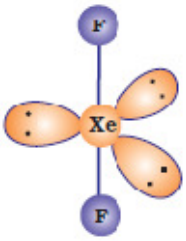
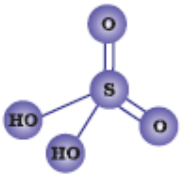
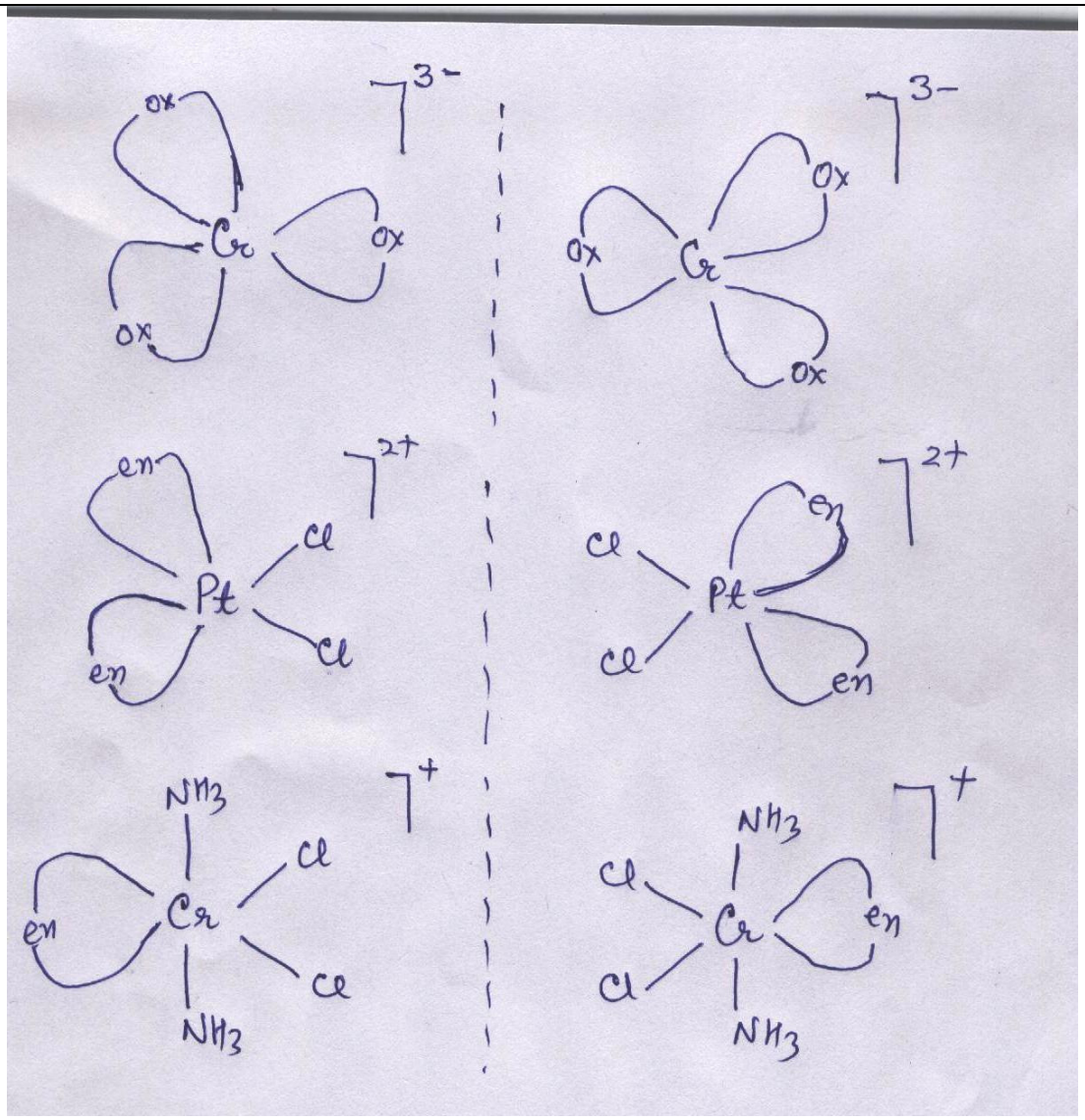
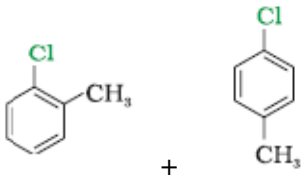
CHEMISTRY MARKING SCHEME
DELHI -2014
SET -56/1/1

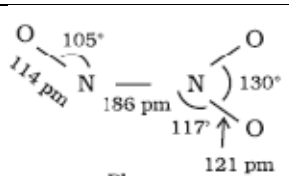
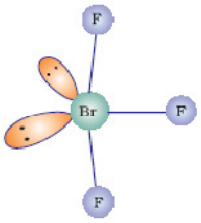
Qn	Answers	Marks
1	2	1
2	Lyophillic sol are liquid loving and lyophobic are liquid hating (or any other suitable difference)	1
3		1
4	SiO_2 removes impurtiy FeS, FeO in the form of slag.	1
5	Due to incomplete filling of d-orbitls	1
6	CH_3CH (Br) CH_2 CH_2 CH_3	1
7	2-methylpropanal	1
8	CH_3 NH_2	1
9	Vapour pressure of a solvent decreases This is due to fraction of surface area gets covered by non-volatile solute particles.	1 1
10	a) IIIrd Order b) s^{-1}/ min^{-1}/ $time^{-1}$	1 1
11	a) In roasting, ore is heated in a regular supply of air. b) In calcination, ore is heated in the absence or limited supply of air.	1 1
12	i)  ii) $[PCl_4]^+$ $[PCl_6]^-$	1 1

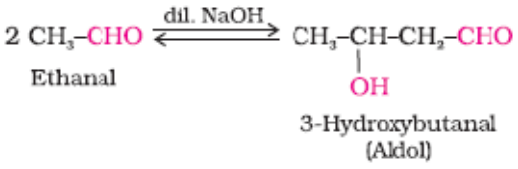
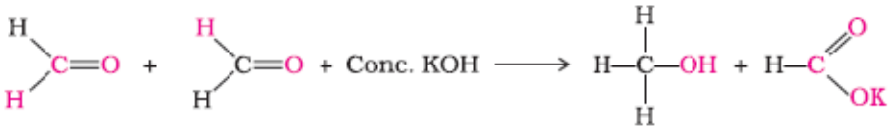
13	i)	Due to strong metallic bonding / due to involvement of greater number of electrons from (n-1)d and ns electrons in the interatomic metallic bonding	1
	ii)	Due to stability of d^0, d^3 and d^5 orbitals	1
		OR	
13	i)	The successive decrease in the size of atoms due to filling of inner orbitals in elements of atomic numbers 57 to 71 (in lanthanoid series) is called lanthanoid contraction	1
	ii)	It causes the radii (atomic sizes) of the third transition series to be very similar to those of the corresponding members of the second series.	1
14	i)	Because of the ability of oxygen to form multiple bonding with metal.	1
	ii)	Due to increase in stability of their lower oxidation states	1
15	i)	$R\text{–}X + R'\text{–}\ddot{O}\,Na \longrightarrow R\text{–}\ddot{O}\text{–}R' + Na\,X$	1
	ii)	 2-Hydroxybenzoic acid (Salicylic acid)	1
16	i)	$CH_3\text{-}CH{=}CH_2 \xrightarrow{H2O/H^+} CH_3\text{-}CH(OH)\text{-}CH_3$	1
	ii)	$CH_3\text{-}CH_2\text{-}Cl \xrightarrow{aq.NaOH} CH_3\text{-}CH_2OH \xrightarrow[CrO_3/PCC]{[O]} CH_3\text{-}CHO$ (or any other suitable method)	1
17	i)	Because deficiency of vitamin A causes night blindness whereas deficiency of vitamin C causes scurvy.	½ +½
	ii)	Nucleotide – base + sugar + phosphate whereas nucleoside is combiation of base and sugar.	1
18	Glucose does not form the hydrogensulphite addition product with NaHSO3. The pentaacetate of glucose does not react with hydroxylamine indicating the absence of free —CHO group.		1 1
19	Mass per unit cell = $\frac{63.55\text{g mol}^{-1}}{6.023x10^{23}mol^{-1}}$ x 4 = $4.22x10^{-22}$g Volume of unit cell = $\frac{mass}{density}$ = $4.22x10^{-22}$g / 8.95g cm^{-3} = $4.71x10^{-23}$ cm^3 Edge = $(volume)^{1/3}$ = ($4.71x10^{-23}$ cm^3)$^{1/3}$ = $3.61x10^{-8}$ cm = 361 pm r= $\frac{a}{2\sqrt{2}}$ = $\frac{361\,pm}{2x1.41}$ = 128 pm		½ ½ 1 ½ ½

20	m $HOCH_2CH_2OH = \frac{\Delta T_f}{K_f} = \frac{15.0^0C}{1.86\ \ ^0C/m} = 8.06m$ $\Delta T_b = K_b$ m $HOCH_2CH_2OH = (0.52^0C/m)(8.06m) = 4.19^0C$ $T_b = 100.00^0C + 4.19^0C$ $= 104.19^0C$	1 1 1
21	i) $k = \frac{2.303}{t} \log \frac{[R]_0}{[R]}$ $\text{Log } \frac{100}{85} = -(1.06x10^{-3})\ \text{min}^{-1}\ \frac{t}{2.303}$ $t = \frac{0.1635}{1.06x10^{-3}\ min^{-1}} = 153$ min ii) $\text{Log } \frac{100}{15} = -(1.06x10^{-3})\ \text{min}^{-1}\ \frac{t}{2.303}$ $t = \frac{0.824x2.303}{1.06x10^{-3}min^{-1}}$ t = 1790 min	½ ½ ½ 1 ½
22	a) The accumulation of molecular species at the surface rather than in the bulk of a solid or liquid is termed adsorption. b) Peptization may be defined as the process of converting a precipitate into colloidal sol by shaking it with dispersion medium in the presence of a small amount of electrolyte. c) Sol is solid dispersed in liquid medium	1 1 1
23	i) Pentaamminechloridocobalt (III) chloride ii) Potassium hexacyanidoferate (III) iii) Tetrachloridonickelate (II)	1 1 1
	OR	

23		1 1 1
24	a) i) CH_3I ii) CH_3Cl b) i) CH_3CN ii) 	½+ ½ 1 ½ +½
25	i) Because of salt formation by $-NH_2$ group with anhyd. $AlCl_3$ ii) Because of hydrogen bonding of ethylamine with H_2O whereas aniline does not form hydrogen bond with H_2O.	1 1

	iii)	Because of electron donating CH_3 group, electron density on 'N' increases whereas in aniline electron desnity on 'N' decreases due to resonance.	1
26	i)	Ethene	1
	ii)	Vinyl chloride	1
	iii)	Phenol & formaldehyde	1
27	i)	Disinfectants are the chemicals applied to inanimate objects which either kill or prevent the growth of microorganisms. For example: 1 per cent solution of phenol (or any other suitable example)	½+½
	ii)	Antacides are the drugs which neutralise acid in the stomach. For example: sodium hydrogencarbonate. (or any other suitable example)	½+½
	iii)	Food preservatives prevent spoilage of food due to microbial growth. For example: table salt (or any other suitable example)	½+½
28	a)	Conductivity of solution is inverse of resistivity ^{k} = G l/A	1
		Limiting molar conductivity – when concentration approches zero the conductivity is known as limiting molar conductivity	1
	b)	Specific conductance = $\frac{1}{R}$ x cell constant	½
		= $\frac{1}{100\Omega}$ x 1.25 cm^{-1}	½
		= $1.244 \times 10^{-3}\Omega^{-1}cm^{-1}$	1
		$\Lambda m = \frac{k}{c} = \frac{1.244x10^{-3}\Omega^{-1}cm^{-1}}{c}$	1
		OR	
28	a)	i) At cathode : $Ag^+ + e^- \rightarrow Ag$	½
		At Anode : $2H_2O \rightarrow O_2 + 4H^+ + 4e^-$	½
		ii)At cathode : $H_2O + e^- \rightarrow ½\ H_2 + OH^-$	½
		At Anode : $2H_2O \rightarrow O_2 + 4H^+ + 4e^-$	½
	b)	n=4	½

	ΔG = -nFE^0 -960 kJ =-4 x 96500JxE^0 E^0=$\frac{960000J}{4x96500J}$ = 2.48V≈2.5V	½ 1 ½ ½
29	a) i) $P_4 + 3NaOH + 3H_2O \rightarrow PH_3 + 3NaH_2PO_2$ ii) $XeF_4 + O_2F_2 \rightarrow XeF_6 + O_2$ b) i) Because of increase in electrongativity from Phorphorous to Chlorine ii) Because of decrease in oxidation state of Chlorine from $HClO_4$ to HClO. iii) Because in vapour form, sulphur exists as S_2 molecules and contains unpaired electrons.	1 1 1 1 1
	OR	
29	a) i)  ii)  b) i) SbH_3 <AsH_3<PH_3<NH_3 ii) Te<Se<O<S iii) I_2<Br_2<F_2<Cl_2	1 1 1 1 1

30	a) i) 	1
	ii) 	1
	b) i) On heating with NaOH +I_2, ethanal forms yellow ppt of iodoform whereas propanal does not.	1
	ii) Acetophenone- On heating with NaOH +I_2, forms yellow ppt of iodoform whereas Benzaldehyde does not (or any other test)	1
	iii)As there is a misprint in the question, award 1 mark for any attempt.	1
	OR	
30	a) i) $CH_3COCH_2CH(Cl)CH_3$	1
	ii)$CH_3CH=CH-CHO$	1
	b) i) $CH_2(Br)COOH$	1
	ii) CH_3CH_2OH	1
	iii)$CH_3CH_2CH_3$	1

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