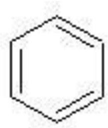
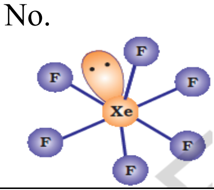
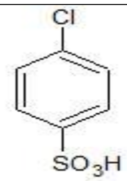
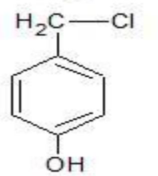
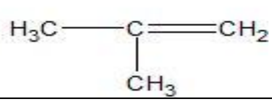
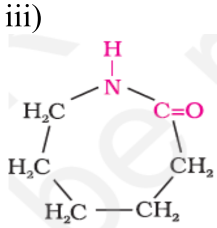
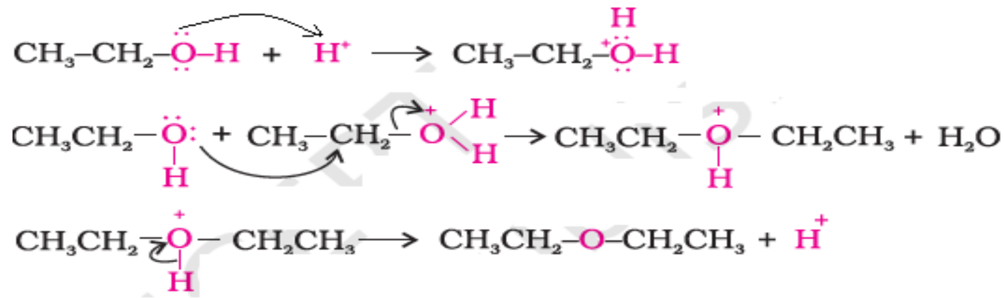
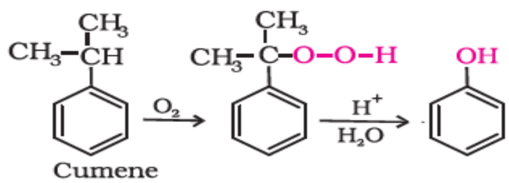
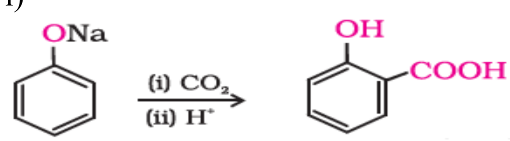
Set – (56/3/2)
MARKING SCHEME
SR. SECONDARY SCHOOL EXAMINATION, 2020
Subject: CHEMISTRY

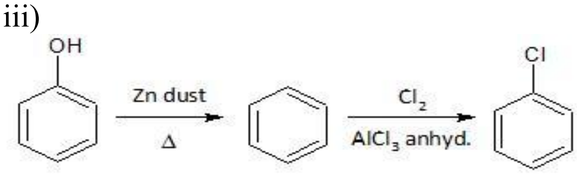
Q.No.	Expected Answer / Value Points	Distribution of Marks
SECTION - A		
1.	Zn , Cd and Hg have completely filled d^{10} configuration in their ground state as well as in their oxidized state.	1
2.	Scandium / Sc	1
3.	Because of multiple oxidation states / ability to form complexes / having large surface area.	1
4.	Involvement of (n-1)d and ns electrons in inter atomic metallic bonding / strong metal-metal bonding.	1
5.	Presence of unpaired e^- showing d-d transition in Cu^{2+}, while in Zn^{2+} there is no unpaired electron.	1
6.	p-dichlorobenzene	1
7.	Benzene / C_6H_6 / 	1
8.	$H_{2(g)}$ / Hydrogen gas	1
9.	Lactose	1
10.	Tranquilizers	1
11.	(D)	1
12.	(B)	1
13.	(C)	1
14.	(D)	1
15.	(C)	1
16.	(iv)	1
17.	(iii)	1
18.	(iv)	1
19.	(i)	1
20.	(i)	1
SECTION – B		
21.	i) Acts as solvent / lowers the melting point of the mixture / Increases the conductivity. ii) It forms a volatile compound $Ni(CO)_4$, which decomposes at higher temperature to give pure Nickel. **OR** $Al_2O_3 + 2\ NaOH + 3H_2O \rightarrow 2\ Na\,[Al(OH)_4]$ $2Na\,[Al(OH)_4] + CO_2 \rightarrow Al_2O_3\ xH_2O + 2\ NaHCO_3$ $Al_2O_3\ xH_2O \xrightarrow{\Delta} Al_2O_3 + xH_2O$	1 1 1 ½ ½

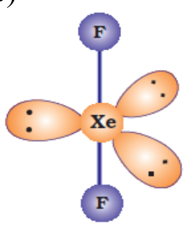
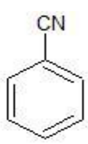
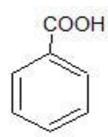
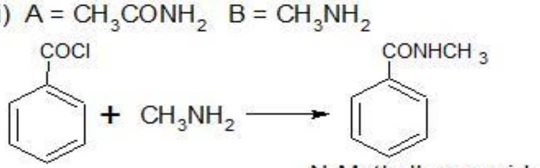
22.	Rate = $-\frac{\Delta[A]}{\Delta t} = -\frac{1}{3}\frac{\Delta[B]}{\Delta t} = \frac{1}{2}\frac{\Delta[C]}{\Delta t}$ (i) Rate = $\frac{1}{2}\frac{\Delta[C]}{\Delta t}$ 2x Rate = $\frac{\Delta[C]}{\Delta t}$ = 2.5 x 10^{-4} Rate = $\frac{2.5 \text{ x } 10^{-4}}{2}$ = 1.25 x 10^{-4} mol $l^{-1}s^{-1}$ ii) Rate = $-\frac{1}{3}\frac{\Delta[B]}{\Delta t}$ 1.25 x 10^{-4} = $-\frac{1}{3}\frac{\Delta[B]}{\Delta t}$ $-\frac{\Delta[B]}{\Delta t}$ = 3 x 1.25 x 10^{-4} = 3.75 x 10^{-4} mol $l^{-1}s^{-1}$	½ ½ ½ ½
23.	a) Hexafluoridocobaltate(III) sp^3d^2 b) Isomerism – Geometrical / optical Cis isomer is optically active	½ + ½ ½ + ½
24.	**Physisorption** / **Chemisorption** 1. It arises because of van der Waals' forces. / 1. It is caused by chemical bond formation. 2. It is not specific in nature. / 2. It is highly specific in nature. (or any other two correct differences)	1 1
	OR	
24.	iii) There are some substances which at low concentration behave as normal strong electrolytes, but at higher concentration exhibit colloidal behavior due to the formation of aggregates. Example: Micelles / soap iv) Oil is dispersed phase and water is dispersion medium. Example : Milk (or any other correct example)	½ + ½ ½ + ½
25.	$XeF_6 + 2H_2O \longrightarrow XeO_2F_2 + 4HF$ No. 	1 ½ ½
26.	i) A linkage between two monosaccharide units through oxygen atom. ii) Protein having a unique three-dimensional structure and biological activity.	1 1
27.	i) Because these are biodegradable ii) Because it is unstable at cooking temperature	1 1
28.	k = $\frac{2.303}{t}\log\frac{[A]o}{[A]}$ = $\frac{2.303}{80}\log\frac{100}{60}$ = $\frac{2.303}{80}$ x (1- 0.7782) = 0.0064 min^{-1} t = $\frac{2.303}{k}\log\frac{[A]o}{[A]}$ = $\frac{2.303}{0.0064}\log\frac{100}{10}$ = 360 min	½ ½ 1 1

29.	$\Delta G^o = -nF\,E^o_{cell}$ $= -2 \times 96500 \times \{0.80 - (-0.25)\}$ $= -202650$ J/ mol Maximum work = 202650 J/ mol $E^o_{cell} = \frac{0.059}{2} log Kc$ $\log Kc = \frac{2 \times 1.15}{0.059}$ $= 35.6$	½ 1 ½ 1
30.	i)  ii)  iii) 	1 1 1
31.	i) $CH_2=CH-CH=CH_2$, $CH_2=CH(CN)$ 1,3-Butadiene Acrylonitrile ii) $H_2C=C(CH_3)-CH=CH_2$ Isoprene iii)  Caprolactam or $NH_2(CH_2)_5COOH$ and Aminocaproic acid	½ + ½ ½ + ½ ½ + ½
32.	Lyophobic sol is liquid or water repelling. Example: $Fe(OH)_3$ sol / gold sol (or any other suitable example) Lyophilic sol is liquid or water attracting. Example: starch sol / rubber sol (or any other suitable example) Due to the charge and solvation of the colloidal particles. **OR** i) The catalytic reaction that depends upon the pore structure of the catalyst and the size of the reactant and product molecules. ii) The formation of micelles takes place only above a particular temperature is called Kraft temperature (T_k) iii) Process of converting a precipitate into colloidal sol by shaking it with dispersion medium in the presence of a small amount of electrolyte.	½ + ½ ½ + ½ ½ + ½ 1 1 1

<table>
<tr><td></td><td></td><td></td></tr>
<tr><td>33.</td><td>a.

b.


OR
i)


ii) $CH_3COCH_3 \xrightarrow{LiAlH_4} CH_3CHOHCH_3 \xrightarrow[443\ K]{H_2SO_{4(conc)}} CH_3CH{=}CH_2$
iii)

</td><td>½
1
½
1
1
1
1</td></tr>
<tr><td>34.</td><td>i) $(CH_3)_3CCH(OH)CH_2COCH_3$
ii) $(CH_3)_3CCH(OH)CN$
iii) $(CH_3)_3CCOONa + (CH_3)_3CCH_2OH$</td><td>1
1
½ + ½</td></tr>
<tr><td colspan="3">SECTION – D</td></tr>
<tr><td>35.</td><td>a) $\pi = i\,CRT$
$4.75 = i \times \frac{5.85}{58.5} \times \frac{1}{1} \times 0.082 \times 300$
i = 1.93
$\alpha = \frac{i-1}{n-1} = \frac{1.93-1}{2-1} = 0.93$ or 93%
b) Partial pressure of gas in liquid is directly proportional to its solubility or mole fraction.
To prevent ‘Bends’
OR</td><td>½
½
1
1
1
1</td></tr>
<tr><td>35.</td><td>a) $\Delta T_f = i\,K_f\,m$
$1 = i \times 1.86 \times \frac{19.5}{78} \times \frac{1000}{500}$
i = 1.075
$\alpha = \frac{i-1}{n-1} = \frac{1.075-1}{2-1} = 0.075$ or 7.5%
b) i) Due to dissociation of KCl / number of particles in 0.1 M KCl is more.
ii) Due to osmosis bacteria loses its water and dies which causes preservation.</td><td>½
½
1
1
1
1</td></tr>
</table>

36.	a) i) Due to high ionization enthalpy ii) Because of higher oxidation state of Cl in $HClO_4$ than in HOCl / ClO_4^- is more stable than ClO^- iii) Because oxygen can form pπ- pπ multiple bond effectively but sulphur can not. b) i) $Cu + 2\ H_2SO_4(conc.) \rightarrow CuSO_4 + SO_2 + 2H_2O$ ii) $C_{12}H_{22}O_{11} \xrightarrow{H_2SO_4} 12C + 11H_2O$ (or any other suitable reaction in both above cases)	1 1 1 1 1
	OR	
36.	a) i) Because of smaller size of F^- ion than Cl^- ion. ii) Because sulphur is more stable in +6 state and Tellurium is more stable in +4 state b) $2F_2 + 2H_2O \longrightarrow 4HF + O_2$ Because I_2 is a weak oxidizing agent. c) 	1 1 1 1 1
37.	a) i) Because aniline gets protonated to give anilinium ion which is deactivating in nature and is meta directing. ii) Because of combined factors of solvation and inductive effects. iii) Because it gives a mixture of amines which is difficult to separate. b) i) On heating with $CHCl_3$ and KOH (alcoholic) $CH_3CH_3NH_2$ gives a foul smelling isocyanide while $(CH_3CH_2)_2NH$ doesn't. ii) On adding benzenediazonium chloride, aniline gives a yellow coloured dye while CH_3NH_2 doesn't. (or any other suitable chemical test)	1 1 1 1 1
	OR	
37.	a) i) A =  B =  ii) A = CH_3CONH_2 B = CH_3NH_2 b)  N-Methylbenzamide c) $(C_2H_5)_2NH < C_2H_5NH_2 < NH_3 < C_6H_5NH_2$	½ + ½ ½ + ½ 1 1 1