

INDIAN SCHOOL MUSCAT**FINAL EXAMINATION****JANUARY 2021****SET A****CLASS XII****Marking Scheme – SUBJECT [THEORY]**

Q.NO.	Answers	Marks (with split up)
1.	i. A ii. C OR B iii. B iv. C	
2.	i) C ii) A OR A iii) B iv) C	
3.	C	
4.	B	
5.	A, B or C OR B	
6.	A OR B	
7.	D	
8.	C	
9.	B	
10.	A OR B	
11.	D OR B	
12.	A OR C	
13.	B	
14.	C	

15.	A	
16.	D	
17.	Derivation	
18.	Structures	
19.	a) Dichloridobis(ethane-1,2-diamine)iron(III)chloride b) Mn^{2+} , $t_{2g}^3 e_g^2$ OR sp^3 , tetrahedral	
20.	$t_{1/2} = 0.693/30 \text{ min}$ $k = 2.303/0231 \log 10$ $= 100.13 \text{ min}^{-1}$ OR $k = 0.693/37.9 = 0.0183 \text{ s}^{-1}$ $k = 2.303/60 \log R_0/R$ $R_0/R = 2.96$ If $[R_0] = 1$, then $[R] = 0.3378$	
21.	a) o and p -chlorotoluene b) benzylchloride OR i) iodide is a better leaving group ii) symmetry, fits crystal lattice	
22.	a) AgCl shows Frenkel defect due to large difference in ion size whereas NaCl shows Schottky defect due to almost similar ionic size b) F centre	
23.	$T_b = K_b m$ $6.34 = 3.63 \times 6.21 \times 1000/M \times 24$ $M = 148.15 \text{ g/mol}$	
24.	a) 3-Methylbut-2-enoic acid b) Structure	
25.	a)  stable carbocation b) Propane isonitrile	
26.	a) i) $XeF_4 + O_2F_2 \rightarrow XeF_6 + O_2$ ii) $NaOH(\text{hot conc.}) + Cl_2 \rightarrow 5NaCl + NaClO_3 + 3H_2O$ b) H ₂ Te, H ₂ Se, H ₂ S, H ₂ O	
27.	Equations	
28.	A-Aniline B-Phenylisocyanide	

	<p>C benzenediazonium chloride Equation OR</p> <ul style="list-style-type: none"> a) Hoffmann reaction b) Hinsberg test c) Diazotization 	
29.	<p>a) Large number of unpaired e and strong metallic bond b) Cu^{2+} is more stable than $\text{Cu}^+(aq)$ because of greater hydration enthalpy . Thus, Cu^+ ions is not stable aqueous solution and undergo disproportionation. c) Due to d-d transitions OR Lanthanoid contraction Consequences</p>	
30.	$d = zM/a^3N_A$ $M = \frac{8x(250 \times 10)^3 \times 6.022 \times 10^{23}}{2}$ $= 37.57 \text{ g/mol}$ $r = \sqrt[3]{a/4}$ $= 108.25 \text{ pm}$	
31.	<p>a) benzoic acid and phenol- neutral FeCl_3 or aq bicarbonate b) chemical equations</p> $\begin{array}{ccc} >\text{C}=\text{O} & \xrightarrow[\text{HCl}]{\text{Zn-Hg}} & >\text{CH}_2 \\ & & + \text{H}_2\text{O} & \end{array} \quad (\text{Clemmensen reduction})$ <p>i)</p> $\begin{array}{ccc} \text{Benzene} & \xrightarrow[\text{Anhyd. AlCl}_3/\text{CuCl}]{\text{CO, HCl}} & \text{Benzaldehyde} \\ \text{Benzene} & & \text{Benzaldehyde} \end{array}$ <p>ii)</p> <p>iii)</p> $\begin{array}{ccc} 2\text{CH}_3\text{CHO} & \xrightleftharpoons{\text{dil. NaOH}} & \text{CH}_3\text{---CH(OH)---CH}_2\text{---CHO} \\ \text{Ethanal} & & \text{3-Hydroxybutanal (Aldol)} \end{array} \xrightarrow[\text{H}_2\text{O}]{\Delta} \begin{array}{c} \text{CH}_3\text{---CH=CH---CHO} \\ \text{But-2-enal} \end{array} \quad (\text{Aldol condensation product})$ <p>c)</p> <p>4-Methoxy benzoic acid ,Benzoic acid, 4-Nitrobenzoic acid, 3,4-Dinitro benzoic acid</p> <p>OR</p> <p>I. $\text{CH}_3\text{COCH}_3 + \text{NH}_2\text{OH} \rightarrow (\text{CH}_3)_2\text{C=NOH}$</p> <p>II. $\text{CH}_3\text{CH}_2\text{CHO} \xrightarrow{\text{NH}_4\text{OH, AgNO}_3} \text{CH}_3\text{CH}_2\text{COOH}$</p> <p>III. $\text{C}_6\text{H}_5\text{CHO} \xrightarrow{\text{conc KOH, red P}_4} \text{C}_6\text{H}_5\text{COONa} + \text{C}_6\text{H}_5\text{CH}_2\text{OH}$</p> <p>IV. $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH} + \text{Cl}_2 \xrightarrow{\text{H}_3\text{O}^+} \text{CH}_3\text{CH}_2\text{CH}(\text{Cl})\text{COOH}$</p>	

	<p style="text-align: center;"> $\text{V. } \text{C}_6\text{H}_5\text{CONH}_2 \xrightarrow{\text{H}_3\text{O}^+} \text{C}_6\text{H}_5\text{COOH}$ </p>	
32.	<p>i) temperature-720K, pressure-200atm ii) repulsion between lone pairs of e iii) Rhombic sulphur iv) $2\text{Fe}^{3+} + \text{SO}_2 + 2\text{H}_2\text{O} \longrightarrow 2\text{Fe}^{2+} + \text{SO}_4^{2-} + 4\text{H}^+$ v) $\frac{3\text{Cu} + 8\text{HNO}_3}{\text{3Cu(NO}_3)_2 + 4\text{H}_2\text{O} + 2\text{NO}}$</p> <p style="text-align: center;">OR</p> <p>a) $4\text{HCl} + \text{O}_2 \xrightarrow[723\text{K}]{\text{CuCl}_2} 2\text{H}_2\text{O} + 2\text{Cl}_2$</p> <p>b) A-chlorine gas, B- ClF_3 $\text{ClF}_3 + \text{H}_2\text{O} \rightarrow \text{ClOF} + \text{HF}$</p> <p>c) BiH_3</p>	
33.	<p>i) Statement + applications ii)</p> <p>$\text{Mg} + \text{Cu}^{2+}(\text{aq}) \rightarrow \text{Mg}^{2+}(\text{aq}) + \text{Cu}$</p> <p><i>Nernst equation for the cell e.m.f is</i></p> $E_{\text{cell}} = E_{\text{cell}}^\ominus - \frac{0.059}{n} \log \frac{[\text{Mg}^{2+}(\text{aq})]}{[\text{Cu}^{2+}(\text{aq})]}$ $E_{\text{cell}}^\ominus = E_{\text{Cu}^{2+}/\text{Cu}}^\ominus - E_{\text{Mg}^{2+}/\text{Mg}}^\ominus$ $= 0.34 - (-2.37)$ $= 0.34 + 2.37$ $= 2.71\text{ V.}$ $E_{\text{cell}} = 2.71 - \frac{0.059}{2} \log \frac{0.1}{1 \times 10^{-3}}$ $= 2.651\text{ V}$ <p style="text-align: center;">OR</p> <p>a) Cathode: $\text{Ag} \rightarrow \text{Ag}^+ + \text{e}^-$ Anode: $4\text{OH}^-(\text{aq}) \rightarrow 2\text{H}_2\text{O}_{(\text{l})} + \text{O}_{(\text{g})} + 4\text{e}^-$</p> <p>b) definition</p> <p>C) Cell constant $G^* = R\kappa = 747.5 \times 0.14114 = 105.5\text{ m}^{-1}$ Conductivity $\kappa = 105/876 = 0.1204\text{ S m}^{-1}$ Molar conductivity $\lambda = 0.1204 / 1000 \times 0.05 = 0.00241\text{ Sm}^2\text{ mol}$</p>	