Marking scheme – 2017-18

CHEMISTRY (043)/ CLASS XII (Compartment Exam)

56(B)

Q.No	Value Points	Marks
1	Due to its tendency to flow.	1
2	Dispersed phase : Water , Dispersion medium : Air	1
3	Because it reacts readily with water to give hydrocarbon.	1
4	$[Pt(NH_3)_3Cl]Cl$	1
5	A : $CH_3CH(OH)CN$, B: $CH_3CH(OH)COOH$	½ , ½
6	a) Zinc being more reactive and will sacrifies for sake of iron. b) No. of ions per unit volume decreases.	1 1
	OR	
6	The conductivity of a solution at any given concentration is the conductance of one unit volume of solution kept between two platinum electrodes with unit area of cross section and at a distance of unit length. Molar conductivity of a solution at a given concentration is the conductance of the volume V of solution containing one mole of electrolyte kept between two electrodes with area of cross section A and distance of unit length.	1 1
7	a) Rate constant is defined as the rate when the concentration terms are unity. b) Activation energy is the minimum energy required to form an activated complex which may or may not be converted to products.	1 1
8	a) 3 b) sp^3	1 1
9	a) Because it undergoes disproportionation reaction. b) Because Cr^{3+} has stable $t_{2g}^{\ 3}$ configuration.	1 1
10.	a) $C_6H_5OH \xrightarrow{Zn\ dust,\ heat} C_6H_6 \xrightarrow{CH_3Cl,\ Anhyd.AlCl_3} C_6H_5CH_3$ b) $RCOR + R'MgX \longrightarrow R-\underset{R}{\overset{R'}{C}}-OMgX \xrightarrow{H_2O} R-\underset{R}{\overset{R'}{C}}-OH + Mg(OH)X$ (R and R'= CH_3)	1 1
11	Mass of 2×10^{24} atoms = 300g Mass of 6.022×10^{23} atoms = $\frac{300 \times 6.022 \times 10^{23}}{2 \times 10^{24}}$ = 90.3 g $d=\frac{zM}{a^3\ Na} = \frac{4 \times 90.3}{(250 \times 10^{-10})^3 \times 6.022 \times 10^{23}}$ $d=38.4\ g/cm^3$	1 ½ , ½ 1
12	$E_{cell} = E^o_{cell} - \frac{0.0591}{n} \log \frac{[Mg2+]}{[Cu2+]}$ $=2.71V - \frac{0.0591}{2} \log \frac{[0.1]}{[0.01]}$ $= 2.71\ V - 0.0295 \times 1 = 2.68\ V$	1 1 1
	OR	
12	Cell constant , G* = conductivity × resistance $= 1.29 \times 10^{-2}\ Scm^{-1} \times 100\ ohm = 1.29\ cm^{-1}$ Conductivity of 0.02 $mol.L^{-1}$ KCl $= \frac{G*}{Resistance} = \frac{1.29\ cm-1}{520\ ohm} = 0.00248\ S\ cm^{-1}$ $\Lambda m = \frac{k \times 1000}{conc} = \frac{2.48 \times 10^{-3} \times 1000}{0.02} = 124\ S\ cm^2\ mol^{-1}$	1 1 1
13	$k=\frac{2.303}{t} \log \frac{[A]_0}{[A]}$	

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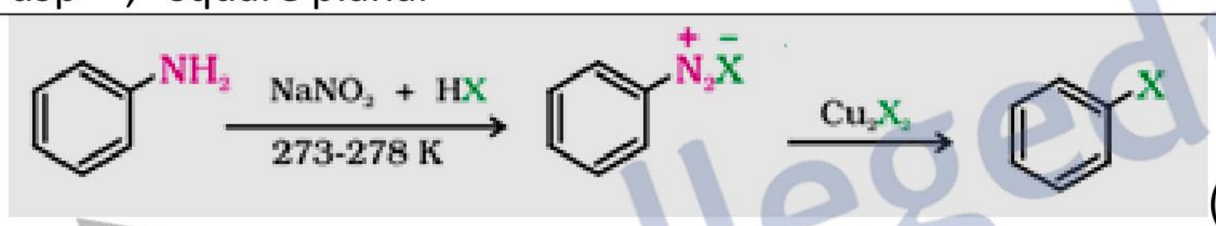
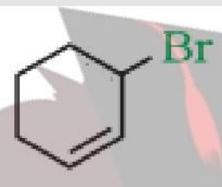
	$k=\frac{2.303}{40}\log\frac{100}{70}$ $k=\frac{2.303}{40}\times 0.1549 = 0.0089\ min^{-1}$ $t_{½}=\frac{0.693}{k}=\frac{0.693}{0.0089}=77.86\ min$	1 1 1
14	a) The process of settling of colloidal particles forming precipitate. b) The process in which reactants and catalyst are in different phase. c) It is the potential difference between the fixed layer and the diffused / double layer of opposite charges around the colloidal particles.	1 1 1
15	a) Zone refining ; It is based on the principle that the impurities are more soluble in the melt than in the solid state of the metal. b) Because iron oxide present in copper ore as impurity reacts with silica forming slag	1,1 1
16	a) It is due to small size , high ionic charge and availability of d-orbitals. b) Because of lanthanoid contraction. c) $3d^5$ of Mn^{2+} is more stable than $3d^6$ of Fe^{2+}	1 1 1
17	a) 5 b) Pentaamminenitrito-O-cobalt(III) chloride c) dsp^2 , square planar	1 1 ½ , ½
18	a)  (where X= Br) b)  c) 4-chloropent-1-ene	1 1 1
19.	A : CH_3COOH , B: CH_3COCl C: CH_3CHO , D: CH_3CH_2OH	1, ½ 1, ½
20.	a) Due to oxidation b) Due to combined effects of solvation , +I and steric effects c) In aniline ,due to resonance(+R effect) lone pair of electrons on nitrogen is not readily available for protonation and hence weaker base than cyclohexylamine.	1 1 1
21	a) Vinyl chloride b) Hexamethylene diamine and adipic acid c) Ethylene glycol and terepthalic acid (Structures of monomers are also accepted)	1 1 1
22	a) Tranquilizers are a class of chemical compounds used for the treatment of stress, and mild or even severe mental diseases. b) Antiseptics are the chemicals which either kill or prevent the growth of microorganisms when applied on living tissues. c) Chemical compounds used for treatment of acidity of the stomach	1 1 1
23	a) Responsive, helpful, kindness (any two) b) Insulin c) Vitamin D ; Rickets	½ + ½ 1 1,1
24	a) Case I : $\frac{p_A^0-p_A}{p_A^0}=\frac{w_B/M_B}{w_A/M_A}$ $\frac{p_A^0-2.8}{p_A^0}=\frac{30/M_B}{90/18}=\frac{6}{M_B}$	½

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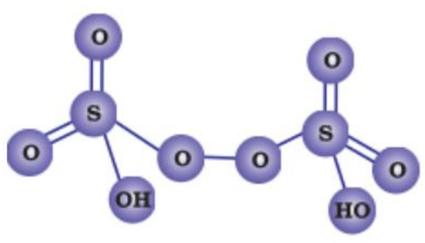
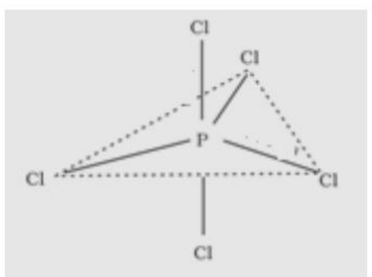
	$\frac{p_A^0 - 2.8}{p_A^0} = \frac{6}{M_B}$ .....(1)	½
	Case II : $\frac{p_A^0 - 2.9}{p_A^0} = \frac{30/M_B}{108/18} = \frac{5}{M_B}$ $\frac{p_A^0 - 2.9}{p_A^0} = \frac{5}{M_B}$ .....(2) Divide equation (1) by (2)	½
	$\frac{p_A^0 - 2.8}{p_A^0 - 2.9} = \frac{6}{5}$ $p_A^0 = 3.4$ kPa	½
	Substituting the value of p_A^0 in equation (1) $\frac{3.4 - 2.8}{3.4} = \frac{6}{M_B}$ $M_B = 34$ g/mol	1
	(or any other suitable method)	
	b) i)Solubilty of gases decrease with increase in temperature, less oxygen is available in summer in lakes but cold waters contains more oxygen.	1
	ii)Because of increase in intermolecular attractions between A---B in comparison to A—A or B---B interactions.	1
	OR	
24	a) $\Delta T_b = K_b.m = \frac{k_b \times w_B \times 1000}{M_B \times w_A}$	1
	$M_B = \frac{k_b \times w_B \times 1000}{\Delta T_b \times w_A} = \frac{2.52 \times 1.5 \times 1000}{(353.93 - 353.23) \times 90}$	1
	$M_B = 60.0$ g/mol	1
	b) Due to osmosis. An increase in temperature accelerates the process of osmosis.	1,1
25	a) i)Due to lower bond dissociation enthalpy of Te-H than S-H bond.	1
	ii)In +5 state it has small size and high polarisation power.	1
	iii)H_3PO_2 has P-H bond due to which it acts as reducing agent.	1
	b) . 	1,1
	OR	
25	a) i) $PCl_5 \xrightarrow{Heat} PCl_3 + Cl_2$	1
	ii) $6\ NaOH + 3Cl_2 \rightarrow 5NaCl + NaClO_3 + 3H_2O$ (hot and conc.)	1
	iii) $Ca_3P_2 + 6H_2O \rightarrow 3Ca(OH)_2 + 2PH_3$	1
	b) .  	1,1

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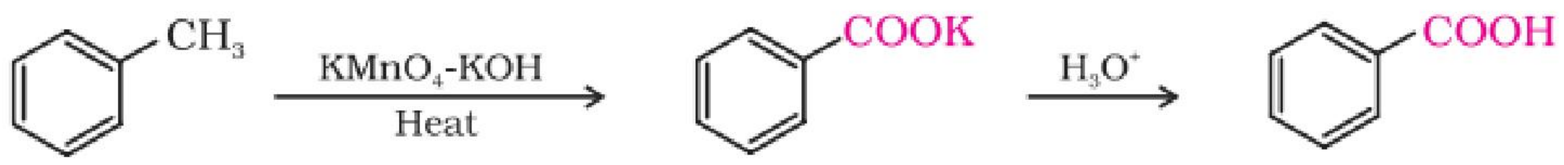
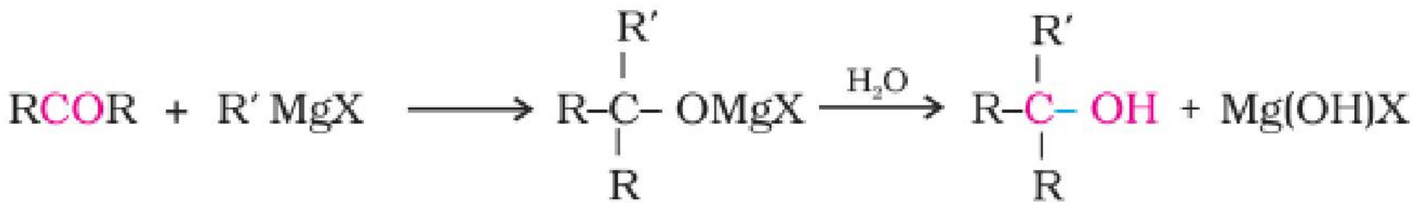
26	a)i)$CH_3COCH_3 \xrightarrow{Zn\text{-}Hg/HCl} CH_3CH_2CH_3$ ii)  iii)  (R and R'= CH_3) d) i)Add ammonical solution of silver nitrate to both the compounds and heat, HCOOH will give silver mirror. ii)Add neutral $FeCl_3$ solution to both the compounds, phenol gives violet complex. (or any other suitable test)	1 1 1 1 1
	OR	
26	a)i)Because carboxyl group gets bonded to the catalyst anhydrous $AlCl_3$ ii)Because $-NH_2$ group closer to carbonyl group is involved in resonance. iii)Sodium bisulphite reacts with carbonyl compound to give crystalline addition product.So these products are easily isolated in pure state from non-carbonyl compounds. b)i) A : CH_3COOH , B: $ClCH_2COOH$ ii) A : C_6H_5COONa , B : C_6H_6	1 1 1 ½ + ½ ½ + ½

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