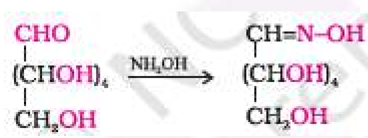
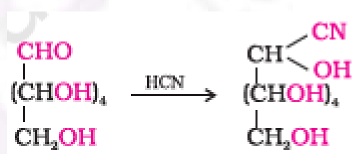
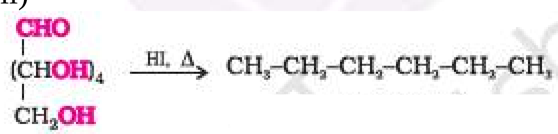
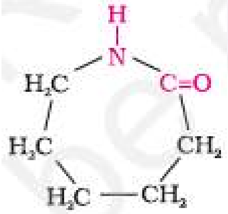
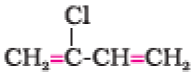
CBSE Class 12 Chemistry Question Paper Solution 2020 Set 56/4/1

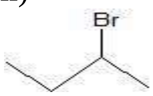
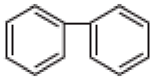
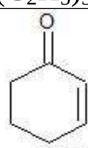
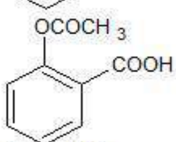
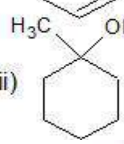
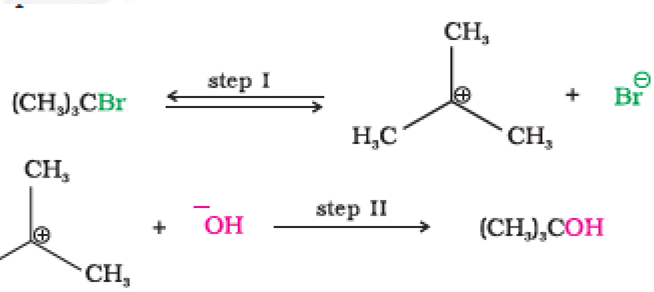
56/4/1
MARKING SCHEME
SR. SECONDARY SCHOOL EXAMINATION, 2020
Subject: CHEMISTRY

Q.No.	Expected Answer / Value Points	Distribution of Marks
	SECTION - A	
1.	Due to preferential adsorption of common ions from solution / due to electron capture by sol particles during electrodispersion of metal/ due to formulation of electrical double layer	1
2.	Due to repulsion between the particles of similar charge.	1
3.	Due to preferential adsorption of I^- from dispersion medium.	1
4.	By electrophoresis / by mixing two oppositely charged sols / by boiling / by persistent dialysis / by addition of electrolyte.	1
5.	K_2SO_4	1
6.	Leaching / Baeyer's process	1
7.		1
8.	$CH_3–CH_2–CH_2–NH_2$	1
9.	Luminal	1
10.	Amylose	1
11.	(c)	1
12.	(d)	1
13.	(c)	1
14.	(c)	1
15.	(b)	1
16.	(B)	1
17.	(A)	1
18.	(D)	1
19.	(A)	1
20.	(C)	1
	SECTION – B	
21.	(i) Reverse osmosis occurs. (ii) Solution shows positive deviation from Raoult's Law.	1 1

22.	(a) The metal is converted into its volatile compound which is collected and decomposed to give pure metal. (b) Different components of a mixture are adsorbed to different extent on an adsorbent.	1 1
	OR	
22.	(i) $2Cu_2S + 3O_2 \longrightarrow 2Cu_2O + 2SO_2$ $2Cu_2O + Cu_2S \longrightarrow 6Cu + SO_2$ / $Cu_2O + C \longrightarrow 2Cu + CO$ (ii) $2[Ag(CN)_2]^-_{(aq.)} + Zn_{(s)} \longrightarrow 2Ag_{(s)} + [Zn(CN)_4]^{2-}_{(aq)}$	½ ½ 1
23.	$2MnO_2 + 4KOH + O_2 \longrightarrow 2K_2MnO_4 + 2H_2O$ $3MnO_4^{2-} + 4H^+ \longrightarrow 2MnO_4^- + MnO_2 + 2H_2O$ / $MnO_4^{2-} \xrightarrow[\text{oxidation}]{\text{Electrolytic}} MnO_4^- + e^-$	1 1
	OR	
23.	$Cr_2O_7^{2-} + 6Fe^{2+} + 14H^+ \longrightarrow 2Cr^{3+} + 6Fe^{3+} + 7H_2O$ $Cr_2O_7^{2-} + 3Sn^{2+} + 14H^+ \longrightarrow 2Cr^{3+} + 3Sn^{4+} + 7H_2O$	1 1
24.	(i) Tetracyanidonickelate(II) / Tetracyanonickelate(II) dsp^2 (ii) Hexaaquairon(II) sp^3d^2	½ ½ ½ ½
25.	(i) A chemical substance which in low concentrations inhibits the growth or destroys microorganisms. eg: Pencillin / Ofloxacin / Chloramphenicol / Tetracycline (ii) Antiseptics are the chemical substances applied to the living tissues which prevent the growth or kill the microorganisms. eg: Dettol / Furacine / Soframycine. (or any other suitable example)	½ ½ ½ ½
26.	i)  or  ii) 	1 1
27.	The partial pressure of the gas in vapour phase (p) is directly proportional to the mole fraction of gas(x) in the solution. $p = K_H.x$ $x = \frac{p}{K_H}$ $x = \frac{760}{1.25\times10^6}$ $= 6.08 \times 10^{-4}$	1 ½ ½

SECTION – C

28.	$\Delta T_f = i\, K_f\, m$ $\Delta T_f = i \times K_f \times \frac{w_B \times 1000}{MB \times w_A}$ $2.94 = i \times 4.9 \times \frac{5\times1000}{122\times35}$ $i = 0.512$ $\alpha = \frac{i-1}{\frac{1}{n}-1}$ $\alpha = \frac{0.512-1}{\frac{1}{2}-1}$ $= 0.976$ $= 97.6\%$	½ ½ ½ ½ 1
29.	$k = A\ e^{-Ea/RT}$ $k = (2.5\times10^{14}\ s^{-1})\ e^{(-25000\ K/T)}$ $\frac{-E_a}{RT} = \frac{-25000K}{T}$ $\frac{E_a}{R} = 25000K$ $E_a = 25000 \times R$ $= 25000 \times 8.314$ J/mol $= 207850$ J/mol or 207.85 kJ/mol $t_{\frac{1}{2}} = \frac{0.693}{K}$, $k = \frac{0.693}{t_{\frac{1}{2}}}$ $k = \frac{0.693}{300\ min}$ $= 0.00231\ min^{-1}$	½ ½ 1 1
30.	i)  Caprolactam / Aminocaproic acid and $NH_2(CH_2)_5COOH$ ii) CH_2=CH-Cl, Vinyl Chloride or Chloroethene iii)  , Chloroprene or 2-Chlorobuta-1,3-diene.	½ + ½ ½ + ½ ½ + ½
31.	(i) Cr^{2+}, because the stable state of chromium is +3 due to t_{2g}^3 configuration. (ii) $Cu^{+}_{(aq)}$, due to more negative $\Delta_{hyd}H^O$ of $Cu^{2+}_{(aq)}$ than $Cu^{+}_{(aq)}$ / It undergoes	1 1

	disproportionation. (iii) Mn^{3+}, because the most stable state of manganese is +2 due to half filled configuration / $3d^5$.	1
32.	i) $(CH_3)_3C\text{-}C(CH_3)\text{=}CHCH_3$ ii)  iii) A=  , B = C_6H_5MgBr	1 1 ½ + ½
	OR	
32.	i) $CH_3CH_2CH\text{=}CH_2 \xrightarrow{\text{HBr / Peroxide}} CH_3CH_2CH_2CH_2\text{-}Br \xrightarrow{\text{NaI / dry acetone}} CH_3CH_2CH_2CH_2\text{-}I$ ii) $C_6H_6 \xrightarrow[\text{AlCl}_{3(anhyd.}]{CH_3COCl,} C_6H_5COCH_3$ iii) $CH_3CH_2OH \xrightarrow{PCl_5} CH_3CH_2Cl \xrightarrow{KCN} CH_3CH_2CN$ (or by any other method of conversion)	1 1 1
33.	(i) $C_6H_5NH_2 < (CH_3)_2NH < CH_3NH_2$ (ii) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$ (iii) $(C_2H_5)_3N < (C_2H_5)_2NH < C_2H_5NH_2$	1 1 1
34.	i)  ii)  iii)  	1 1 1
	OR	
34.	a)  b)  	 1 1 1

SECTION – D

35.

(a) $R = \frac{\rho l}{A}$

Resistivity $\rightarrow \rho = \frac{RA}{l}$ — ½

$= \frac{5 \times 10^3 \times 0.625}{50}$ — ½

$= 62.5\ \Omega$ cm — ½

Conductivity $K = \frac{1}{\rho}$

$= \frac{1}{62.5}$

$= 0.016\ \Omega^{-1}cm^{-1}$ — ½

Molar conductivity $\Lambda_m = \frac{K \times 1000}{C}$ — ½

$= \frac{0.016 \times 1000}{0.05}$

$= 320\ \Omega^{-1}cm^2mol^{-1}$ — ½

(b) At cathode : $Cu^{2+} + 2e^- \longrightarrow Cu$ — ½

Because $E^0_{Cu^{2+}/Cu} > E^0_{H^+/H_2}$ — ½

At anode:

$H_2O \rightarrow \frac{1}{2}O_2 + 2H^+ + 2e^-$

This reaction should occur at anode but due to over-potential of O_2, oxidation of Cl^- is preferred. — ½

$2Cl^- \longrightarrow Cl_2 + 2e^-$ — ½

OR

35.

(a). $E^0cell = E^0_C - E^0_A$ — ½

$= 0.80 - (-0.76) = 1.56$ V — ½

$E\ cell = E^0cell - \frac{0.059}{n}\log\frac{[Zn^{2+}]}{[Ag^+]^2}$ — ½

$= 1.56 - \frac{0.059}{2}\log 10^3$ — ½

$= 1.47$ V (deduct ½ mark for incorrect or no unit) — 1

(b). Y, as molar conductivity increases with dilution due to increase in degree of dissociation. — 1+1

36.

(a) A = $CH_3COCH_2CH_3$ — ½

B = $CH_3CHOHCH_2CH_3$ — ½

C = $CH_3CH{=}CHCH_3$ — ½

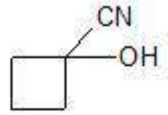
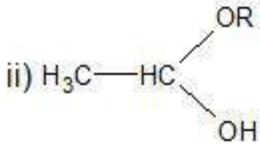
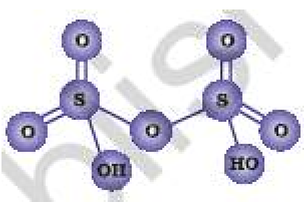
$CH_3COCH_2CH_3 \xrightarrow{NaOH + I_2} CHI_3 + CH_3CH_2COONa$ — 1

$CH_3COCH_2CH_3 \xrightarrow{NaBH_4} CH_3CHOHCH_2CH_3$ — ½

(b) i) Cleavage of C-H bond in propanal is easier than C-C bond in propanone. — 1

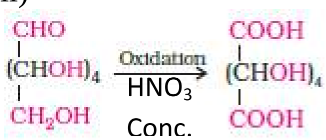
ii) Due to resonance stabilization of conjugate base / enolate ion or structural representation. — 1

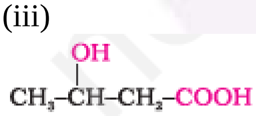
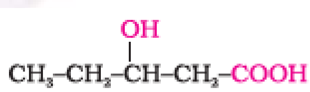
OR

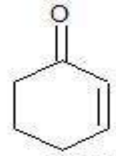
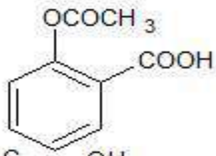
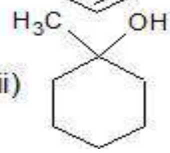
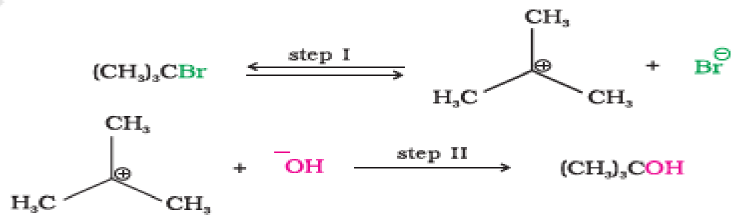
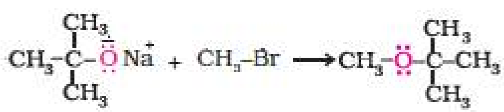
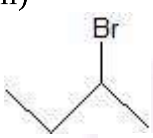
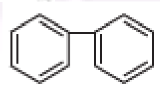
36.	a)	
	i) 	1
		1
	b) i) $H_3C-CH=CH-CH_2-CHO$	1
	ii) CH_3CHO	1
	(c) On heating with $NaOH + I_2$, propanone gives yellow ppt. of CHI_3 while propanal doesn't. (Or any other suitable chemical test)	1
37.	(a) (i) Because of decrease in electronegativity / increase in metallic character.	1
	(ii) Due to decrease in bond dissociation enthalpy from HF to HI.	1
	(iii) Sulphur is more stable in +6 oxidation state.	1
	(b) 	1
	(c) $2XeF_2 + 2H_2O \longrightarrow 2Xe + 4HF + O_2$	1
	OR	
37.	(a) (i) H_2Te, because of low bond dissociation enthalpy	½ + ½
	(ii) H_2O, because of small size and high electronegativity of oxygen, bond pair–bond pair repulsion is more.	½ + ½
	(iii) H_2O, because of high bond dissociation enthalpy.	½ + ½
	(b) $S + 2H_2SO_4 \longrightarrow 3SO_2 + 2H_2O$	1
	$Cl_2 + NaOH \xrightarrow{\text{(Cold and dilute)}} NaCl + NaOCl + H_2O$	1

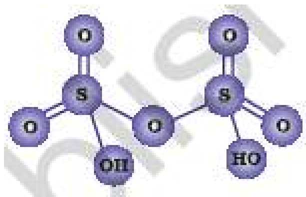
56/4/2
MARKING SCHEME
SR. SECONDARY SCHOOL EXAMINATION, 2020
Subject: CHEMISTRY

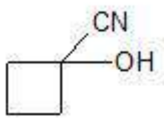
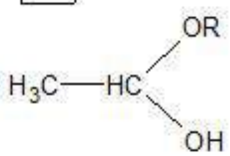
Q.No.	Expected Answer / Value Points	Distribution of Marks
	SECTION - A	
1.	Due to preferential adsorption of common ions from solution / due to electron capture by sol particles during electrodispersion of metal/ due to formulation of electrical double layer.	1
2.	Due to repulsion between the particles of similar charge.	1
3.	Due to preferential adsorption of I^- from dispersion medium.	1
4.	By electrophoresis / by mixing two oppositely charged sols / by boiling / by persistent dialysis / by addition of electrolyte.	1
5.	K_2SO_4	1
6.	NaCN	1
7.	$C_6H_5CH_2Cl$	1
8.	CH_3–OH	1
9.	Codeine	1
10.	Glycosidic linkage	1
11.	(b)	1
12.	(c)	1
13.	(d)	1
14.	(c)	1
15.	(c)	1
16.	(B)	1
17.	(A)	1
18.	(C)	1
19.	(A)	1
20.	(C)	1
	SECTION – B	
21.	$2MnO_2 + 4KOH + O_2 \longrightarrow 2K_2MnO_4 + 2H_2O$ $3MnO_4^{2-} + 4H^+ \longrightarrow 2MnO_4^- + MnO_2 + 2H_2O$ / $MnO_4^{2-} \xrightarrow[\text{oxidation}]{\text{Electrolytic}} MnO_4^- + e^-$ **OR**	1 1
21.	$Cr_2O_7^{2-} + 6Fe^{2+} + 14H^+ \longrightarrow 2Cr^{3+} + 6Fe^{3+} + 7H_2O$ $Cr_2O_7^{2-} + 3Sn^{2+} + 14H^+ \longrightarrow 2Cr^{3+} + 3Sn^{4+} + 7H_2O$	1 1
22.	(i) Reverse osmosis occurs. (ii) Solution shows positive deviation from Raoult's Law.	1 1
23.	(i) Tetracarbonylnickel(0) sp^3 (ii) Hexafluoridocobaltate(III) sp^3d^2	½ ½ ½ ½

24.	The partial pressure of the gas in vapour phase (p) is directly proportional to the mole fraction of gas(x) in the solution. $p = K_H.x$ $x = \frac{p}{K_H}$ $x = \frac{760}{1.25\times10^6}$ $= 6.08 \times 10^{-4}$	1 ½ ½
25.	(i) Chemical compounds used for the treatment of stress, and mild or even severe mental diseases. Example : Equanil / meprobamate / luminal (or any other suitable example) (ii) Sodium salts of sulphonated long chain alcohols or hydrocarbons. Example : Sodium Lauryl sulphate / sodium dodecylbenzenesulphonate (or any other suitable example)	½ ½ ½ ½
26.	i)  ii) 	1 1
27.	(a) The metal is converted into its volatile compound which is collected and decomposed to give pure metal. (b) Different components of a mixture are adsorbed to different extent on an adsorbent.	1 1
	OR	
27.	(i) $2Cu_2S + 3O_2 \longrightarrow 2Cu_2O + 2SO_2$ $2Cu_2O + Cu_2S \longrightarrow 6Cu + SO_2$ / $Cu_2O + C \longrightarrow 2Cu + CO$ (ii) $2[Ag(CN)_2]^-_{(aq.)} + Zn_{(s)} \longrightarrow 2Ag_{(s)} + [Zn(CN)_4]^{2-}_{(aq)}$	½ ½ 1
	SECTION - C	
28.	$k = A \; e^{-Ea/RT}$ $k = (2.5 \times 10^{14} s^{-1})\, e^{(-25000\ K/T)}$ $\frac{-E_a}{RT} = \frac{-25000K}{T}$ $\frac{E_a}{R} = 25000K$ $E_a = 25000 \times R$ $= 25000 \times 8.314$ J/mol $= 207850$ J/mol or 207.85 kJ/mol	½ ½ 1

	$t_{\frac{1}{2}} = \frac{0.693}{K}$, k = $\frac{0.693}{t_{\frac{1}{2}}}$ k = $\frac{0.693}{300\ min}$ = 0.00231 min^{-1}	1
29.	(i) Cr^{2+}, because the stable state of chromium is +3 due to t_{2g}^{3} configuration. (ii) $Cu^{+}_{(aq)}$, due to more negative $\Delta_{hyd}H^{O}$ of $Cu^{2+}_{(aq)}$ than $Cu^{+}_{(aq)}$ / It undergoes disproportionation. (iii) Mn^{3+}, because the most stable state of manganese is +2 due to half filled configuration / $3d^5$.	1 1 1
30.	$\Delta T_f = i\ K_f\ m$ $\Delta T_f = i \times K_f \times \frac{w_B \times 1000}{MB \times w_A}$ $2.94 = i \text{ x } 4.9 \times \frac{5 \times 1000}{122 \times 35}$ i = 0.512 $\alpha = \frac{i-1}{\frac{1}{n}-1}$ $\alpha = \frac{0.512-1}{\frac{1}{2}-1}$ = 0.976 = 97.6%	½ ½ ½ ½ 1
31.	(i) Adipic acid and Hexamethylene diamine $HOOC(CH_2)_4COOH$ n $H_2N\ (CH_2)_6\ NH_2$ (ii) HOH_2C-CH_2OH  Ethylene glycol (Ethane-1, 2 - diol) Terephthalic acid (Benzene-1,4 - di carboxylic acid) (iii)   3-Hydroxybutanoic acid 3-Hydroxypentanoic acid	½ + ½ ½ + ½ ½ + ½
32.	(i) $C_6H_5NH_2 < (CH_3)_2NH < CH_3NH_2$ (ii) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$ (iii) $(C_2H_5)_3N < (C_2H_5)_2NH < C_2H_5NH_2$	1 1 1

33.	i)  ii)  iii) 	1 1 1
	OR	
33.	a)  b) 	1 1 1
34.	i) $(CH_3)_3C\text{-}C(CH_3)=CHCH_3$ ii)  iii) A=  , B = C_6H_5MgBr	1 1 ½ + ½
	OR	
34.	i) $CH_3CH_2CH=CH_2 \xrightarrow{\text{HBr / Peroxide}} CH_3CH_2CH_2CH_2\text{-}Br \xrightarrow{\text{NaI / dry acetone}} CH_3CH_2CH_2CH_2\text{-}I$ ii) $C_6H_6 \xrightarrow[\text{AlCl}_{3(anhyd.}]{CH_3COCl,} C_6H_5COCH_3$ iii) $CH_3CH_2OH \xrightarrow{PCl_5} CH_3CH_2Cl \xrightarrow{KCN} CH_3CH_2CN$	1 1 1

SECTION – D		
35.	(a) (i) Because of decrease in electronegativity / increase in metallic character.	1
	(ii) Due to decrease in bond dissociation enthalpy from HF to HI.	1
	(iii) Sulphur is more stable in +6 oxidation state.	1
	(b) 	1
	(c) $2XeF_2 + 2H_2O \longrightarrow 2Xe + 4HF + O_2$	1
	OR	
35.	(a) (i) H_2Te, because of low bond dissociation enthalpy	½ + ½
	(ii) H_2O, because of small size and high electronegativity of oxygen, bond pair–bond pair repulsion is more.	½ + ½
	(iii) H_2O, because of high bond dissociation enthalpy.	½ + ½
	(b) $S + 2H_2SO_4 \longrightarrow 3SO_2 + 2H_2O$	1
	$Cl_2 + NaOH \underset{\text{(Cold and dilute)}}{\longrightarrow} NaCl + NaOCl + H_2O$	1
36.	(a) $R = \frac{\rho l}{A}$	½
	Resistivity $\rightarrow \rho = \frac{RA}{l}$	
	$= \frac{5 \times 10^3 \times 0.625}{50}$	½
	$= 62.5\ \Omega\ cm$	½
	Conductivity $K = \frac{1}{\rho}$	
	$= \frac{1}{62.5}$	½
	$= 0.016\ \Omega^{-1}cm^{-1}$	½
	Molar conductivity $\Lambda_m = \frac{K \times 1000}{C}$	
	$= \frac{0.016 \times 1000}{0.05}$	½
	$= 320\ \Omega^{-1}cm^2mol^{-1}$	
	(b) At cathode : $Cu^{2+} + 2e^- \longrightarrow Cu$	½
	Because $E^0_{Cu^{2+}/Cu} > E^0_{H^+/H2}$	½
	At anode:	
	$H_2O \rightarrow \frac{1}{2}O_2 + 2H^+ + 2e^-$	
	This reaction should occur at anode but due to over-potential of O_2, oxidation of Cl^- is preferred.	½
	$2Cl^- \longrightarrow Cl_2 + 2e^-$	½

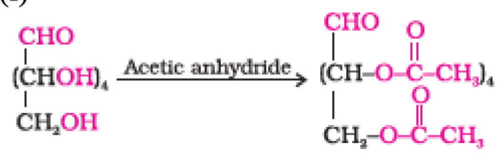
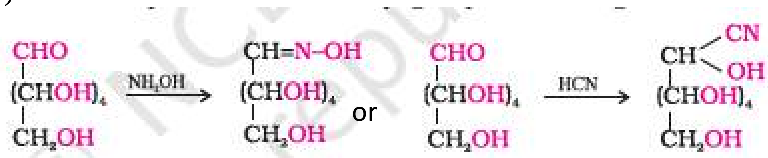
	OR	
36.	(a). $E^0cell = E^0_C - E^0_A$ $= 0.80 – (-0.76) = 1.56$ V $E\ cell = E^0cell – \frac{0.059}{n}\log\frac{[Zn^{2+}]}{[Ag^+]^2}$ $= 1.56 – \frac{0.059}{2}\log 10^3$ $= 1.47$ V (deduct ½ mark for incorrect or no unit) (b). Y, as molar conductivity increases with dilution due to increase in degree of dissociation.	½ ½ ½ ½ 1 1+1
37.	(a) A = $CH_3COCH_2CH_3$ B = $CH_3CHOHCH_2CH_3$ C = $CH_3CH{=}CHCH_3$ $CH_3COCH_2CH_3 \xrightarrow{NaOH + I_2} CHI_3 + CH_3CH_2COONa$ $CH_3COCH_2CH_3 \xrightarrow{NaBH_4} CH_3CHOHCH_2CH_3$ (b) i) Cleavage of C-H bond in propanal is easier than C-C bond in propanone. ii) Due to resonance stabilization of conjugate base / enolate ion or structural representation.	½ ½ ½ 1 ½ 1 1
	OR	
37.	a) i)  ii)  b) i) $H_3C—CH{=}CH—CH_2—CHO$ ii) CH_3CHO (c) On heating with NaOH + I_2, propanone gives yellow ppt. of CHI_3 while propanal doesn't. (Or any other suitable chemical test)	 1 1 1 1 1

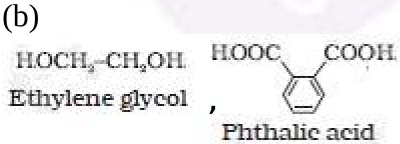
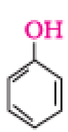
MARKING SCHEME

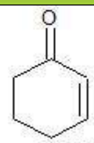
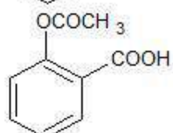
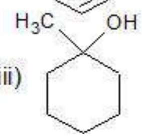
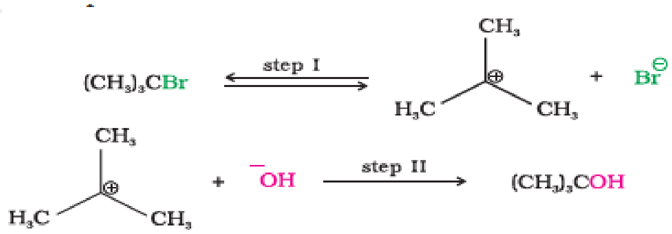
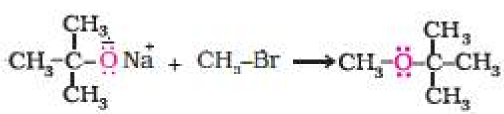
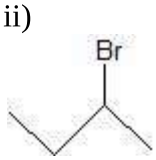
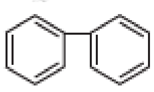
SR. SECONDARY SCHOOL EXAMINATION, 2020

Subject: CHEMISTRY

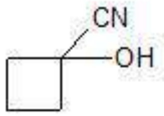
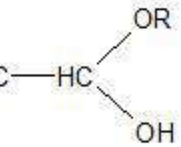
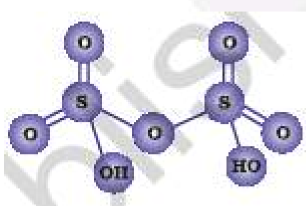
Q.No.	Expected Answer / Value Points	Distribution of Marks
	SECTION - A	
1.	Due to preferential adsorption of common ions from solution / due to electron capture by sol particles during electrodispersion of metal/ due to formulation of electrical double layer.	1
2.	Due to repulsion between the particles of similar charge.	1
3.	Due to preferential adsorption of I^- from dispersion medium.	1
4.	By electrophoresis / by mixing two oppositely charged sols / by boiling / by persistent dialysis / by addition of electrolyte.	1
5.	K_2SO_4	1
6.	Distillation / Electrolytic refining	1
7.	$CH_2=CH-CH_2Cl$	1
8.	$(CH_3)_3N$	1
9.	Fibrous Proteins	1
10.	Bithionol / Bithional	1
11.	(c)	1
12.	(a)	1
13.	(b)	1
14.	(c)	1
15.	(b)	1
16.	(D)	1
17.	(C)	1
18.	(D)	1
19.	(A)	1
20.	(B)	1
	SECTION – B	
21.	(a) The metal is converted into its volatile compound which is collected and decomposed to give pure metal. (b) Different components of a mixture are adsorbed to different extent on an adsorbent.	1 1
	OR	
21.	(i) $2Cu_2S + 3O_2 \longrightarrow 2Cu_2O + 2SO_2$ $2Cu_2O + Cu_2S \longrightarrow 6Cu + SO_2$ / $Cu_2O + C \longrightarrow 2Cu + CO$ (ii) $2[Ag(CN)_2]^-_{(aq.)} + Zn_{(s)} \longrightarrow 2Ag_{(s)} + [Zn(CN)_4]^{2-}_{(aq)}$	½ ½ 1
22.	(i) Reverse osmosis occurs. (ii) Solution shows positive deviation from Raoult's Law.	1 1

23.	i) Hexaamminecobalt(III) d^2sp^3 ii) Tetrachloridonickelate (II) sp^3	½ ½ ½ ½
24.	$2MnO_2 + 4KOH + O_2 \longrightarrow 2K_2MnO_4 + 2H_2O$ $3MnO_4^{2-} + 4H^+ \longrightarrow 2MnO_4^- + MnO_2 + 2H_2O$ / $MnO_4^{2-} \xrightarrow[\text{oxidation}]{\text{Electrolytic}} MnO_4^- + e^-$ **OR**	1 1
24.	$Cr_2O_7^{2-} + 6Fe^{2+} + 14H^+ \longrightarrow 2Cr^{3+} + 6Fe^{3+} + 7H_2O$ $Cr_2O_7^{2-} + 3Sn^{2+} + 14H^+ \longrightarrow 2Cr^{3+} + 3Sn^{4+} + 7H_2O$	1 1
25.	(i)  ii) 	1 1
26.	The partial pressure of the gas in vapour phase (p) is directly proportional to the mole fraction of gas(x) in the solution. $p = K_H.x$ $x = \frac{p}{K_H}$ $x = \frac{760}{1.25\times10^6}$ $= 6.08 \times 10^{-4}$	1 ½ ½
27.	i) Chemical substances used for the treatment of hyperacidity in the stomach Example: $Al(OH)_3/Mg(OH)_2/$ $NaHCO_3$ (or any other suitable example) ii) Chemical substances used to provide sweetness to food with low calories Example: Sucralose / Saccharin / Aspartame (or any other suitable example)	½ + ½ ½ + ½
SECTION - C		
28.	(i) Cr^{2+}, because the stable state of chromium is +3 due to t_{2g}^3 configuration. (ii) $Cu^+_{(aq)}$, due to more negative $\Delta_{hyd}H^O$ of $Cu^{2+}_{(aq)}$ than $Cu^+_{(aq)}$ / It undergoes disproportionation. (iii) Mn^{3+}, because the most stable state of manganese is +2 due to half filled configuration / $3d^5$.	1 1 1
29.	$\Delta T_f = i\, K_f\, m$ $\Delta T_f = i \times K_f \times \frac{w_B\times1000}{MB\times w_A}$ $2.94 = i \text{ x } 4.9 \times \frac{5\times1000}{122\times35}$ $i = 0.512$	½ ½ ½

	$\alpha = \dfrac{i-1}{\frac{1}{n}-1}$ $\alpha = \dfrac{0.512-1}{\frac{1}{2}-1}$ = 0.976 = 97.6%	½ 1
30.	$k = A\ e^{-Ea/RT}$ $k = (2.5 \times 10^{14} s^{-1})\ e^{(-25000\ K/T)}$ $\dfrac{-E_a}{RT} = \dfrac{-25000K}{T}$ $\dfrac{E_a}{R} = 25000K$ $E_a = 25000 \times R$ $= 25000 \times 8.314$ J/mol $= 207850$ J/mol or 207.85 kJ/mol $t_{\frac{1}{2}} = \dfrac{0.693}{K}$, $k = \dfrac{0.693}{t_{\frac{1}{2}}}$ $k = \dfrac{0.693}{300\ min}$ $= 0.00231\ min^{-1}$	½ ½ 1 1
31.	(a)  (b)  (c)  , HCHO ; Phenol and formaldehyde	½ x 6

32.	i)  ii)  iii) 	1 1 1
	OR	
32.	a)  b) 	1 1 1
33.	i) $(CH_3)_3C\text{-}C(CH_3)=CHCH_3$ ii)  iii) A=  , B = C_6H_5MgBr	1 1 ½ + ½
	OR	
33.	i) $CH_3CH_2CH=CH_2 \xrightarrow{\text{HBr / Peroxide}} CH_3CH_2CH_2CH_2\text{-}Br \xrightarrow{\text{NaI / dry acetone}} CH_3CH_2CH_2CH_2\text{-}I$ ii) $C_6H_6 \xrightarrow[\text{AlCl}_{3(anhyd.}]{\text{CH}_3\text{COCl,}} C_6H_5COCH_3$ iii) $CH_3CH_2OH \xrightarrow{PCl_5} CH_3CH_2Cl \xrightarrow{KCN} CH_3CH_2CN$	1 1 1
34.	(i) $C_6H_5NH_2 < (CH_3)_2NH < CH_3NH_2$ (ii) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$ (iii) $(C_2H_5)_3N < (C_2H_5)_2NH < C_2H_5NH_2$	1 1 1

SECTION – D

35.	a) A = $CH_3COCH_2CH_3$	½
	B = $CH_3CHOHCH_2CH_3$	½
	C = $CH_3CH{=}CHCH_3$	½
	$CH_3COCH_2CH_3 \xrightarrow{NaOH + I_2} CHI_3 + CH_3CH_2COONa$	1
	$CH_3COCH_2CH_3 \xrightarrow{NaBH_4} CH_3CHOHCH_2CH_3$	½
	b) i) Cleavage of C-H bond in propanal is easier than C-C bond in propanone.	1
	ii) Due to resonance stabilization of conjugate base / enolate ion or structural representation.	1
	OR	
35.	a) i) 	1
	ii) 	1
	b) i) $H_3C{-}CH{=}CH{-}CH_2{-}CHO$	1
	ii) CH_3CHO	1
	(c) On heating with NaOH + I_2, propanone gives yellow ppt. of CHI_3 while propanal doesn't. (Or any other suitable chemical test)	1
36.	(a) (i) Because of decrease in electronegativity / increase in atomic size / increase in metallic character.	1
	(ii) Due to decrease in bond dissociation enthalpy from HF to HI.	1
	(iii) Sulphur is more stable in +6 oxidation state.	1
	(b) 	1
	(c) $2XeF_2 + 2H_2O \longrightarrow 2Xe + 4HF + O_2$	1
	OR	
36.	(a) (i) H_2Te, because of low bond dissociation enthalpy	½ + ½
	(ii) H_2O, because of small size and high electronegativity of oxygen, bond pair–bond pair repulsion is more.	½ + ½
	(iii) H_2O, because of high bond dissociation enthalpy.	½ + ½
	(b) $S + 2H_2SO_4 \longrightarrow 3SO_2 + 2H_2O$	1
	$Cl_2 + NaOH \xrightarrow[\text{(Cold and dilute)}]{} NaCl + NaOCl + H_2O$	1

37.	(a) $R = \frac{\rho l}{A}$ Resistivity $\rightarrow \rho = \frac{RA}{l}$ $= \frac{5 \times 10^3 \times 0.625}{50}$ $= 62.5\ \Omega$ cm Conductivity $K = \frac{1}{\rho}$ $= \frac{1}{62.5}$ $= 0.016\ \Omega^{-1}cm^{-1}$ Molar conductivity $\Lambda_m = \frac{K \times 1000}{C}$ $= \frac{0.016 \times 1000}{0.05}$ $= 320\ \Omega^{-1}cm^2mol^{-1}$ (b) At cathode : $Cu^{2+} + 2e^- \longrightarrow Cu$ Because $E^0_{Cu^{2+}/Cu} > E^0_{H^+/H2}$ At anode: $H_2O \rightarrow \frac{1}{2}O_2 + 2H^+ + 2e^-$ This reaction should occur at anode but due to over-potential of O_2, oxidation of Cl^- is preferred. $2Cl^- \longrightarrow Cl_2 + 2e^-$	½ ½ ½ ½ ½ ½ ½ ½ ½ ½
	OR	
37.	(a). $E^0cell = E^0_C - E^0_A$ $= 0.80 - (-0.76) = 1.56$ V E cell = $E^0cell - \frac{0.059}{n} \log \frac{[Zn^{2+}]}{[Ag^+]^2}$ $= 1.56 - \frac{0.059}{2} \log 10^3$ = 1.47 V (deduct ½ mark for incorrect or no unit) (b). Y, as molar conductivity increases with dilution due to increase in degree of dissociation.	½ ½ ½ ½ 1 1+1