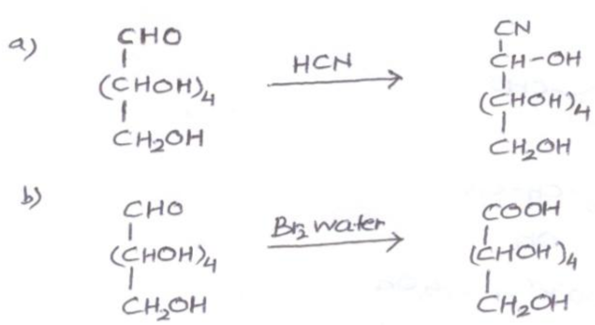
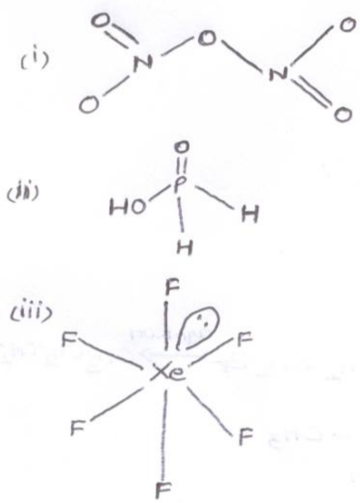
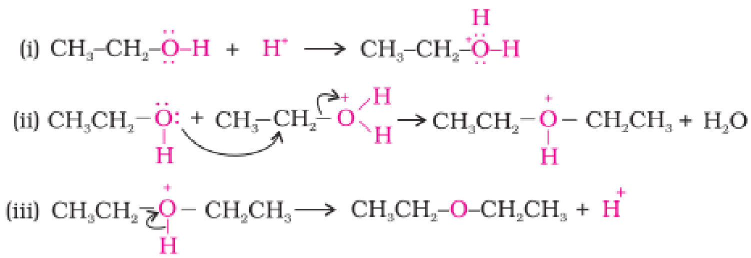
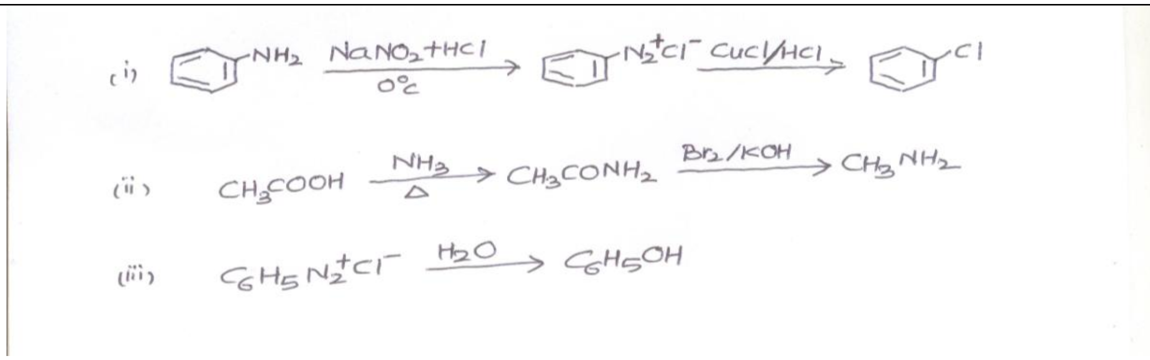
CHEMISTRY MARKING SCHEME
FOREIGN-2013
SET -56/2/1

Q no.	**Answers**	**Marks**
1	Metallic solids	1
2	Osmotic pressure	1
3	Zone refining	1
4	2-chloro-3-methylbutane	1
5	Phenol < 4-nitrophenol < 2,4,6-trinitrophenol	1
6	$CH_3 - CH(OH) - CH_2 - CHO$	1
7	Because of +I effect or electron donating nature of methyl group.	1
8	Hexamethylene diamine and adipic acid	1
9	According to Henry's law, $p = k_H x_{CH_4}$ $\therefore \quad x_{CH_4} = \frac{p}{k_H} = \frac{760 \text{ mm Hg}}{4.27 \times 10^5 \text{ mm Hg}} = 1.78 \times 10^{-3}$ Mole fraction of methane in benzene; $x_{CH_4} = \mathbf{1.78 \times 10^{-3}}$.	½ 1 ½
10	(1) [illegible] (2) [illegible] to freeze the solution, temperature has to be lowe[illegible]	1 1
11	a) $k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$ $t = \frac{2.303}{60 \text{ s}^{-1}} \log 10$ **t = 0.0383sec**	½ 1 ½
12	a) Peptization takes place. b) Because of larger surface area.	1 1
13	Lyophilic sols: 1. Lyophilic sols are solvent attracting; 2. Reversible Lyophobic sols: 1. Lyophobic sols are solvent repelling; 2. Irreversible	

	3. Stable ex. Gum, gelatine, starch, rubber *(any one)*	3. Unstable (any two) ex. Metal sols, metal sulphides *(any one)*	½+½ ½+½
14	Alumina is leached out by using conc. NaOH solution to sodium aluminate and silica as sodium silicate. $Al_2O_3 + 2NaOH + 3H_2O \longrightarrow 2Na[Al(OH)_4]$ Aluminium hydroxide or hydrated alumina is then ppt. by passing CO_2 gas whereas sodium silicate remained in solution. Aluminium hydroxide is ignited to get pure alumina. (or explained in any other correct suitable manner) OR (a) $Cu_2S + FeS$ (b) Depressant is used to separate sulphide ore selectively from a mixture of two sulphide ores.		2 1 1
15	(i) HF < HCl < HBr < HI (ii) $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$		1 1
16			1 1
17	a) Hydrogen bonding b) Nucleotide is sugar + nitrogenous base + phosphate group whereas Nucleoside is sugar + nitrogenous base.		1+1

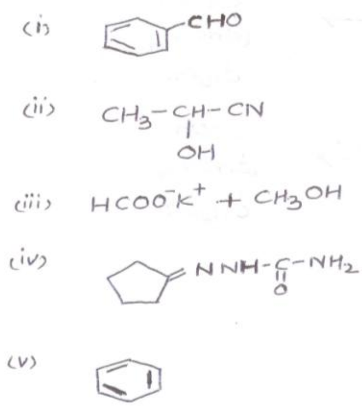
18	1) Buna-S < Polythene < nylon-6,6 2) Neoprene < PVC < Nylon-6	1+1
19	$d = \frac{z \times M}{a^3 \times N_A}$ $2.7\ g\ cm^{-3} = \frac{z \times 27\ g\ mol^{-1}}{(4.05 \times 10^{-8}\ cm)^3 \times 6.022 \times 10^{23}\ mol^{-1}}$ $z = \frac{2.7\ g\ cm^{-3} \times 6.022 \times 10^{23}\ mol^{-1} \times (4.05 \times 10^{-8}\ cm)^3}{27\ g\ mol^{-1}}$ $\mathbf{z \approx 4}$ **Hence the cubic unit cell is f.c.c.**	½ 1 ½ 1
20	1) I[st] order 2) – k 3) sec^{-1}	1x3=3

21		1 x3=3
22	i) Due to discrete tetrahedral structure and angular strain, white phosphorus is more reactive whereas red phosphorus is polymeric and therefore less reactive. ii) Because of higher charge/size ratio of Sn^{4+}. iii) Due to its ease of liberating nascent oxygen. OR	1x3=3
22	(i) $PCl_3 + 3H_2O \longrightarrow H_3PO_3 + 3HCl$ (ii) $XeF_2 + PF_5 \longrightarrow [XeF]^+[PF_6]^-$ (iii) $2NaN_3 \longrightarrow 2Na + 3N_2$	1x3=3
23	i) Dibromidobis-(ethane-1,2-diamine)cobalt(III) / Dibromidobis-(ethylenediamine)cobalt(III) ii) Ionization isomerism iii) Because of back bonding(synergic bonding), CO stabilize the complex more than NH_3.	1 x 3=3

24	i) Retention of configuration ii)Inversion of configuration iii) Racemisation	1x3=3
25	 (b) CrO_3 / $KMnO_4$/ Acidified $K_2Cr_2O_7$	½ ½ 1 1
26	 	1x3=3
27	i) Helping, caring and setting an example of true friendship. ii) Tranquilizers iii) Because in excess it act as poison and can harm the nervous system.	1x3=3
28	(a) Kohlrausch's law states that limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte. It is used to calculate $\Lambda^0 m$ of even weak electrolyte./ It is used to calculate degree of dissociation.	1 1

28	(b) **$R=\rho(l/a)$** **Cell constant $l/a = R/\rho = R\kappa$** $= (1500\ \Omega) \times (0.15 \times 10^{-4}\ S\ cm^{-1})$ **$= 0.225\ cm^{-1}$** OR $E^o_{cell} = E^o_{cathode} - E^o_{anode}$ $= 0.34\ V - (-2.36)\ V$ $= +2.70\ V$ $E_{cell} = E^o_{cell} - \frac{0.059}{2} \log \frac{[Mg^{2+}]}{[Cu^{2+}]}$ $E_{cell} = 2.70\ V - \frac{0.059}{2} \log \frac{(0.001\ M)}{(0.0001\ M)}$ $2.70\ V - \frac{0.059}{2} \log (10)$ $= 2.70\ V - 0.0295\ V$ **$= 2.6705\ V$** $\Delta_r G^o = - nFE^O_{cell}$ $= - 2 \times 96500\ C\ mol^{-1} \times 2.70\ V$ $= -521.1\ kJ\ mol^{-1}$	 1 1 1 ½ ½ 1 1 ½ 1 ½
29	i) Because of the absence of unpaired electron in the formation of metallic bond / because of non-involvment of d-orbital electrons in the formation of metallic bond. ii) Because of lanthanoid contraction. iii) Because of incomplete filling of d-orbitals.	

	iv) Because of low $\Delta_{hyd} H^{o}$ and high $\Delta_{a} H^{o}$ of Cu^{2+} ion and Cu respectively. v) Because Cr^{3+} has stable t_{2g}^{3} half filled configuration.	1x5=5
	OR	
29	$2MnO_2 + 4KOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$	1
	MnO_4^{2-} undergoes disproportionation reaction in acid medium to give MnO_4^{-} ion.	1
	$3MnO_4^{2-} + 4H^{+} \rightarrow 2MnO_4^{-} + MnO_2 + 2H_2O$	1
	i) $MnO_4^{-} + 8H^{+} + Fe^{2+} \rightarrow Mn^{2+} + Fe^{3+} + 4H_2O$	1
	ii) $2MnO_4^{-} + 16H^{+} + 5C_2O_4^{2-} \rightarrow 2Mn^{2+} + 10CO_2 + 8H_2O$	1
30	a) i) Because carbon of carbonyl group in ethanal is more electrophilic than of ketone due to the presence of one electron donating methyl group. ii) Because of the absence of α- hydrogen atom. iii) Because of extensive association of hydrogen bond / dimerisation in carboxylic acid	1x3=3
	b) i) Add $NaOH + I_2$, acetophenone gives yellow ppt. of CHI_3 whereas benzophenone does not for many ppt. ii) Add $NaOH + I_2$, ethanal gives yellow ppt. of CHI_3 whereas benzaldehyde does not for many ppt. ***(or any other correct suitable test)*** OR	1+1

30	 Sh. S K Munjal Dr (Mrs.) Sangeeta Bhatia Prof. R D Shukla Dr. K N Uppadhya Mr. Rakesh Dhawan Ms. Neeru Sofat Mr. Virendra Singh Mr. K M Abdul Raheem Mr. D A Mishra Mr. Deshbir Singh Mr. Akhileshwar Mishra	1 x5=5