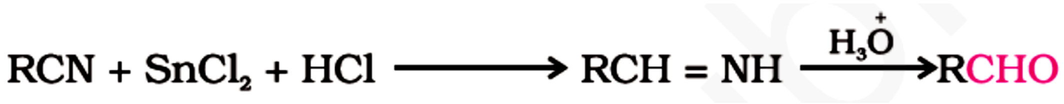
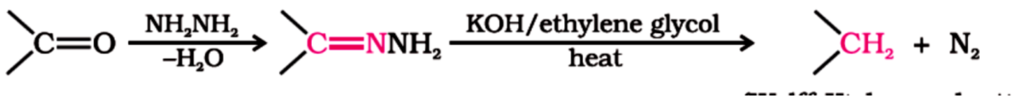
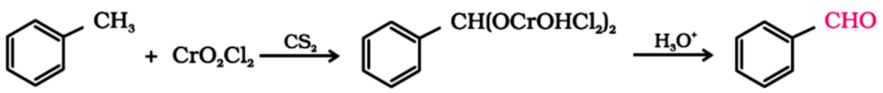
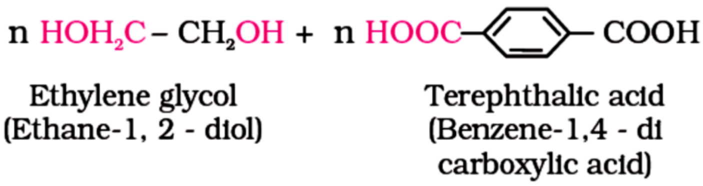
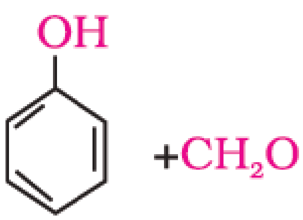
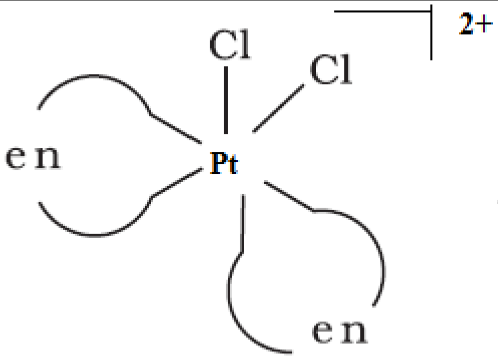
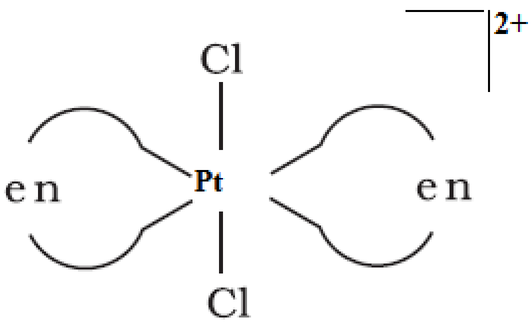
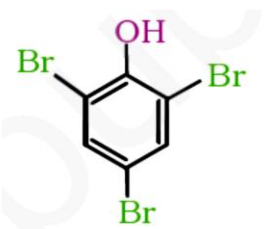
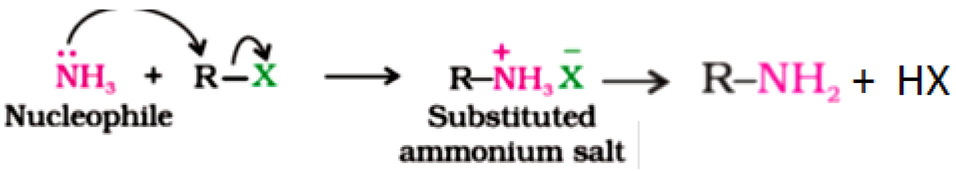
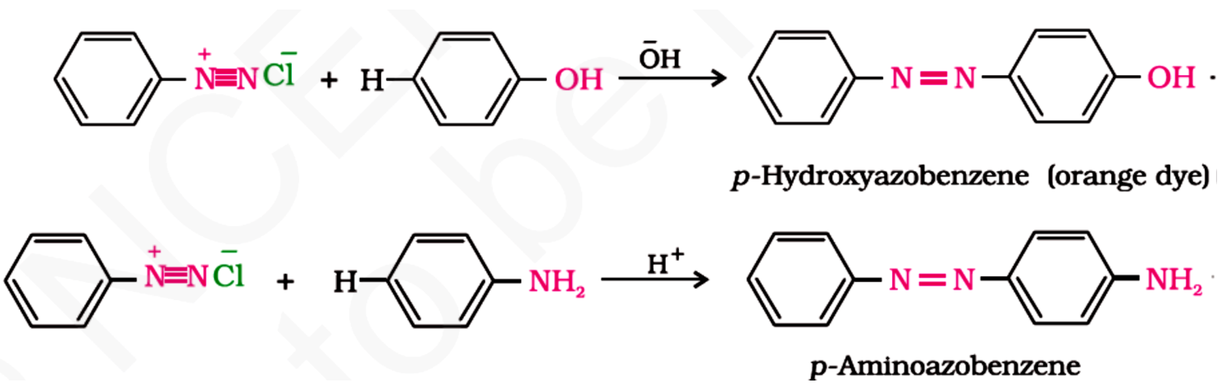
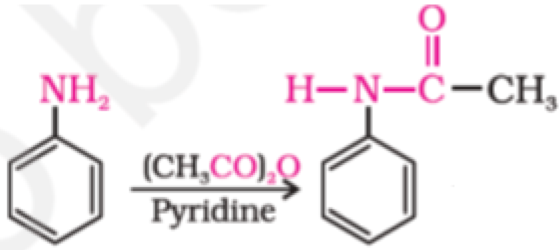
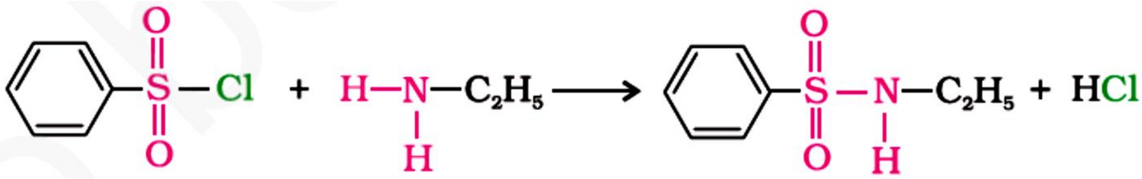
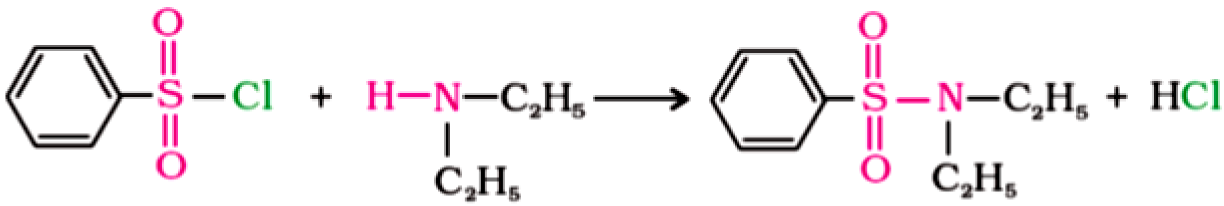
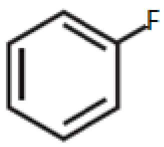
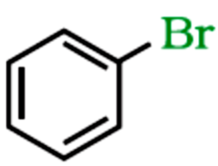
CHEMISTRY MARKING SCHEME 2015
SET -56/2/3 F

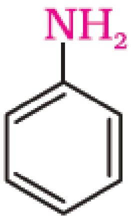
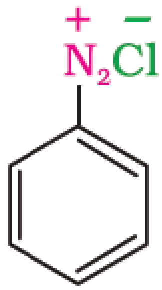
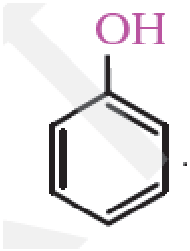
Qn	Value points	Marks
1	X_2Y_3	1
2	3-Methylbut-2-en-1-ol	1
3	Because of weak van der Waals' forces in physisorption whereas there are strong chemical forces in chemisorption.	1
4	CH_3CH_2I , because I is a better leaving group.	½ , ½
5	Rhombic sulphur	1
6	a) Cu^{2+} (aq) + 2 e $\longrightarrow$ Cu(s) because of high E^0 value/ more negative ΔG b) It states that limiting molar conductivity of an electrolyte is equal to the sum of the individual contributions of cations and anions of the electrolyte. It is used to calculate the Λm^0 for weak electrolyte / It is used to calculate α and Kc (Any one application)	½ , ½ 1 1
7	a) Due to presence of unpaired d-electrons/ comparable energies of 3d and 4s orbitals. b) Mn , due to involvement of 4s and 3d electrons/ presence of maximum unpaired d-electrons.	1 ½ ,½
8	i) tris-(ethane-1,2-diamine)chromium(III) chloride ii) $K_3[Cr(C_2O_4)_3]$	1 1
9	(i) CH_3MgBr/ H_3O^+ (ii) $PCl_5/ PCl_3 / SOCl_2$	1 1
10	When solute- solvent interaction is stronger than pure solvent or solute interaction. Eg: chloroform and acetone (or any other correct eg) ΔmixH= negative	1 ½ ½
	OR	
10	Azeotropes –binary mixtures having same composition in liquid and vapour phase and boil at constant temperature / is a liquid mixture which distills at constant temperature without undergoing change in composition	1 ½

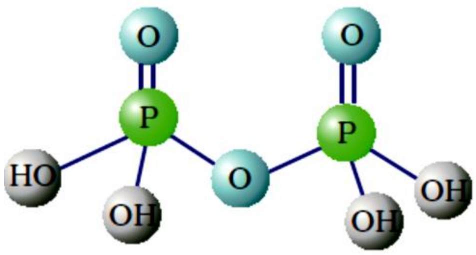
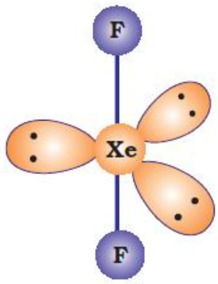
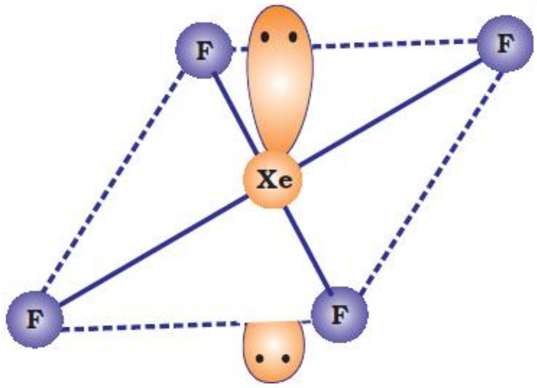
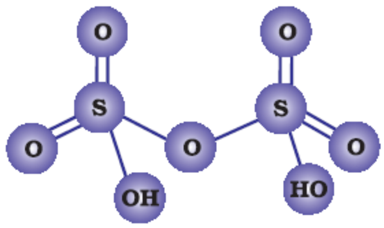
	Maximum boiling azeotropes eg: HNO_3 (68%) and H_2O(32%) (or any other correct example)	½
11	a) Because they are unable to form H-bonds with water molecules. b) Because of the presence of chiral carbon in butan-2-ol. c) Due to dominating +R effect	1 1 1
12	i) $C_6H_5COOH \xrightarrow{PCl_5} C_6H_5COCl \xrightarrow[BaSO_4]{H_2/Pd} C_6H_5CHO$ ii) $CH{\equiv}CH + H_2O \xrightarrow{Hg^{2+}/H_2SO_4} CH_3CHO$ iii) $CH_3COOH \xrightarrow{NaOH} CH_3COONa \xrightarrow{NaOH\ +\ CaO\ ,\ heat} CH_4$ **OR** i)  ii)  iii) 	1 1 1 1 1 1
13	$\Delta T_f = i.\ K_f\ m$ $= i\ K_f \dfrac{w_B \times 1000}{M_B \times w_A}$ $2K = \dfrac{2 \times 1.86K\ kg/mol \times w_B \times 1000}{58.5\ g/mol \times 37.2\ g}$ $w_B = 1.17g$	 1 1 1
14	i)  ii)  Phenol and formaldehyde	1 1

	iii) $CH_2 = CH - CH = CH_2$ 1, 3-Butadiene; $C_6H_5CH{=}CH_2$ Styrene (Note: half mark for structure/s and half mark for name/s)	1
15	i) Fructose ii) Acidic amino acid has more number of acidic carboxylic group than basic amino group whereas basic amino acid has more number of basic amino group. iii) Vitamin C	1 1 1
16	i)   cis- isomer trans-isomer ii) t_{2g}^{4} iii) dsp^2 , diamagnetic	1 1 ½ , ½
17	a) Impure Ni reacts with CO to form volatile $Ni(CO)_4$ which when heated at higher temperature decomposes to give pure Ni. b) NaCN acts as a leaching agent to form a soluble complex with gold. c) It is a mixture of Cu_2S and FeS	1 1 1
18	$E\ cell = E^0\ cell - \frac{0.059}{n} V \log \frac{[Zn^{2+}]}{[H^+]2}$ $E\ cell = 0.76\ V - \frac{0.059}{2}\ V \log \frac{10^{-3}}{(10^{-2})2}$ $E\ cell = 0.76 - 0.0295\ V \log 10$ $= 0.7305\ V$	1 1 1
19	i) $CH_3CH_2CH_2OH$ ii) 	1 1

	iii) CH_3CHO	1
20	$d=\frac{Z \times M}{N_a \times a^3}$ $6.23\ g\ cm^{-3} = \frac{z \times 60\ g/mol}{6.022 \times 10^{23}\ mol^{-1}\ \times\ (4 \times 10{-}8 cm)^3}$ z=4 fcc	½ ½ 1 1
21	i) Because oxygen stabilizes Mn more than F due to multiple bonding ii) Because of their ability to show variable oxidation state(or any other correct reason) iii) $3MnO_4^{2-} + 4H^+ \longrightarrow 2MnO_4^- + MnO_2 + 2H_2O$	1 1 1
22	i) Due to coagulation of colloidal clay particles. ii) Because NH_3 is easily liquefiable than N_2 due to its larger molecular size. iii) Because of more surface area.	1 1 1
23	a) Concern for students health, Application of knowledge of chemistry to daily life, empathy , caring or any other b) Through posters, nukkad natak in community, social media, play in assembly (or any other relevant answer) c) Wrong choice and overdose may be harmful d) Aspartame, saccharin (or any other correct example)	½ , ½ 1 1 ½+ ½
24	a) i)ammonolysis  ii)  	1 1

	(any one)	
	 iii) (or any other correct reaction)	1
	b)reaction of primary amine	
	 (soluble in alkali)	1
	Reaction of secondary amine	
	 (insoluble in alkali)	1
	Tertiary amine doesn't react	
	OR	
24	 a) i)	1
	 ii)	1
		½,½, ½

	b) i) A-  B-  C-  ii) A- CH_3CN B- $CH_3CH_2NH_2$ C- CH_3CH_2OH	½ ,½, ½
25	a)i) Activation energy- Extra energy required by reactants to form activated complex. ii) Rate constant- rate of reaction when the concentration of reactant is unity. b) $k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$ $k = \frac{2.303}{10\ min} \log \frac{100}{75}$ $k = \frac{2.303 \times 0.125}{10\ min}$ $k = 0.02879\ min^{-1}$ $t_{1/2} = \frac{0.693}{k} = \frac{0.693}{0.02879\ min^{-1}}$ $t_{1/2} = 24.07 min$	1 1 ½ ½ 1 1
	OR a) i)First order ii) -k iii) s^{-1} b) $t = \frac{2.303}{k} \log \frac{[R]0}{[R]}$ $t_{99\%} = \frac{2.303}{k} \log \frac{100}{1}$ $t = \frac{2.303}{k} \times 2$	1,1,1 ½

	$t_{90\%} = \frac{2.303}{k} \quad \log\frac{100}{10}$ $= \frac{2.303}{k}$ $t_{99\%} = 2 \text{ x } t_{90\%}$	½ 1
26	a) i)Because of lone pair in NH_3 , lone pair- bond pair repulsion decreases the bond angle ii)Because of absence of H-bonding in H_2S iii)Because stability of +4 oxidation state increases from SO_2 to TeO_2 b)  $H_4P_2O_7$  **OR** a)   b)i)Because iron on reaction with HCl produces $H_2(g)$ which prevents the formation of $FeCl_2$ to $FeCl_3$ / Because HCl is a weak oxidising agent. ii) Because of higher oxidation state of chlorine in $HClO_4$ iii) Because of lower dissociation enthalpy of Bi-H bond.	1 1 1 1,1 1,1 1 1 1