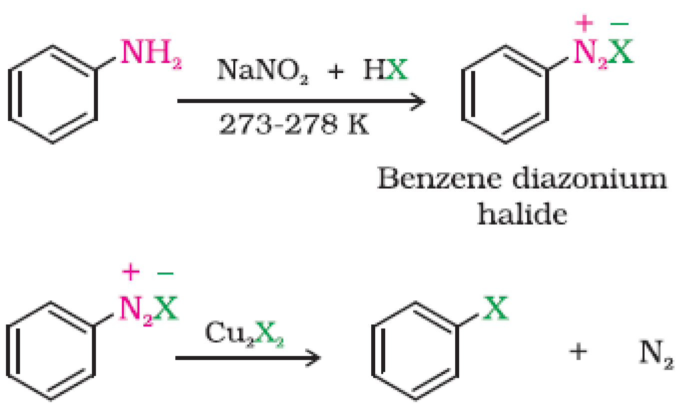
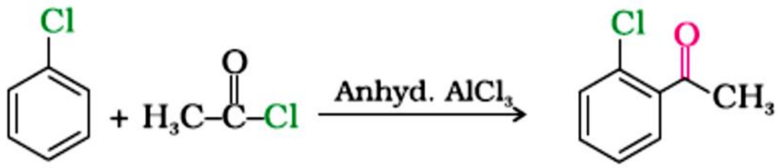
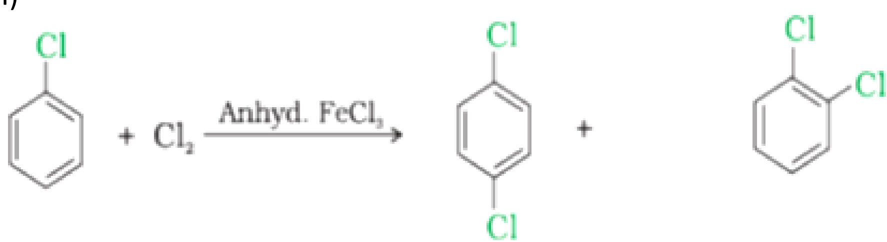
CHEMISTRY MARKING SCHEME

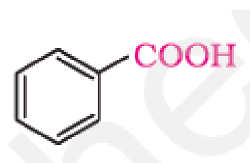
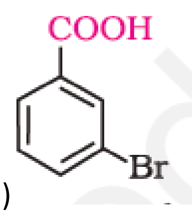
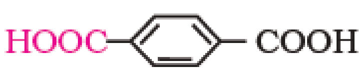
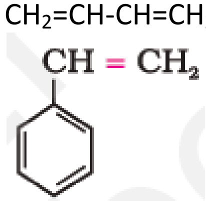
2015

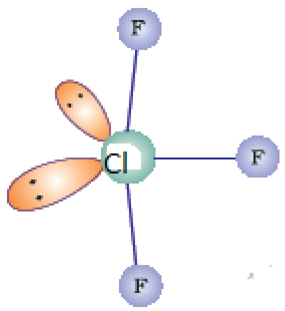
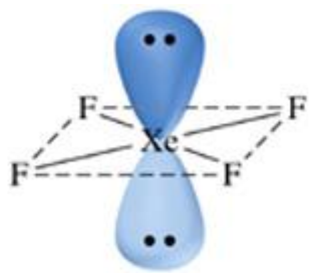
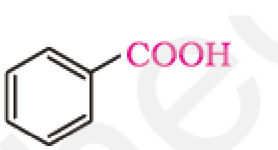
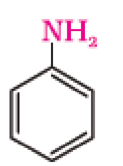
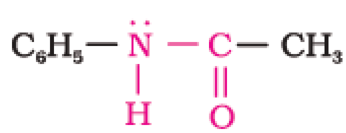
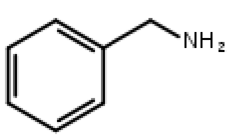
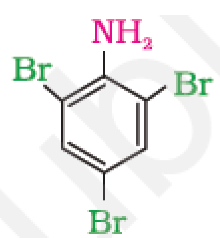
56/1/RU

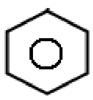
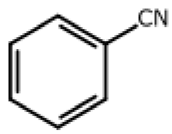
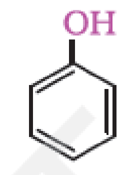
. NO.	Value points	MARKS
Q.1	H_2SO_3 $H_2SO_4 H_2S_2O_8$, H_2SO_5 (any two formulae)	½ + ½
Q.2	1-ethoxy-2-methylpropane	1
Q.3	Due to coagulation of colloidal clay particles	1
Q.4	CH_3-CH(Br)-CH_3	1
Q.5	X_4Y_3	1
Q.6	Similarity : Both show contraction in size /Both show irregularity in their electronic configuration/Both are stable in +3oxidation state (any one) Difference :Actinoids are mainly radioactive but lanthanoids are not/ Actinoids show wide range of oxidation states but lanthanoids do not /Actinoid contraction is greater than lanthanoid contraction. (any other one similarity and one difference)	1 1
Q.7	(i) Pentaamminechloridocobalt(III) ion (ii) $K_2[NiCl_4]$	1 1
Q.8 8.	(i) PCC / Cu at 573 K (ii) NH_3 , Δ (heat) OR (i) $C_6H_5COCH_3 < CH_3COCH_3 < CH_3CHO$ (ii) $CH_3COOH < Cl\text{-}CH_2\text{-}COOH < F\text{-}CH_2\text{-}COOH$	1 1 1 1
Q.9	(i) Negative deviation ,temperature will increase. (ii) Blood cell will swell due to osmosis , water enters into the cell.	½ +½ ½+½
Q.10	$Cu^{2+} + 2e \rightarrow Cu$ 63.5 g Cu is deposited = 2x96500 C 1.27 g Cu is deposited = 2x96500x1.27/63.5 C = ixt (Q = ixt) t = 2x96500x1.27/63.5 x 2 = 1930s Or	 1 1

	by Faraday First law m = zx i xt z = atomic mass/valencyxF 1.27 = 63.5x2xt/2x96500 t = 1930 s	 ½ ½ 1
Q.11	$\frac{p^0 - p}{p^0} = \frac{w_s x \text{ Msolvent}}{M_s \text{ x Wsolvent}}$, s = solute (32 – 31.84)/32 = 10 x 18/ Ms x 200 M_s = 180 g/mol	1 1 1
Q.12	(i) Zone refining (ii) SiO_2 act as flux to remove the impurity of Iron oxide (iii) Depressants prevent one type of sulphide ore forming the froth with air bubbles.	1 1 1
Q.13	(i) Starch. (ii) α- Helix polypeptide chains are stabilized by intramolecular H-bonding whereas β- pleated sheet is stabilized by intermolecular H-bonding. (or any other difference) (iii) Pernicious anaemia	1 1 1
Q.14	(i) Hydration isomerism (ii) Electronic configuration ist_{2g}^4/ or by diagram (iii) Hybridization is sp^3d^2 and shape is octahedral.	1 1 ½ + ½
Q.15	(i)  (where X=Br) (ii)	 1

15	 iii) $CH_3CH_2Cl \xrightarrow[dry\ ether]{Na} CH_3CH_2CH_2CH_3$ **OR** (I)  (ii) $CH_3CH_2Cl + AgNO_2 \rightarrow CH_3CH_2NO_2 + AgCl$ (iii) $CH_3CH_2CH_2CH(Br)CH_3 + KOH\ (alc.) \rightarrow CH_3CH_2CH{=}CHCH_3$	1 1 1 1 1
Q.16	(i) Stoichiometric defect (ii) Schottky defect e.g.NaCl(or any other example) (iii) Density of crystal decreases	1 ½ + ½ 1
Q.17	$\Lambda_m = \frac{1000\ x\ k}{M}$ Scm^2mol^{-1} $\Lambda_m = \frac{1000\ x\ 5.25\ x\ 10^{-5}}{2.5\ x\ 10^{-4}}$ Scm^2mol^{-1} $= 210 Scm^2mol^{-1}$ Λ_m^0 HCOOH $= \lambda^0$ $HCOO^-$ $+ \lambda^0 H^+$ $(50.5 + 349.5)\ S\ cm^2mol^{-1} = 400\ S\ cm^2mol^{-1}$ $\alpha = \Lambda_m / \Lambda_m^0$	½ 1 ½

	α = 210 /400 = 0.525	1
Q.18	Physisorption : adsorbate is held by weak van der Waals' force non-specific It forms multimolecular layer Chemisorption : adsorbate molecules are held by strong forces like a chemical bond It is specific It forms unimolecular layer (or any correct three points)	1,1,1
Q.19	(i) Phenoxide ion is stabilized by resonance as compared to CH_3O^-/ In phenol, oxygen acquires + ve charge due to resonance and releases H^+ ion easily whereas there is no resonance in methanol. (ii) Due to lone pair- lone pair repulsion on oxygen. (iii) $(CH_3)_3C^+$ is 3^0 carbo-cation which is more stable than CH_3^+ for S_N1 reaction.	1 1 1
Q.20	i) $(CH_3)_2C=N-NH_2$ ii)  / benzoic acid iii)  / m-bromobenzoic acid	1+1+1
Q.21	(a) (i) Because Cu^+ undergoes disproportionation as $2Cu^+ \rightarrow Cu + Cu^{2+}$ (ii) Because of small size of metal, high ionic charge and availability of vacant d –orbital. (b) $Cr_2O_7^{2-} + 8H^+ + 3NO_2^- \rightarrow 2Cr^{3+} + 3NO_3^- + 4H_2O$ (Balanced equation only)	 1 1 1
Q.22	(i) ethylene glycol $HO-CH_2-CH_2-OH$ Terephthalic acid  (ii) 1,3- butadiene $CH_2=CH-CH=CH_2$  Styrene (iii) Chloroprene $CH_2=C(Cl)-CH=CH_2$ (Note: Half mark for name/s and half mark for structure/s in each case)	½ +½ ½ + ½ ½ , ½
Q.23	(i) Social awareness ,Health conscious, Caring , empathy, concern .(or any other two values)	½ , ½

	(ii) Cartoon display / street display/poster making (or any other correct answer) (iii) Wrong choice and over dose may be harmful. (iv) Saccharin , Aspartame (or any other example)	1 1 ½ + ½
Q.24 24	(a) (i) Due to decrease in bond dissociation enthalpy from HF to HI , there is an increase in acidic character observed. (ii)Oxygen exists as diatomic O_2 molecule while sulphur as polyatomic S_8 (iii)Due to non- availability of d orbitals (b) i)  ii)  **OR** (i) White Phosphorus, because it is less stable due to angular strain (ii)Nitrogen oxides emitted by supersonic jet planes are responsible for depletion of ozone layer. Or $NO+O_3 \rightarrow NO_2+ O_2$ (iii)due to small size of F, large inter electronic repulsion / electron- electron repulsion among the lone pairs of fluorine (iv)Helium (v) $XeF_2 + PF_5 \rightarrow [XeF]^+ [PF_6]^-$	1 1 1 1+1 ½ , ½ 1 1 1 1
Q.25	A =  B=  C=  D=  E= 	1 each

25	OR i)  ii)  iii)  (b) $C_2H_5NH_2 < (C_2H_5)_3N < (C_2H_5)_2NH$ (c) Add $CHCl_3$ and alc KOH , C_6H_5-NH_2 gives foul smell of isocyanide whereas C_6H_5-NH-CH_3 does not (or any other correct test)	1,1,1 1 1
Q.26	(a) $[A]_0 = 0.10$ mol/L [A] = 0.05 mol/L at time t = 10s $k = \frac{2.303}{t} \log\frac{[A_0]}{[A]}$ $k = \frac{2.303}{10\ s} \log\frac{0.10}{0.05}$ $k = 0.0693 s^{-1}$ t = 20s $k = \frac{2.303}{t} \log\frac{[A_0]}{[A]}$ $k = \frac{2.303}{20\ s} \log\frac{0.10}{0.025}$ $k = 0.0693 s^{-1}$ As the rate constant is same so it follows pseudo first order reaction. (b) Average rate of reaction = - Δ[R]/ Δt = - [0.025 – 0.05 / 20 - 10] = 0.0025 mol $L^{-1}s^{-1}$	½ 1 1 ½ ½ ½ 1

	OR	
26	(a)	
	(i) Rate of reaction becomes 4 times	1
	(ii) Over all order of reaction = 2	1
	(b) $t_{1/2} = \frac{0.693}{k}$	
	$30\text{min} = \frac{0.693}{k}$	
	$k = 0.0231\text{min}^{-1}$	1
	$k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$	½
	$t = \frac{2.303}{0.0231} \log \frac{100}{10}$	½
	$t = \frac{2.303}{0.0231}\text{min}$	
	$t = 99.7\text{min}$	1