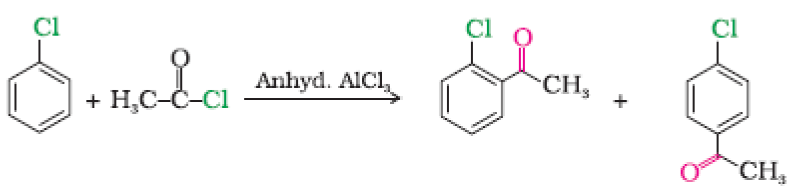
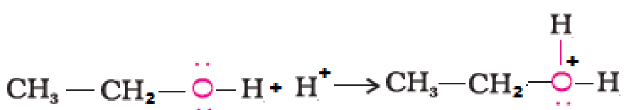
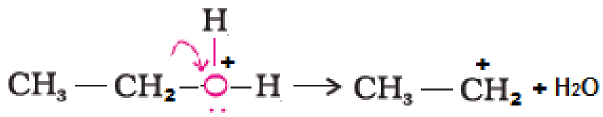
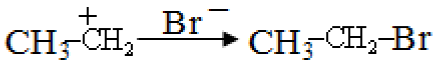
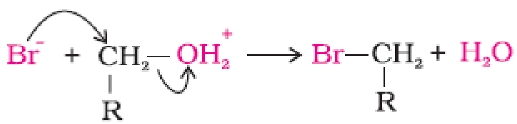
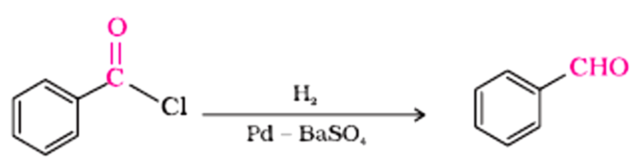
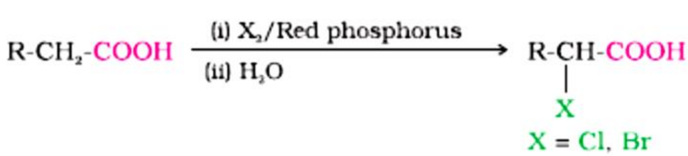
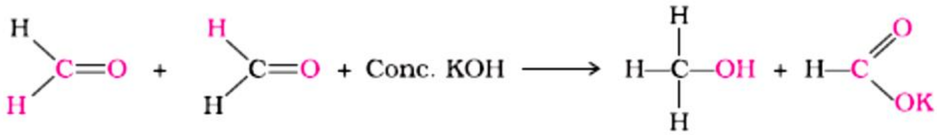
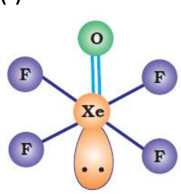
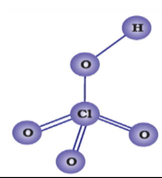
MARKING SCHEME
Chemistry – 2014
FOREIGN – SET (56/2/2)

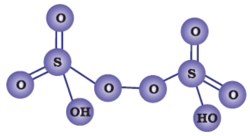
1	Impurities are more soluble in the melt than the solid state of the metal.	1
2	Kraft temperature	1
3	$BiH_3 < SbH_3 < AsH_3 < PH_3 < NH_3$	1
4	Ionization isomersion	1
5	$r = \frac{a}{2\sqrt{2}}$	1
6	$CH_3 – NH_2$; because of increase in electron density on N by +I effect of CH_3 group	½ + ½
7	Chloroprene	1
8	2 – hydroxybenzaldehyde	1
9	(i) CO reacts with Ni to form volatile compound $[Ni(CO)_4]$ which on further heating at higher temperature gives pure Ni (ii) Graphite acts as anode and prevent the liberation of O_2 by forming CO_2 gas and CO gas	1 1
10	(i) $2MnO^-_4 + 5NO^-_2 + 6H^+ \rightarrow 2Mn^{2+} + 5NO^-_3 + 3H_2O$ (ii) $Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$	1+1
11	dsp^2 , square planar Tetracyanonickelate (II)	½+½ 1
12	(i)$CH_3Cl + AgNO_2 \longrightarrow CH_3NO_2 + AgCl$ (ii) 	1 1
13	(i) Conc.HNO_3 (ii) $LiAlH_4$ or $NaBH_4$ OR H_2 / Ni (iii) R COCl/anhyd $AlCl_3$ (iv) CrO_3	½x4=2
14	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
15	**$HBr \rightarrow H^+ + Br^-$** 	½

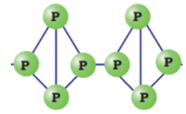
	  Or  (where R = $-CH_3$)	½ 1
16	m= z I t I=5 A t= 20 x 60s = 1200s m= $\frac{\text{atomic mass}}{\text{n x F}}$ = x I x t m= $\frac{58.7 g\ mol^{-1}}{2 \times 96500\ C\ mol^{-1}}$ x 5 A x 1200 s m= 1.825 g (or any other suitable method)	½ ½ 1
17	Half-life of a reaction is the time in which the concentration 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
18	Rhombic and Monoclinic Rhombic Sulphur Rhombic sulphur changes to monoclinic sulphur	1 ½ ½
	OR	
18	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
19	(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 1 1
20	(i) polysaccharides- are carbohydrates which yield a large number of mono saccharide units on hydrolysis. (ii) Amino Acids- are the compounds containing Amino and carboxyl groups. (iii) Enzymes are the biocatalysts which increase the rate of metabolism / chemical reactions in living organism.	1 1 1
21	(i) The drugs which are used to prevent the interaction of histamine with the receptors present in the stomach wall. Eg. Cimetidine / Ranitidine /	1

	Dimetapp (or any other) (ii) Chloramphenicol (iii) Because it is unstable at cooking temperature	 1 1
22	(i) A = CH_3CN B = $CH_3CH_2NH_2$ C = CH_3CH_2OH (ii) A = CH_3 $CONH_2$ B = CH_3NH_2 C = CH_3NC	½+½+½ ½+½+½
23	(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
24	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 = $\frac{2xE^0cell}{0.059}$ log 10 =$\frac{2xE^0cell}{0.059}$ [log 10 = 1] $E^0_{cell} = \frac{0.059}{2}$ = 0.0295 V	 ½ ½ ½ ½ 1
25	$SO_2\ Cl_2 \rightarrow SO_2 + Cl_2$ At t = 0s 0.4 atm 0 atm 0 atm At t = 100s (0.4 – x) atm x atm x atm Pt = 0.4 – x + x + x Pt = 0.4 + x 0.7 = 0.4 + x x = 0.3 $k = \frac{2.303}{t} \log \frac{p_i}{2p_i - p_t}$ $k = \frac{2.303}{t} \log \frac{0.4}{0.8-0.7}$ $k = \frac{2.303}{100} \log \frac{0.4}{0.1}$ $k = \frac{2.303}{100}$ x 0.6021 = 1.39 x 10^{-2} s^{-1}	 1 1 1
26	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
27	a) +3 +2 +4 oxidation states b) Transition elements	1

	(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	 ½+½
	c) Zn because of fully filled d orbitals	½+½
	OR	
27	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
28	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	
28	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 group CH_3) 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)	

	 (or any other suitable reaction)	1
29	(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) $\Delta T_b = i\, K_b \times \frac{W_{cacl_2}}{M_{cacl_2}} \times \frac{1000}{w_{H_2O}}$ $= 3 \times 0.512 \text{ K kg mol}^{-1} \times \frac{10g}{111\, gmol^{-1}} \times \frac{1000}{200 \text{ kg}}$ $= 0.69\text{K}$ or 0.69^0C	1 1 1 1 1
	OR	
29	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) $M = \frac{n_B}{V(L)} = \frac{w_B}{m_B} \times \frac{1000}{V(mL)}$ (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
30	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 b) (i)  (ii) 	 1x3=3 1+1
	OR	
30	a) (i) (ii)	1+1





Polymeric

b) 1

(i) Because of the presence of two unpaired electrons . 1

(ii) Because of high ionization enthalpy of He. 1

(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.

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