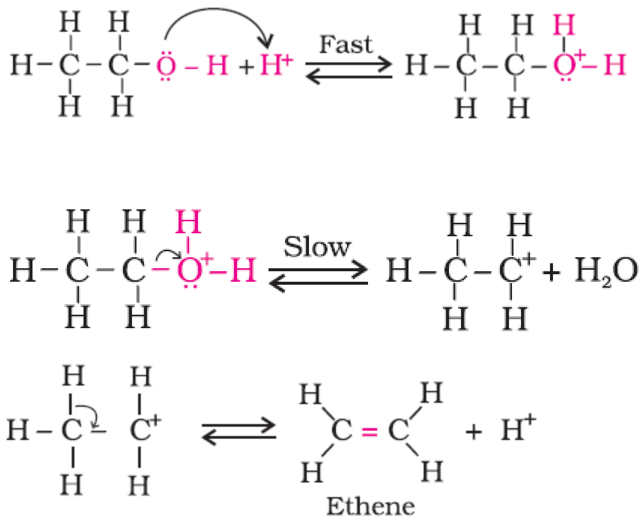
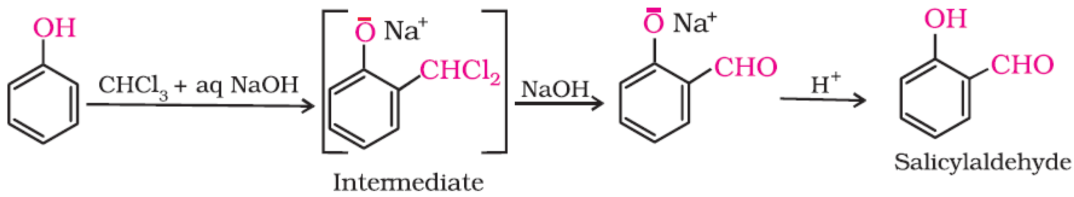
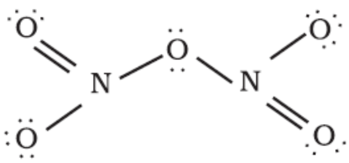
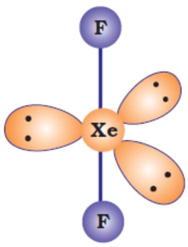
CHEMISTRY MARKING SCHEME
OUTSIDE DELHI -2013
SET - 56/3

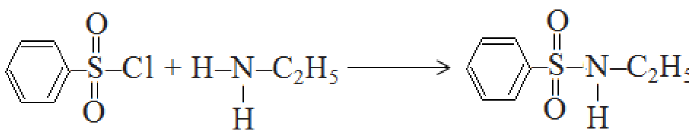
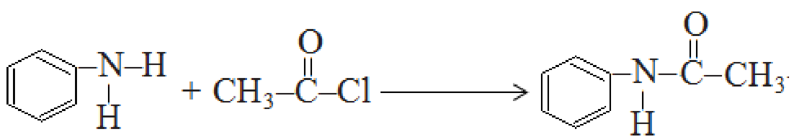
1	Tyndall effect / Illumination of path of light.	1
2	Basicity = 2 As two P- OH bonds are present.	½ ½
3	1, 4 - Dichloro-2- methylbenzene./ 2,5- Dichlorotoluene	1
4	Electrolytic refining	1
5	Glucose & Galactose	1
6.	Homopolymer	1
7.	$CH_3CH_2CH_3$ < CH_3CHO < CH_3CH_2OH	1
8.	$CH_2=CH-CH_2-NH_2$	1
9.		½ ½ 1
10	The interhalogen compounds can be prepared by the direct combination or by the action of halogen on lower interhalogen compounds. General composition XX'_n (where n = 1,3,5,7 & X′ is more electronegative)	1 1
11	(a) Reimer-Tiemann reaction	

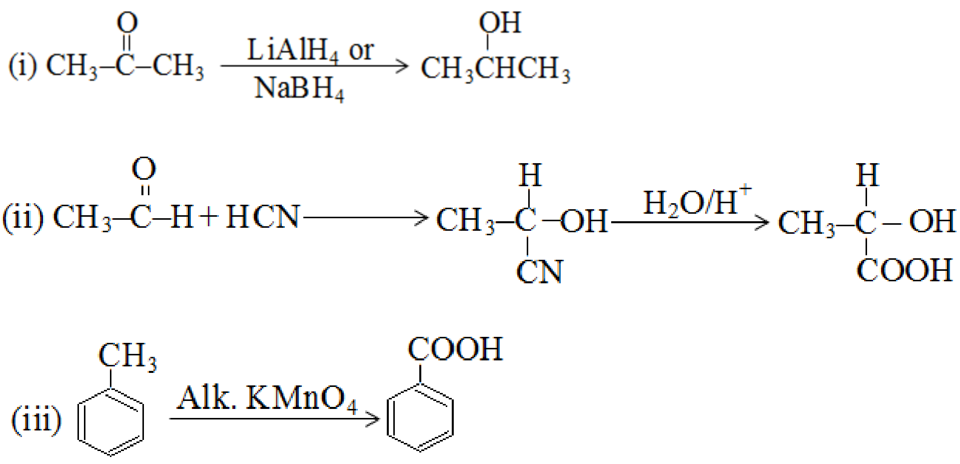
	 (b) Williamson synthesis $R{-}X + R'{-}\ddot{O}\,Na \longrightarrow R{-}\ddot{O}{-}R' + Na\,X$	1+1
12	(i)  (ii)  	1 1
13	(i) Cationic vacancy is generated (ii) p - type	1 1
14	For f.c.c unit cell $r = \frac{a}{2\sqrt{2}}$ $a = 2r \times \sqrt{2}$ $= 2 \times 125\ pm \times 1.414$ $= 353.5\ pm$	½ 1 ½
15	$\Delta G^o = -nFE^o_{cell}$ $= -2 \times 96500\ C\ mol^{-1} \times 1.1\ V$ $= -212300\ J\ mol^{-1}$ or $-212.3\ kJ\ mol^{-1}$	½ ½ 1
16	(a) order = 2 + ½ = 5/2 (b) $t_{1/2} = \frac{0.693}{k}$	½ ½

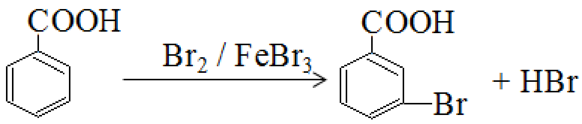
	$= \frac{0.693\ s}{5.5 \times 10^{-14}}$ $= 1.26 \times 10^{13}$ s	1
17	**Thermoplastics**. These polymers are easily softened on heating, moulded and then hardened on cooling. **Examples:** polythene, polypropylene, polystyrene, polyvinyl chloride, teflon, polyvinyl acetate, etc. (any one) **Thermosetting polymers** These polymers on heating become infusible and form an insoluble hard mass thus, cannot be remoulded. **Examples**: Bakelite, urea-formaldelyde resins, etc.(any one)	½+ ½ ½+ ½
	OR	
17	The polymers which can be degraded by the micro organism **Example:** PHBV (or any other correct one example)	1 1
18	Bauxite ($Al_2O_3.2H_2O$) The significance of leaching is to prepare pure Alumina from the Bauxite ore./ reactions involved.	1 1
19	**(i) Macromolecular colloids:** Macromolecules in suitable solvents forms solutions in which the size of the macromolecules may be in the colloidal range. **Examples:** starch, cellulose, proteins and enzymes; and those of man- made macromolecules are polythene, nylon, polystyrene, synthetic rubber, etc. (any one) **(ii) Peptization:** the process of converting a precipitate into colloidal sol by shaking it with dispersion medium in the presence of a small amount of electrolyte. **Example:** Freshly formed precipitate of ferric hydroxide, $Fe(OH)_3$, is peptized by ferric chloride, $FeCl_3$, solution. Similarly, a sol of aluminium hydroxide ($Al(OH)_3$) is obtained by adding	½+ ½ ½+ ½

	insufficient quantity of very dilute HCl solution to freshly precipitated aluminium hydroxide. (any one) **(iii) Emulsion:** Those colloids in which dispersed phase & dispersion medium both are liquid **Example:** milk is an emulsion of fat in water, cod liver oil is an emulsion of water in oil. (any one)	½+ ½
20 20	(i) tetrachloridonickelate(II) ion (ii) sp^3 (iii) Tetrahedral. OR The energy involved in splitting the degenerate d-orbitals into two sets t_{2g} and e_g is called crystal field splitting energy. (i) $t_{2g}^4 e_g^o$ (ii) $t_{2g}^3 e_g^1$	1x3=3 1 1+1
21	(i) Its covalency cannot exceed 4 / Due to non-availability of d-orbitals in its valence shell. (ii) Because of small size of F atom the inter electronic repulsion is large in F atom. (iii) Due to resonance. / Resonance structures.	1x3=3
22	Given if rate at 293 K is R thus at 313 K rate becomes 4R $\text{Log}\,\frac{k_2}{k_1} = \frac{E_a}{2{\cdot}303R}\left[\frac{T_2 - T_1}{T_1 \times T_2}\right]$ $\text{Log}\,\frac{4R}{R} = \frac{E_a}{2{\cdot}303 \times 8{\cdot}314}\left[\frac{313-293}{293 \times 313}\right]$ $\text{Log}\,4 = \frac{E_a}{19{\cdot}1471}\left[\frac{20}{91709}\right]$ $0{\cdot}6021 = \frac{E_a}{19{\cdot}1471}\left[\frac{20}{91709}\right]$ $\frac{0{\cdot}6021 \times 19{\cdot}1471 \times 91709}{20} = E_a$ $E_a = 52863{\cdot}2177J$ or $52{\cdot}863\,KJ$	1 1 1

23	(i) Mrs. Anuradha has shown generosity / caring / helping / kindness attitude towards poor (ii) Vit. B_{12}. (iii) Vitamin B/ C	1x3=3
24	**Given cell notation is incorrect** **Correct cell formula is** $Cu^{2+}(10^{-1}M) \mid Cu_{(s)} \parallel Ag^{+}(10^{-3}M) \mid Ag_{(s)}$ Given $E^{o}cell = 0{\cdot}46V$ $E_{cell} = E^{o}_{cell} - \frac{0{\cdot}0591}{n} \log \frac{[Cu^{2+}]}{[Ag^{+}]^{2}}$ $E_{cell} = 0{\cdot}46 - \frac{0{\cdot}0591}{2} \log \frac{[0.1]}{[10^{-3}]^{2}}$ $E_{cell} = 0{\cdot}46 - 0{\cdot}02955 \log \frac{[0.1]}{[10^{-6}]}$ $E_{cell} = 0{\cdot}46 - 0{\cdot}02955 \log 10^{5}$ $E_{cell} = 0{\cdot}46 - 0{\cdot}02955 \times 5$ $E_{cell} = 0{\cdot}46 - 0{\cdot}146$ $E_{cell} = 0{\cdot}314V$ or $E_{cell} = E^{0}_{cell} - \frac{0.059}{2} \log \frac{[Ag^{+}]^{2}}{[Cu^{2+}]}$ $= 0.46V - \frac{0.059}{2} \log \frac{[10^{-3}]^{2}}{[0.1]}$ $= 0.46V - \frac{0.059}{2} \log \frac{[10^{-3}]^{2}}{[0.1]}$	1 1 1 1 1

	= 0.46 V + 0.0295 x 5 =0.6075 V	1
25	(i) I, is better leaving group / C-I bond is weeker then C-Br bond. (ii) Because it is a racemic mixture / equal & opposite rotation of two enantiomers cancel each other. (iii) Due to resonance in halobenzene / sp^2 hybridization of C - atom in halobenzene & sp^3 hybridization of C - atom in CH_3X	1x3=3
26	(i) Antacid / Antihistamine (ii) Synthetic detergents (iii) 0·2 % Phenol	1x3=3
27	(i) $CH_3CH_2NH_2 \xrightarrow{HNO_2\ /\ 0°C} CH_3CH_2OH$ (ii)  (iii) 	1x3=3
28	(a) (i) Mn^{3+} ($3d^4$) good electron acceptor as resulting species is more stable ($3d^5$) (ii) The $E^o(M^{2+}/M)$ values are not regular which can be explained from the irregular variation of ionisation enthalpies ($\Delta_i H_1 + \Delta_i H_2$) sublimation enthalpies and hydration enthalpies. (iii) Due to multiple bond formation ability of oxygen with Mn in Mn_2O_7. (b) (i) $2CrO_4^{2-} + 2H^+ \longrightarrow Cr_2O_7^{2-} + H_2O$	1x3=3

28	(ii) $2KMnO_4 \xrightarrow{Heat} K_2MnO_4 + MnO_2 + O_2$. OR (a) Because of incomplete filling of d-orbitals (i) Mn (ii) Scandium(Sc) (b) There is a steady decrease in the size of atoms/ions with increase in atomic number in lanthanoid. Misch metal	1+1 1x3=3 1+1
29 29	(a)  (b) (i) Add I_2 & NaOH in both the solutions pentan-2-one gives yellow coloured precipitate, but pentan-3-one does not. (ii) Add I_2 & NaOH in both the solutions ethanal gives yellow coloured precipitate, but propanal does not. (or any other correct suitable test) OR	1x3=3 1+1

	(a) (i) $CH_3-\overset{O}{\overset{\Vert}{C}}-CH_3 \xrightarrow[\text{conc. HCl}]{Zn-Hg} CH_3-CH_2-CH_3 + H_2O$ (ii) $CH_3-\overset{O}{\overset{\Vert}{C}}-Cl + H_2 \xrightarrow{Pd-BaSO_4} CH_3-\overset{O}{\overset{\Vert}{C}}-H + HCl$ (iii)  (b) (i) $F-CH_2-COOH$ (ii) CH_3COOH	1x3=3 1+1
30	(a) Partial vapour pressure of a liquid component is directly propertional to its mole fraction in its solution. The partial pressure of the volatile component or gas is directly proportional to its mole fraction in solution. Only the proportionality constant K_H differs from P^o_A. Thus, Raoult's law becomes a special case of Henry's law in which K_H becomes equal to P^o_A. (b) Given $W_B = 1\cdot00g$; $W_A = 50g$; $K_f = 5\cdot12 K\ kg/mol^{-1}$; $\Delta T_f = 0\cdot40 K$ $\Delta T_f = K_f \frac{W_B \, X\, 1000}{M_B \, X\, W_A (\text{in grams})}$ $M_B = K_f \frac{W_B \, X\, 1000}{\Delta T_f \, X\, W_A}$ $M_B = \frac{5\cdot12 \times 1 \times 1000}{0\cdot40 \times 50}$ $= 256 g\ mol^{-1}$ OR	1 1 1 1 1
30		

	(a) **(i) Ideal Solution:** Those solutions which follows Raoult's law under all conditions of temperature and pressure. **(ii) Azeotrope:** A liquid mixture which distills at constant temperature without undergoing any change in composition is called Azeotrope. **(iii) Osmotic Pressure:** The minimum excess pressure that has to be applied on the solution side to prevent the entry of the solvent into the solution through the semi - permeable membrane is called **osmotic pressure**. (b) Given Molecular mass of Glucose = 180, % by wt = 10 $$m = \frac{1000 \text{ x wt \%}}{(100 - \text{wt \%}) \text{ x mol. wt. of solute}} \quad \text{or} \quad m = \frac{w \text{ x } 1000}{M \text{ x } W}$$ $$m = \frac{1000 \text{ x } 10}{(100-10) \text{ x } 180}$$ $$m = \frac{10000}{90 \text{ x } 180}$$ $$m = 0.617 \text{ m}$$ Sh. S.K.Munjal Dr (Mrs.) Sangeeta Bhatia Prof. R.D.Shukla Mr. K.M. Abdul Raheem Dr. K.N.Uppadhya Mr.D. A Mishra Mr. Rakesh Dhawan Mr.Deshbir Singh Ms. Neeru Sofat Mr. Akhileshwar Mishra Mr. Virendra Singh	1x3=3 ½+ ½ 1
