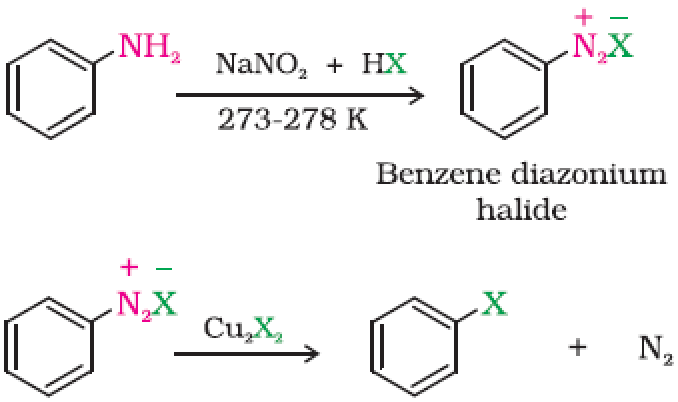
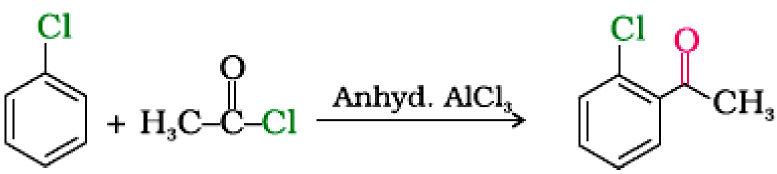
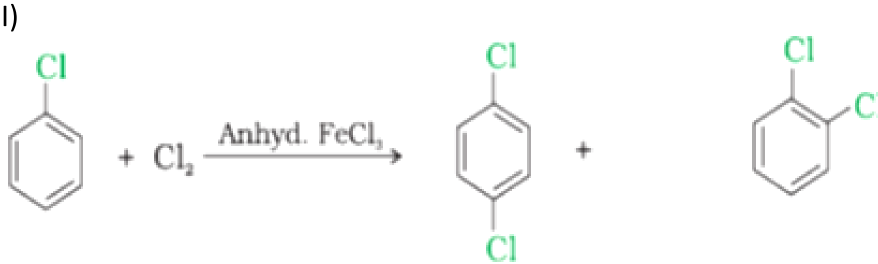
CHEMISTRY MARKING SCHEME

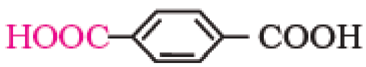
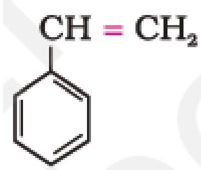
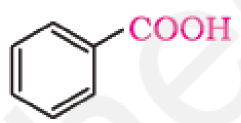
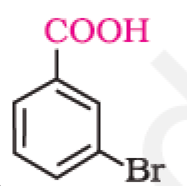
2015

56/3/RU

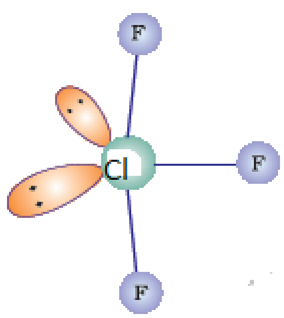
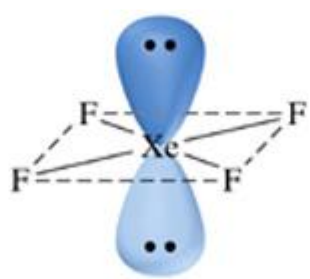
. NO.	Value points	MARKS
Q.1	CH_3-CH(Br)-CH_3	1
Q.2	Due to coagulation of colloidal clay particles	1
Q.3	X_4Y_3	1
Q.4	H_2SO_3 $H_2SO_4H_2S_2O_8$,H_2SO_5 (any two formulae)	½ + ½
Q.5	1-ethoxy-2-methylpropane	1
Q.6	(i) Negative deviation ,temperature will increase. (ii) Blood cell will swell due to osmosis , water enters into the cell.	½ +½ ½+½
Q.7	Cu^{2+} + $2e^-$ → 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 by Faraday First law m = zx i xt z = atomic mass/valencyxF 1.27 = 63.5x2xt/2x96500 t = 1930 s	 1 1 ½ ½ 1
Q.8	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.9 Q9.	(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-CH_2-COOH < F-CH_2-COOH	1 1 1 1
Q.10	(i) Pentaamminechloridocobalt(III) ion (ii) $K_2[NiCl_4]$	1 1

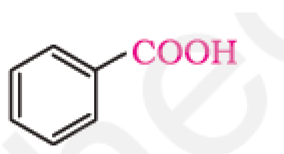
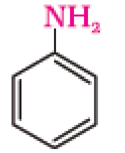
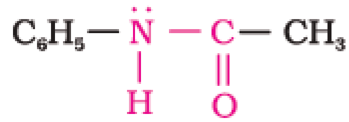
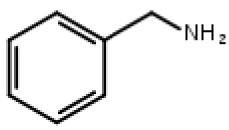
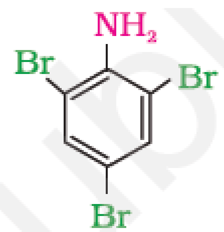
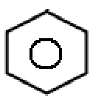
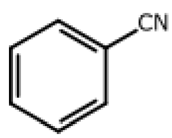
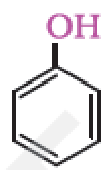
Q.11	Physisorption : adsorbate is held by weak van der Waals' force non-specific It forms multimolecular layer Chemisorption : adsorbate molecules are held by strong forces like a chemical bond It is specific It forms unimolecular layer (or any correct three points)	1,1,1
Q.12	(i) Phenoxide ion is stabilized 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.13	$\frac{p^0 - p}{p^0} = \frac{w_s x\ Msolvent}{M_s\ x\ Wsolvent}$, s = solute (32 – 31.84)/32 = 10 x 18/ Ms x 200 M_s = 180 g/mol	1 1 1
Q.14	(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 bubble.	1 1 1
Q.15	(i) Starch. (ii) α- Helix polypeptide chains are stabilized by intramolecular H-bondingwhereas β- pleated sheet is stabilized by intermolecular H-bonding. (or any other difference) (iii) Pernicious anaemia	1 1 1
Q.16	$\Lambda_m = \frac{1000\ x\ k}{M}$ 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 = λ^0 $HCOO^-$ + $\lambda^0 H^+$ (50.5 + 349.5) S cm^2mol^{-1} = 400 S cm^2mol^{-1} α = Λ_m / Λ_m^0 α = 210 /400 = 0.525	½ 1 ½ 1

Q.17	(i) Hydration isomerism (ii) Electronic configuration ist$_{2g}^{4}$ / by diagram (iii) Hybridization is sp^3d^2 and shape is octahedral.	1 1 ½ + ½
Q.18	(i)  (where X=Br) (ii)  iii) $CH_3CH_2Cl \xrightarrow[dry\ ether]{Na} CH_3CH_2CH_2CH_3$	 1 1 1
	OR	
Q18	(I)  	1

	(ii) CH_3CH_2Cl + $AgNO_2$ → $CH_3CH_2NO_2$ + $AgCl$ (iii) $CH_3CH_2CH_2CH(Br)CH_3$ + KOH (alc.) → $CH_3CH_2CH{=}CHCH_3$	1 1
Q.19	(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.20	(i) ethylene glycol $HO\text{-}CH_2\text{-}CH_2\text{-}OH$ Terephthalic acid  (ii) 1,3- butadiene $CH_2{=}CH\text{-}CH{=}CH_2$  Styrene (iii) Chloroprene $CH_2{=}C(Cl)\text{-}CH{=}CH_2$ (Note: Half mark for name/s and half mark for structure/s in each case)	½ +½ ½ + ½ ½ , ½
Q.21	i) $(CH_3)_2C{=}N\text{-}NH_2$ ii)  / benzoic acid iii)  / m-bromobenzoic acid	1+1+1
Q.22	(i) Stoichiometric defect (ii) Schottky defect e.g.NaCl (or any other example) (iii) Density of crystal decreases	1 ½ + ½ 1
Q.23	(i) Social awareness ,Health conscious, Caring , empathy, concern .(or any other two values) (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)	½ , ½ 1 1 ½ + ½

Q.24	(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 = $- \Delta[R]/ \Delta t$ = - [0.025 – 0.05 / 20 - 10] = 0.0025 mol $L^{-1}s^{-1}$	½ 1 1 ½ ½ ½ 1
Q24.	OR (a) (i) Rate of reaction becomes 4 times (ii) Over all order of reaction = 2 (b) $t_{1/2} = \frac{0.693}{k}$ $30min = \frac{0.693}{k}$ $k = 0.0231 min^{-1}$	1 1 1

	$k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$ $t = \frac{2.303}{0.0231} \log \frac{100}{10}$ $t = \frac{2.303}{0.0231}$ min t = 99.7min	½ ½ 1
Q.25 Q25.	(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.26		1 x5

Q26.	A =  B=  C=  D=  E=  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 isocynaide whereas C_6H_5-NH-CH_3 does not (or any other correct test)	1,1,1 1 1