenon fluorides react with fluoride ion donors like NaF? Give equation.**	
Ans:	Xenon fluorides react with fluoride ion donors like NaF to form Fluoro anions OR anionic species. $XeF_6 + NaF \rightarrow Na^+ [XeF_7]^-$	**1** **1**
22)	**Write S_N2 mechanism of conversion of chloromethane to methanol.**	
Ans:	S_N2 mechanism involves only one step. The nucleophile OH^- attacks electron deficient carbon atom from the back side (rear side) of the carbon atom to form unstable transition state. In the transition state a partial (HO – C) bond is formed and partial C – Cl bond is broken. The product methyl alcohol obtained has inversion configuration. **OR**  Methyl chloride Transition state Methyl alcohol	**(Equation OR Explanation) Any one: 2marks**
23)	**Complete the equation.** $\_\_\_\_ + HNO_2 \xrightarrow{NaNO_2+HCl} [H_3CN_2^+Cl^-] \xrightarrow{H_2O} CH_3OH + \_\_\_\_ + HCl$	
Ans:	CH_3NH_2 & N_2	**1 + 1**
24)	**What are analgesics? Give an example for the Narcotic analgesics.**	
Ans:	The chemicals used to relieve pain or pain killers are called Analgesics. Example: Morphine **OR** Heroin **OR** Codeine	**1** **1**

25)	**Why soap does not work in hard water?**	**Explanation without equation:** 2Marks **& Only Equation:** 1Mark
Ans:	Hard water contains calcium and magnesium ions. When soaps are dissolved in hard water, these ions displace sodium or potassium ions from their salts and form insoluble calcium or magnesium salts of fatty acids. These insoluble salts separate as scum. $2C_{17}H_{35}COONa + CaCl_2 \longrightarrow 2NaCl + (C_{17}H_{35}COO)_2\ Ca$ Soap → Insoluble calcium stearate (scum)	
	PART - C	
III.	**ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 3 MARKS.**	**5X3=15**
26) **a)** **b)** **c)**	**In the extraction of Aluminium by Hall – Heroult process,** **Write overall cell reaction.** **What is the role of Na_3AlF_6?** **On which electrode Aluminium metal deposits.**	
Ans: a)	Overall Cell Reaction: $2Al_2O_3 + 3C \longrightarrow 4Al + 3CO_2$	**1**
b)	Cryolite (Na_3AlF_6) acts as 1. Electrolyte 2. Increases the conductivity 3. Lowers the melting point of mixture. (Any One)	**1**
c)	Cathode.	**1**
27)	**Write the chemical equations with necessary conditions Involved in the manufacture of Nitric acid by Ostwald's process.**	
Ans:	$4NH_3(g) + 5O_2(g) \xrightarrow[500\ K,\ 9\ bar]{Pt/Rh\ gauze\ catalyst} 4NO(g) + 6H_2O(l)$ (from air) $2NO_{(g)} + O_{2(g)} \longrightarrow 2NO_{2(g)}$ $3NO_{2(g)} + H_2O_{(l)} \longrightarrow 2HNO_{3(aq)} + NO_{(g)}$	**1** **1** **1** Physical states are not compulsory
28) **a)** **b)** **c)**	**Complete the following equation:** **$CaO + H_2O \rightarrow$** **$SO_2 + H_2O \rightarrow$** **$Na_2SO_3 + H_2O + SO_2 \rightarrow$**	
Ans: a)	$Ca(OH)_2$ OR Calcium hydroxide.	**1**
b)	H_2SO_3 OR Sulphurous acid	**1**
c)	$2NaHSO_3$ OR Sodium hydrogen sulphite	**1**
29. a) **b)**	**How is Chlorine prepared in laboratory using $KMnO_4$?** **Chlorine water on standing loses yellow colour.**	
Ans: a)	Chlorine gas is prepared by the action of dil HCl on potassium permanganate. $2KMnO_4 + 16HCl \rightarrow 2KCl + 2MnCl_2 + 8H_2O + 5Cl_2$.	**1** **1**
b)	Due to formation of hydrogen chloride (HCl) and hypochlorous acid (HOCl).	**1**

30. a) **b)**	**Calculate spin only magnetic moment of ferric ion. [Given: atomic number of iron is 26]** **Between Sc^{+3} and Cu^{+2} ions, which is colourless?**		Formula: 1Mark; Substitution with final value: 1Mark
Ans: a)	Fe (Z= 26, $3d^6,4s^2$) ⟶ Fe^{3+} ([Ar]$3d^5$ $4s^o$), Hence it has 5 unpaired electrons i.e., n=5 $\boldsymbol{\mu = \sqrt{n(n+2)}}$ BM $\mu = \sqrt{\mathbf{5(5+2)}}$ = √35 = 5.91BM	**1** **1**	
b)	Sc^{+3} ion is colorless **OR** Sc^{+3}.	**1**	
31)	**Write the balanced chemical equations involved in the manufacture of $K_2Cr_2O_7$ from chromite ore.**		
Ans:	$4\ FeCr_2O_4 + 8\ Na_2CO_3 + 7\ O_2 \rightarrow 8\ Na_2CrO_4 + 2\ Fe_2O_3 + 8\ CO_2$ $2Na_2CrO_4 + H_2SO_4 \rightarrow Na_2Cr_2O_7 + Na_2SO_4 + H_2O$ OR $2Na_2CrO_4 + 2H^+ \rightarrow Na_2Cr_2O_7 + 2Na^+ + H_2O$ $Na_2Cr_2O_7 + 2KCl \rightarrow K_2Cr_2O_7 + 2NaCl$	**1** **1** **1**	
32)	**What is Lanthanoid contraction? Mention any two consequences of it.**		
Ans:	The overall decrease in atomic radii and ionic radii from lanthanum to lutetium (across lanthanoids) is called Lanthanoid contraction. Consequences: 1. The radii of 3rd row transition series elements (metals) are almost similar to that of 2nd row transition series elements. **OR** The identical radii of Zirconium (Zr) and Hofnium (Hf). 2. The separation of lanthanoids in pure state becomes difficult. 3. Basicity of lanthanoids decreases 4. Covalent character increases. (Any two)	**1** **1 + 1**	
33)	**Write the geometrical isomeric structures of $[Co(en)_2Cl_2]$. What is the coordination number of Cobalt in this complex?**		
Ans:	The geometrical isomeric structures of $[Co(en)_2Cl_2]$ are  *cis* *trans* Six **OR** '6' **OR** The coordination number of Cobalt in this complex is six **OR** '6'.	**1 + 1** **1**	

34)	**Using Valence Bond Theory [VBT], explain geometry, hybridisation and magnetic property of $[CoF_6]^{-3}$ ion. [Atomic number of Cobalt is 27].**		
Ans:	In this complex, the oxidation state of Cobalt is +3. F^- ion provides a weak ligand field. The electronic configuration of Cobalt in +3 oxidation state is $[Ar]3d^6 4s^0$.  one 4s, three 4p & two outer 4d-orbitals hybridised to yield six sp^3d^2 hybrid orbitals pointing towards the six corners of an octahedron.  These hybridised orbitals of Co^{3+} ion overlap with orbitals of F^- ligands and forms six coordinate bonds between Co^{+3} & F^- ligand. Six sp^3d^2 hybrid orbitals with six pairs of electrons from F^- ligands:  Thus, the complex has octahedral geometry. This complex is paramagnetic due to presence of unpaired electrons. Hybridisation: sp^3d^2; Geometry: Octahedral; Magnetic property: Paramagnetic due to presence of unpaired electrons.	**1** **1** **1**	**No explanation: 2marks; With explanation: 3marks**
35)	**What are Heteroleptic complexes? Give an example.** **If Δ_0 < P, on the basis of Crystal Field Theory [CFT], write the electronic configuration of d^4- ion in octahedral complexes.**		
Ans:	Complexes in which the central metal atom or ion is bound to more than one kind of donor groups or ligands are called heteroleptic complexes. Example: $[Pt(NH_3)_2Cl_2]$, $[Co(NH_3)_4Cl_2]^+$, $[NiCl_2(H_2O)_4]$, $[Co(NH_3)_3(NO_2)_3]$ (Any one correct example) $\mathbf{t_{2g}^3\ e_g^1}$	**1** **1** **1**	
	PART - D		
IV.	**ANSWER ANY THREE OF THE FOLLOWING. EACH QUESTION CARRIES 5 MARKS.**	**3X5=15**	
36) a) **b)**	**Calculate the packing efficiency in simple cubic crystal lattice.** **Calculate the number of particles (atoms) per unit cell in Body Centred Cubic (BCC) crystal Lattice.**		

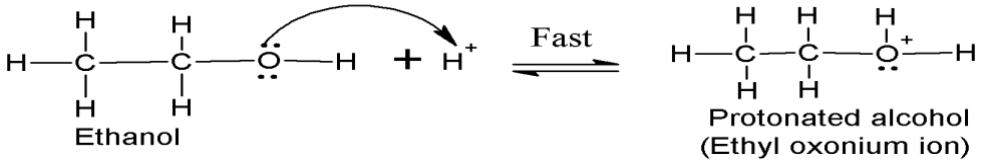
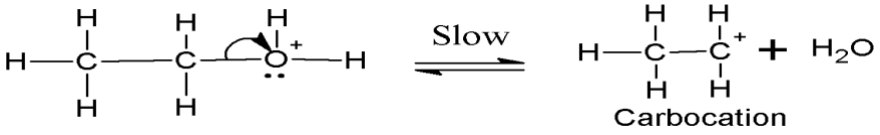
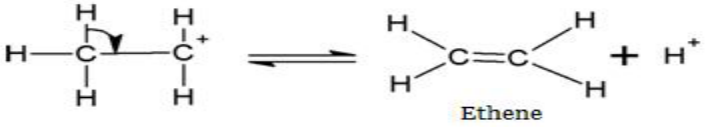
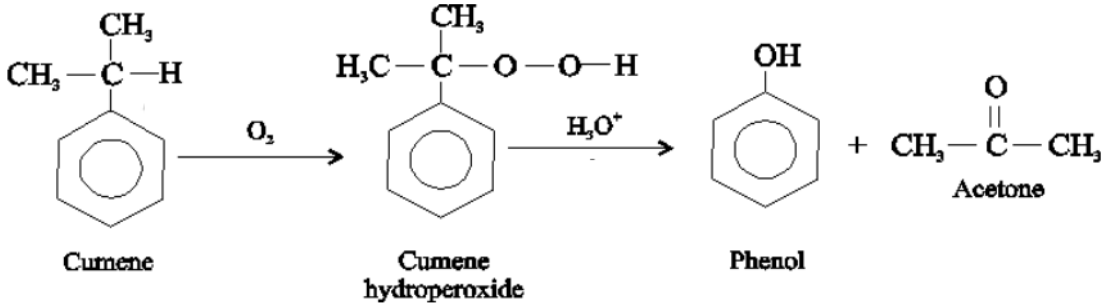
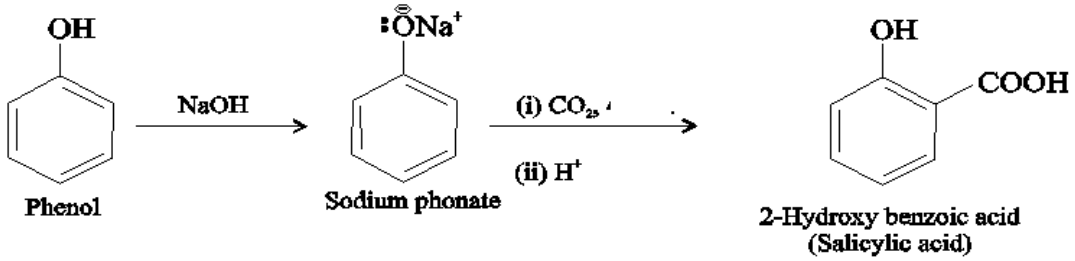
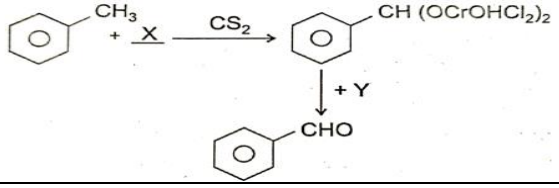
Ans: a)		The edge length or side of the cube 'a' and the radius of each sphere (particle) 'r' are related as ***a* = 2*r*** Total volume of the unit cell = $a^3 = (2r)^3 = 8r^3$ Since a simple cubic unit cell contains only 1 atom. The volume of one sphere = $\frac{4}{3}\pi r^3$	**1**
		$\therefore \text{Packing efficiency} = \frac{\text{Volume of one sphere (atom)}}{\text{Total volume of the unit cell}} \times 100\%$	**1**
		$\text{Packing efficiency} = \frac{\frac{4}{3}\pi r^3}{8r^3} \times 100 = \frac{\pi}{6} \times 100 = 52.4\%$	**1**
b)		BCC unit cell contains 8 corner atoms and 1 atom at the body centre. Contribution of corner atom to the unit cell is $\frac{1}{8}$ Contribution of body atom to the unit cell is 1 Total number of particles (atoms) per unit cell in BCC = $(8 \times \frac{1}{8}) + (1X1)$ = 1 + 1 = 2 atoms. **OR** Number of particles (atoms) per unit cell in BCC = = 8 particles at the corners +1 particle at body centred atom = $(8 \times \frac{1}{8}) + (1X1)$ = 1 + 1 = 2 atoms.	**1** **1** **OR** **1** **1**
37) a) **b)**		**On dissolving 3.46g of solute in 100g of water, the boiling point of solution was raised to that of pure water by 0.12K. Calculate the molar mass of the non–volatile solute. (Given: K_b of water is 0.51Kkgmol^{-1})** **What type of deviation from Raoult's law is observed When equal volume of ethanol and acetone are mixed? Mention the reason for it.**	

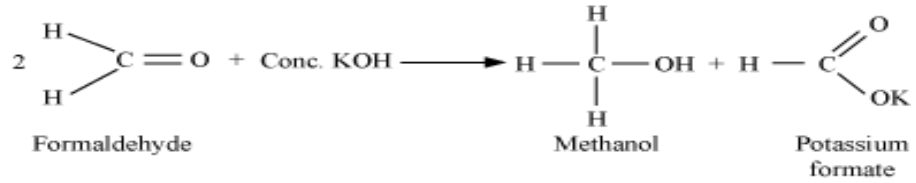
Ans: a)	$M_2 = \frac{1000 \times k_b \times W_2}{\Delta T_b \times W_1}$ OR $M_B = \frac{1000 \times k_b \times W_B}{\Delta T_b \times W_A}$	**1**
	$M_2 = \frac{1000 \text{ X } 0.51 \text{ X } 3.46}{0.12 \text{ X } 100}$	**1**
	$M_2 = 147.05 \text{gmol}^{-1}$	**1**

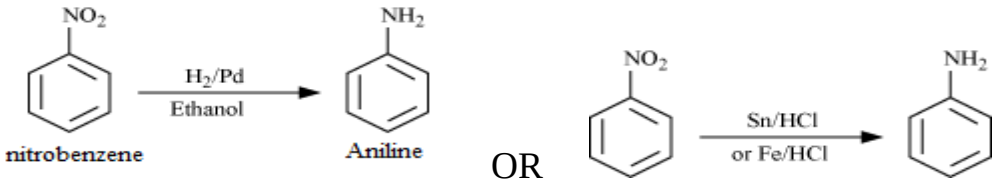
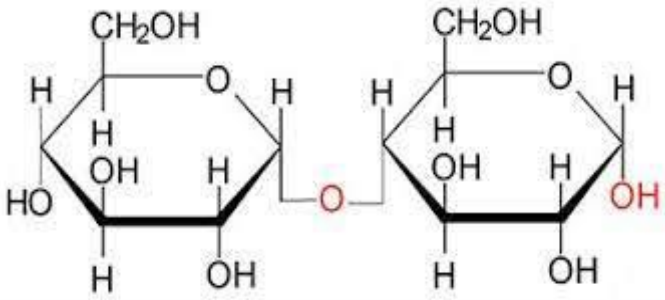
b)	$+^{ve}$ deviation OR Positive deviation from Raoult's law. Because 1. Force of attraction between ethanol and acetone molecules is less than that of ethanol – ethanol & acetone – acetone molecules. 2. Attractive Force between A - B molecules is less than that of A - A & B - B molecules. 3. $F_{A-B} < F_{A-A}$ & F_{B-B} 4. In pure ethanol molecules are hydrogen bonded. On adding acetone, its molecules get in between the ethanol molecules and break hydrogen bonds between them. 5. The ethanol-acetone shows weaker interaction than pure ethanol-ethanol interaction. (Any one answer)	**1** **1**
38) a) b)	**Calculate the ΔG^0 at 298K for the cell reaction:** $$Mg_{(s)} + Cu^{+2}_{(aq)} \rightarrow Mg^{2+}_{(aq)} + Cu_{(s)}$$ **Given: $E^o_{(Mg^{2+}/Mg)} = -2.37V$ & $E^o_{(Cu^{+2}/Cu)} = +0.34V$; & F = 96487Cmol^{-1}.** **Suggest any two methods to prevent corrosion of iron.**	
Ans: a)	$E^o_{(cell)} = E^o_{(Cu+2/Cu)} - E^o_{(Mg^{2+}/Mg)} = +0.34V - (-2.37V) = +2.71V$ $\Delta G^0 = -nFE^0_{cell}$ $\Delta G^0 = -2 \times 96487 \times 2.71 = -522959J = -522.95KJ = -523KJ$	**1** **1** **1**
b)	**Methods to prevent corrosion of iron:** 1. Painting. 2. Applying grease or oil (Lubrication). 3. Galvanisation by zinc (Sacrificial protection). 4. Surface is coated with non-corroding metals like Ni or Cr or Al etc… 5. Cathodic protection (Electrical protection). 6. Using anti rust solution. 7. Tinning: iron surface is coated with tin. (Any two)	**1 +1**
39) a) b)	**Derive integrated rate equation for the rate constant of a zero-order reaction.** **Mention any two factors which influence the rate of the reaction.**	
Ans: a)	Consider a zero-order reaction, R → P $$\text{Rate} = -\frac{d[R]}{dt} = k[R]^0$$ Where 'k' is rate constant of a zero order reaction $$\therefore -\frac{d[R]}{dt} = k[R]^0$$ $$-\frac{d[R]}{dt} = k \times 1$$ $$d[R] = -k[dt]$$ Integrate on both sides; We get $[R] = -kt + I$ … (i) where I or C= Integration constant	**1**

	When $t = 0$ then $[R] = [R]_0$; Where $[R]_0$ = Initial concentration of the reactant Equation (i) becomes, $[R]_0 = -k \times 0 + I$ $[R]_0 = I$ Substituting value of 'I' in equation (i), $[R] = -kt + [R]_0$ $k = \frac{[R]_0 - [R]}{t}$	**1** **1**
Ans: b)	**Factors influence the rate of the reaction:** 1. Temperature. 2. Catalyst. 3. Concentration of Reactants. 4. Nature of Reactants. 5. Pressure (in case of Gaseous reactants). (Any Two)	**1 + 1**
40. a) **b)**	**What is effective collision? Write any two factors responsible for effective collision.** **Show that the half-life period of a first order reaction is independent of initial concentration of reacting species.**	
Ans: a)	The collision which results in a chemical reaction. **OR** The collision in which molecules collide with sufficient kinetic energy and proper orientation, to facilitate breaking of bonds between reacting species and formation of new bonds to form products are called effective collision. Two factors responsible for effective collision are: i) Activation energy (E_a). ii) Proper orientation of reactant molecules.	**1** **1** **1**
b)	Rate constant for the first order reaction is $k = \frac{2.303}{t} \log \frac{[R]_0}{[R]}$ When t = $t_{1/2}$ then $[R] = [R_0]/2$ $\therefore \quad k = \frac{2.303}{t_{1/2}} \log \frac{[R]_0}{[R]_0/2}$ $t_{1/2} = \frac{2.303}{k} \log 2$ $t_{1/2} = \frac{0.693}{k}$ This above relation shows the half-life period I - order reaction is independent of initial concentration of reacting species $[R]_0$.	**1** **1**

41) a) **b)**	**Give any three differences between Lyophilic and Lyophobic Colloids.** **Write the expression for Freundlich adsorption isotherm. What is the value of 1/n to show that adsorption can be independent of pressure?**		
Ans: a)	**Lyophilic Colloids**	**Lyophobic Colloids**	**Any three; Each carry one mark**
	They have more affinity towards the medium.	They have little or no affinity towards the medium.	
	These are reversible sols.	These are Irreversible sols.	
	They are more Stable	They are less Stable	
	The particles are solvated	The particles are not solvated	
	They may or may not carry charge.	They carry charge.	
	They cannot coagulate easily.	They can coagulate easily.	
	Viscosity is more than that of medium.	Viscosity is almost same as the medium.	
b)	Freundlich adsorption isotherm: $\frac{x}{m} = k \times p^{\frac{1}{n}}$ where n > 1 1/n = 0 or zero		**1** **1**
V.	**ANSWER ANY FOUR OF THE FOLLOWING. EACH QUESTION CARRIES 5 MARKS.**		**4X5=20**
42) a) **b)** **c)**	**Explain Swarts reaction with an example.** **What are Grignard reagents? Write its general formula.** **Name the poisonous gas evolved when chloroform is oxidised by air in the presence of light.**		
Ans:a)	When alkyl chloride/bromide (chloro or bromoalkene) on heating in the presence of metallic fluoride such as AgF, Hg_2F_2, CoF_2, or SbF_3 gives alkyl fluorides or Fluoroalkanes. OR Alkyl chloride/ bromide (chloro or bromoalkene) reacts with AgF gives alkyl fluoride or Fluoroalkanes. $CH_3Br + AgF \longrightarrow CH_3F + AgBr$		**1** **1**
b)	Organo-magnesium halides OR Alkyl/ Aryl magnesium halides are called Grignard reagents. General formula: R – Mg – X **OR** RMgX		**1** **1**
c)	Phosgene OR $COCl_2$		**1**
43) a) **b)**	**Write three steps involved in the mechanism of acid catalysed dehydration of ethanol to ethene.** **What is Lucas reagent? Which class of alcohols does not readily form turbidity with Lucas reagent?**		

Ans: a)	Step1: Formation of protonated alcohol:  Step2: Formation of carbocation:  Step3: Elimination of proton:  	**1** **1** **1**
b)	Lucas reagent is mixture of anhydrous Zinc chloride ($ZnCl_2$) & conc. HCl. Primary Alcohol	**1** **1**
44) a) **b)**	**How was phenol manufactured by cumene?** **Explain Kolbe's reaction with equation.**	
Ans: a)	When cumene (isopropyl benzene) is oxidised in the presence of air, it gives cumene hydroperoxide which on acidification with dilute acid gives phenol.  	**Explanation: 1Mark** **Equation each step: 1Mark** **Self-explanatory equation:3M**
b)	Phenol reacts with NaOH (sodium hydroxide) give phenoxide ion (Sodium phenate), which reacts with carbon dioxide (CO_2) gas in acidified medium gives salicylic acid (2-hydroxybenzoic acid).  	Explanation: 1Mark Equation: 1Mark Self-explanatory equation:2M
45) a) **b)**	**How does formaldehyde reacts with concentrated alkali on heating? Name this reaction.** **Identify the reagent X and y used in the following conversion.**  	

Ans: a)	Formaldehyde reacts with Conc. KOH to form methyl alcohol (methanol) and potassium formate.  OR $2HCHO + KOH_{(conc)} \rightarrow CH_3OH + H\,COO^-K^+$.	**1** **1**	**Self-explanatory equation: 2M**
	Cannizzaro Reaction	**1**	
b)	X = Chromyl chloride (CrO_2Cl_2) Y = H_2O/ H^+ OR H_3O^+ .	**1** **1**	
46) a) **b)**	**What type of carboxylic acids undergoes Hell-Volhard-Zelinsky (HVZ) reaction? Explain this reaction with example.** **Among formic acid and acetic acid, which is weaker acid and why?**		
Ans: a)	Carboxylic acids containing α - hydrogen atom. Carboxylic acids having an α-hydrogen on treated with chlorine or bromine in the presence of red Phosphorus gives α-halocarboxylic acid.  **OR** Any suitable example	**1** **1** **1**	Explanation:1Mark; Equation:1Mark Self-explanatory equation:2M
b)	**Acetic acid** is weaker acid. Due to positive inductive effect OR Due to +I effect OR Electron donating $-CH_3$ group decreases the acidity in acetic acid.	**1** **1**	
47) a) **b)** **c)**	**Explain carbylamine reaction with example.** **How is Aniline prepared from nitro benzene?** **Give the IUPAC name of trimethylamine.**		
Ans: a)	primary amines on heating with chloroform and ethanolic KOH (potassium hydroxide) gives isocyanides or carbylamines. This reaction is called carbylamine reaction. $R - NH_2 + CHCl_3 + 3\,KOH \xrightarrow{Heat} R - NC + 3KCl + 3H_2O$ OR $R-\underset{1^\circ\text{ amine}}{NH_2} + \underset{\text{Chloroform}}{CHCl_3} + 3KOH \xrightarrow[(\text{Alcoholic})]{\Delta} \underset{\text{isocyanide}}{R-NC} + 3KCl + 3H_2O$ **OR** Any suitable example	**1** **1**	Explanation:1Mark; Equation:1Mark Self-explanatory equation:2M

Ans: b)	Nitrobenzene is reduced to give aniline by passing hydrogen gas in the presence of finely divided nickel, palladium, or platinum OR By reducing with tin (Sn) and conc. HCl OR Fe and Conc. HCl.  	1 1	Explanation:1Mark; Equation: 1Mark; Self-explanatory equation:2M
c)	N, N – Dimethylmethanamine.	1	
48. a) **b)** **c)**	**Write the Haworth structure of Maltose.** **What are polysaccharides? Give an example.** **Name any one vitamin that is stored in liver and adipose tissues.**		
Ans: a)	 	**2**	
b)	Polysaccharides are the carbohydrates which on hydrolysis give more than ten (many) monosaccharide units.	**1**	
	Example: Starch, cellulose, glycogen, gums etc. (Any one)	**1**	
c)	Vitamin A, D, E and K (Any one)	**1**	
49) a) **b)** **c)**	**What are fibrous proteins? Name the protein in hair.** **Mention two hormones which regulates the glucose level in the blood.** **Name the base present only in DNA, but not in RNA**		
Ans: a)	Fibrous proteins have fibre (Hair) like structure and insoluble in water.	**1**	
	Keratin (present in hair)	**1**	
b)	Insulin & Glucagon	**1 + 1**	
c)	Thymine	**1**	
50) a) **b)** **c)**	**Name the two monomers present in Nylon-6,6.** **Explain Vulcanisation of rubber.** **Write the name of the biodegradable polymer used in manufacture of orthopaedic devices.**		
Ans: a)	Hexamethylene diamine and Adipic acid.	**1 + 1**	
b)	Heating a mixture of raw (natural) rubber with sulphur and an additive at 373K to 415K to make it hard and stiff is called vulcanisation. OR The process of heating natural rubber with calculated amount of sulphur or sulphur compounds at 373K to 413K to make it hard and tough is called vulcanisation.	**2**	
c)	PHBV (Poly β – hydroxyburate – co- β – hydroxy valerate)	**1**	