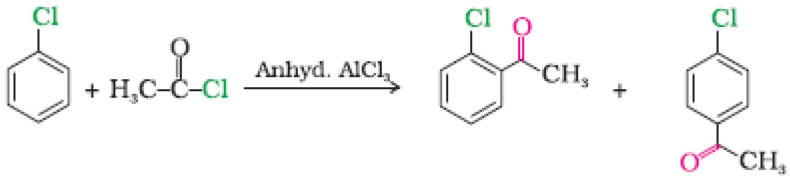
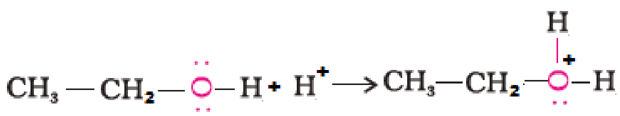
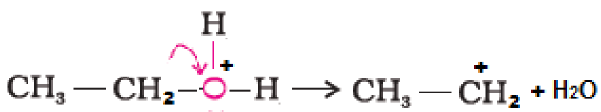
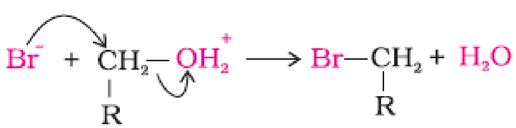
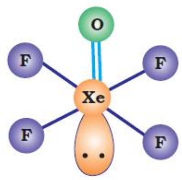
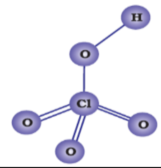
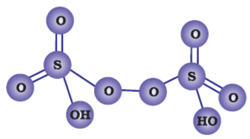
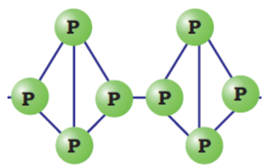
MARKING SCHEME
Chemistry – 2014
FOREIGN – SET (56/2/1)

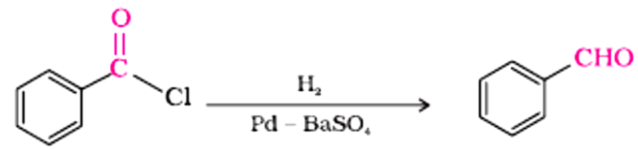
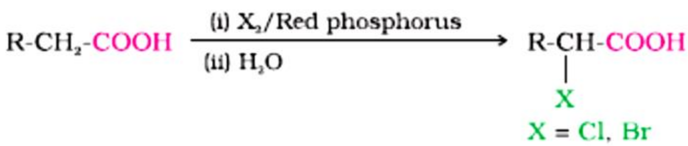
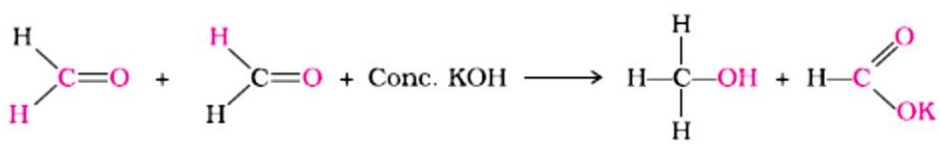
1	Collectors enhance non-wettability of the mineral/ore particles	1
2	van der Waals forces	1
3	Because of high inter-electronic repulsion of non bonding electrons owing to the small bond length / atomic size	1
4	Coordination isomerism	1
5	$r = \frac{\sqrt{3}}{4}a$ or $4r = \sqrt{3}a$	1
6	2 – hydroxybenzaldehyde	1
7	$CH_3 – NH_2$, because of the electron releasing (+I effect) tendency of methyl group	½+½
8	Amylose and amylopectin	1
9	m= z I t I=5 A t= 20 x 60s = 1200s $m = \frac{\text{atomic mass}}{\text{n x F}} \times I \times t$ $m = \frac{58.7 g\ mol^{-1}}{2 \times 96500\ C\ mol^{-1}} \times 5\ A \times 1200\ s$ m= 1.825 g (or any other suitable method)	 ½ ½ 1
10	Half-life of a reaction is the time in which the concentration of a reactant is reduced to half of its initial concentration. (i) $t_{1/2} = \frac{[R]_0}{2k}$ (ii) $t_{1/2} = \frac{0.693}{k}$	1 ½+½
11	$4Ag + 8\ CN^- + 2H_2O + O_2 \rightarrow 4\ [Ag(CN)_2]^- + 4\ OH^-$ $2[Ag(CN)_2]^- + Zn \rightarrow [Zn(CN)_4]^{-2} + 2Ag$ Or $Ag_2S + 4NaCN \rightarrow 2\ Na[Ag(CN)_2] + Na_2S$ $2Na[Ag(CN)_2] + Zn \rightarrow Na_2[Zn(CN)_4] + 2Ag$ (balancing of equation is not necessary)	1 1
12	Rhombic and Monoclinic Rhombic Sulphur Rhombic sulphur changes to monoclinic sulphur	1 ½ ½
	OR	
12	a) High pressure and low temperature b) Because ionization of HSO^-_4 is difficult / removal of proton from negatively charged HSO^-_4 is difficult.	1 1
13	(i) $5S^{2-} + 2MnO^-_4 + 16H^+ \longrightarrow 2Mn^{2+} + 8H_2O + 5S$ (ii) $Cr_2O_7^{2-} + 2\ OH^- \rightarrow 2\ CrO_4^{2-} + H_2O$	1 1
14	Hydridization : sp^3d^2 shape– octahedral IUPAC – hexafluoridocobaltate(III)	½+½ 1

15	(i) $CH_3CH_2-Cl + KOH (aq) \rightarrow CH_3CH_2-OH + KCl$ (ii) 	1 1
16	a) 1-Bromobutane / $CH_3CH_2CH_2CH_2Br$ Because it is a primary alkyl halide b) Because carbocation formed in S_N1 reaction is sp^2 hybridized and planar.	½+½ 1
17	**$HBr \rightarrow H^+ + Br^-$**    Or  (where R = $-CH_3$)	 ½ ½ 1
18	(i) Br_2 / H_2O or aq. Br_2 (ii) $LiAlH_4$ or $NaBH_4$ or H_2 / Ni (or any other) (iii) R – Cl and anhyd . Al Cl_3 (iv) Acidic or alkaline $KMnO_4$, $K_2Cr_2O_7$ (acidic)	½x4=2
19	(i) Schottky defect, due to similar size of K^+ and Cl^- ion (ii) n-type (iii) CO_2 (iv) Ferromagnetic	½ +½ 1 ½ ½
20	a) (i) The fuel cell runs continuously as long as the reactants are supplied (ii) Highly efficient (iii) Pollution free (any two) b) $\log Kc = \frac{nE^0cell}{0.059}$ $\log Kc = \frac{2xE^0cell}{0.059}$	 ½ ½ ½

	$\log 10 = \frac{2 \times E^0_{cell}}{0.059}$ [log 10 = 1] $E^0_{cell} = \frac{0.059}{2} = 0.0295$ V	½ 1
21	$SO_2Cl_2 \rightarrow SO_2 + Cl_2$ At t = 0s: 0.4 atm, 0 atm, 0 atm At t = 100s: (0.4 – x) atm, x atm, x atm $P_t = 0.4 - x + x + x$ $P_t = 0.4 + x$ $0.7 = 0.4 + x$ $x = 0.3$ $k = \frac{2.303}{t} \log \frac{p_i}{2p_i - p_t}$ $k = \frac{2.303}{t} \log \frac{0.4}{0.8-0.7}$ $k = \frac{2.303}{100} \log \frac{0.4}{0.1}$ $k = \frac{2.303}{100} \times 0.6021 = 1.39 \times 10^{-2}\ s^{-1}$	 1 1 1
22	a) $\frac{x}{m} = k\, p^{1/n}$ or $\log (x/m) = \log k + 1/n \log p$ b) Dispersed phase = liquid Dispersion medium = Solid c) Because of coagulation of colloidal particles	1 1 1
23	a) +3 +2 +4 oxidation states b) Transition elements (i) Form coloured compounds (ii) Form complexes (iii) Act as catalysts (iv) Paramagnetic (v) Form alloys (vi) Form interstitial compounds (any two) Or any other c) Zn, because of fully filled d orbitals	1 ½+½ ½+½
	OR	
23	a) Because of stable half filled orbitals ($3d^5$) b) Because Zn has no unpaired electrons in d orbitals. c) Because of the presence of one unpaired electron in Ti^{3+} whereas there is no unpaired electron in Sc^{+3}	1 1 1
24	(i) A = CH_3CN B = $CH_3CH_2NH_2$ C = CH_3CH_2OH (ii) A = CH_3CONH_2 B = CH_3NH_2 C = CH_3NC	½+½+½ ½+½+½
25	(i) Anomers – are the isomers which differ only in the configuration of hydroxyl group at C-1 of glucose Or	1

	$\propto$ and β forms of glucose are called anomers (ii) Denaturation of proteins – when native protein is subjected to physical or chemical change, it loses its biological activity and is called denaturation. (iii) Essential amino acids are the amino acids required in our diet for the growth of the body / which are not synthesized by our body and obtained through diet.	 1 1
26	(i) The drugs which are used to prevent the interaction of histamine with the receptors present in the stomach wall. Eg. Cimetidine / Ranitidine / Dimetapp (or any other) (ii) Chloramphenicol (iii) Because it is unstable at cooking temperature	½+½ 1 1
27	(i) Concern towards environment / caring / socially aware / team work. (atleast two values) (ii) Polymers which can be degraded by the action of microorganisms. Eg. PHBV , Nylon -2-nylon- 6/ any natural polymer (iii) Homo polymer	1 ½+½ 1
28	(i) Raoult's law : state that for a solution containing volatile components, the partial vapour pressure of each component is directly proportional to its mole fraction. Ideal solution. (ii) $\Delta T_b = i K_b \times \frac{\text{Wcacl}_2}{\text{Mcacl}_2} \times \frac{1000}{wH_2O}$ $= 3 \times 0.512 \text{ K kg mol}^{-1} \times \frac{10g}{111\ gmol^{-1}} \times \frac{1000}{200 \text{ kg}}$ $= 0.69K$ or 0.69^0C	1 1 1 1 1
	OR	
28	a) (i) Azeotrope is a liquid mixture which boils at constant temperature with constant composition. (ii) Osmotic pressure : is the pressure applied on the solution side to stop the flow of solvent across the semi permeable membrane from lower concentration of the solution to higher concentration. (iii) Colligative properties : are the properties of solution which depend upon the no of moles of solute or concentration of solute and not on the nature of solute. b) $M = \frac{n_B}{\text{V(L)}} = \frac{w_B}{m_B} \times \frac{1000}{\text{V}(mL)}$ (B→ Solute) $M = \frac{9.8\ g}{98\ g\ mol^{-1}} \times \frac{1000}{100} \times 1.02$ M = 1.02M	 1 1 1 ½ ½ 1
29	a) (i) Because Bi is more stable in +3 oxidation state. (ii) Because of the availability to d orbital in P which is not in N/ nitrogen cannot extend its covalency beyond 4 (iii) Because of the formation of $H_2(g)$ which prevents the oxidation of Fe^{+2} to Fe^{+3} / HCl is only a mild oxidising agent	 1x3=3

	a) (i)  (ii) 	1+1
	OR	
29	a) (i) 	1
	(ii)  Polymeric	1
	b)	1
	(i) Because of the presence of two unpaired electrons .	1
	(ii) Because of high ionization enthalpy of He.	
	(iii) Because of the presence of two P-H bonds in H_3PO_2 whereas in H_3PO_3 one P-H bond is present.	1
30	a) (i)	
	$CH_3\text{-}CHO \xrightarrow{CH_3MgBr} CH_3CH(CH_3)\text{-}OMgBr \xrightarrow{H_3O^+} CH_3CH(OH)\text{-}CH_3$	1
	(ii) $CH_3CHO \xrightarrow[\text{Conc HCl}]{\text{Zn-Hg}} CH_3\text{-}CH_3$	1
	(iii) $C_6H_5CHO + CH_3\text{-}CHO \xrightarrow{\text{dil NaOH}} C_6H_5CH(OH)\,CH_2CHO$ (Award full marks even if only products are given)	1
	b) (i) Add $NaHCO_3$, benzoic acid will give brisk effervescence whereas ethyl benzoate will not give this test. (or any other test)	1
	(ii) Add tollen's reagent , propanal will give silver mirror whereas Butan-2-one will not give this test. (or any other test)	1
	OR	

30	a) (i) Because the positve charge on carbonyl carbon of CH_3 CHO decreases to a lesser extent due to one electron releasing (+I effect) CH_3 group as compared to CH_3 $COCH_3$ (two electron releasing CH_3 groups) and hence more reactive.	1
	(ii) because one of the $-NH_2$ is involved in resonance with carbonyl group and hence acquires positive charge.	1
	(b) (i) 	1
	(ii) 	1
	(iii) 	1
	(or any other suitable reaction)	

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