

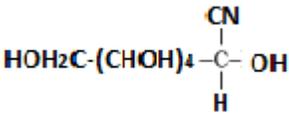
CHEMISTRY MARKING SCHEME

Guwahati -2015

SET -56/2/G

Sr. No.	Value points	Marks						
1	Zn : [Ar] 3d¹⁰4s² / Because of Fully filled d-orbitals in ground state as well as in the oxidized state.	1						
2	1 F/ 1 Faraday	1						
3	$\begin{array}{c} \text{CH}_3 \\ \\ \text{C}_6\text{H}_5 - \text{CH} - \text{Br} \end{array}$	1						
4	Dispersed phase: Solid, Dispersion medium: Gas	½ + ½						
5	2,4 – dimethylphenol	1						
6	$\Delta T_f = T_f^0 - T_f$ The decrease in freezing point of a solvent due to the dissolution of a non-volatile solute in it is called depression in freezing point $\Delta T_f = K_f m$ $\Delta T_f = K_f \times \frac{W_2 / M_2}{W_1 / 1000}$ $M_2 = \frac{K_f \cdot w_2 \times 1000}{W_1 \cdot \Delta T_f}$	1						
7	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Order</td> <td style="width: 50%;">Molecularity</td> </tr> <tr> <td>Sum of powers to which the concentration terms are raised in rate law expression.</td> <td>The number of reacting species in an elementary reaction.</td> </tr> <tr> <td>May also be zero or in fraction</td> <td>Cannot be zero or fraction.</td> </tr> </table> <p align="center">(or any other correct differences)</p>	Order	Molecularity	Sum of powers to which the concentration terms are raised in rate law expression.	The number of reacting species in an elementary reaction.	May also be zero or in fraction	Cannot be zero or fraction.	1+1
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8	i) $\text{C}_6\text{H}_5\text{NH}_2 < \text{CH}_3\text{CH}_2\text{NH}_2 < \text{CH}_3\text{NHCH}_3$ ii) $(\text{CH}_3)_3\text{N} < \text{CH}_3\text{NHCH}_3 < \text{C}_6\text{H}_5\text{NH}_2$	1+1						

9	<p>i) ii) </p>	1+1
10	Dichloridobis(ethane –1,2-diamine)cobalt (III) ion Geometrical Isomerism / cis-trans Isomerism/ optical isomerism	1+1
10	<p style="text-align: center;">OR</p> <p>i) $[\text{Ni}(\text{CO})_4]$ ii) $\text{K}_2[\text{Fe}(\text{CN})_4]$</p>	1+1
11	<p>(i) $\text{CH}_3-\text{CH}_2-\text{CH}_2\text{OH}$ (ii) $\text{CH}_3-\text{CH}_2-\text{CH}(\text{OH})-\text{CH}_3$</p> <p>(iii) </p>	1+1+1
12	<p>(i) </p> <p>(ii) $\text{CH}_3-\text{CH}_2-\text{Cl} + \text{CH}_3\text{ONa} \Rightarrow \text{CH}_3-\text{CH}_2-\text{O}-\text{CH}_3$</p> <p>(iii) $\text{CH}_3-\text{CO}-\text{CH}_3 \xrightarrow[\text{(ii) H}_2\text{O}^+]{\text{(i) CH}_3\text{MgBr}} \text{H}_3\text{C}-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{OH}$</p> <p style="text-align: right;">(Or any other correct method.)</p>	1+1+1
13	<p>(i) Aniline being a base reacts with AlCl_3 (Lewis Acid) to form a salt. (ii) $-\text{CH}_3$ group shows +I – effect (electron releasing group) whereas $-\text{NO}_2$ group shows –I – effect (electron withdrawing group) (iii) To reduce activating effect of $-\text{NH}_2$.</p>	1+1+1

18	<p>a) Impure Zr reacts with I_2 to form volatile ZrI_4 which when heated at higher temperature decomposes to give pure Zr.</p> <p>b) CO acts as a reducing agent.</p> <p>c) It is a mixture of Cu_2S and FeS.</p>	1+1+1
19	<p>(i) Styrene, $C_6H_5-CH=CH_2$</p> <p>(ii) Adipic Acid $HOOC-CH_2-CH_2-CH_2-CH_2-COOH$ Hexamethylenediamine $H_2N-(CH_2)_6-NH_2$</p> <p>(iii) Ethylene glycol $HO-CH_2-CH_2-OH$</p> <p style="text-align: center;">  Terephthalic acid </p> <p style="text-align: center;">(note: half mark for name/s and half mark for structure/s)</p> <p style="text-align: center;">OR</p>	<p>1/2 + 1/2</p> <p>1/2 + 1/2</p> <p>1/2 + 1/2</p>
19	<p>1. Linear polymers – Monomeric units join to form long polymeric chains.</p> <p>2. Branched chain polymers - Monomeric units join not only to form long polymeric chains but also branches.</p> <p>3. Three dimensional network polymers or cross-linked polymers- Monomeric units join to form long polymeric chains and cross links.</p>	<p>1/2 + 1/2</p> <p>1/2 + 1/2</p> <p>1/2 + 1/2</p>
20	<p style="text-align: center;">  </p> <p>(i)</p> <p>(ii) Intermolecular H-Bonding.</p> <p>(iii) Pernicious Anaemia.</p>	1+1+1
21	<p>i) Due to intermolecular H-bonding in ammonia.</p> <p>ii) Bond dissociation enthalpy of $H-Te$ bond is lesser than that of $H-S$ bond.</p> <p>iii) $Cl_2 + H_2O \rightarrow HOCl + HCl$ or Due to the formation of Hydrochloric acid and Hypochlorous acid.</p>	1+1+1
22	<p>(a) (i) sp^3d^2, Octahedral (ii) sp^3, Tetrahedral</p> <p>(b) CO, because of synergic or back bonding.</p>	<p>1/2 + 1/2</p> <p>1/2 + 1/2</p> <p>1/2, 1/2</p>
23	<p>(i) Concern for students health, Application of knowledge of chemistry to daily life, empathy, caring or any other</p> <p>(ii) Through posters, nukkad natak in community, social media, play in assembly or any other</p> <p>(iii) Tranquilizers are drugs used for treatment of stress or mild and severe mental disorders. Eg: equanil (or any other suitable example)</p> <p>(iv) Aspartame is unstable at cooking temperature.</p>	<p>1/2, 1/2</p> <p>1</p> <p>1/2, 1/2</p> <p>1</p>

24	<p>(a) A- CH_3COCl B- CH_3CHO C- $\begin{array}{c} \text{OH} \\ \\ \text{CH}_3-\text{CH}-\text{CH}_3 \end{array}$</p> <p>D- $\text{CH}_3\text{CH}_2\text{OH}$</p> <p>b) i) On heating with NaOH/I_2, $\text{CH}_3\text{COCH}_2\text{CH}_3$ gives yellow ppt of CHI_3 whereas $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$ does not.</p> <p>ii) On adding NaHCO_3 solution, ethanoic acid gives brisk effervescence whereas ethanal does not.</p> <p>(Or any other distinguishing test)</p> <p>c) $\text{CH}_3\text{COCH}_2\text{CH}(\text{Cl})\text{CH}_3$</p>	<p>$\frac{1}{2} \times 4 = 2$</p> <p>1</p> <p>1</p> <p>1</p>
24	<p style="text-align: center;">OR</p> <p>(a) (i) $\text{CH}_3-\text{CH}_2-\text{CH}_3$ (ii) $\text{CH}_3-\text{CH}_2-\text{CH}=\text{N}-\text{OH}$</p> <p>(iii) $\begin{array}{c} \text{OH} \\ \\ \text{CH}_3-\text{CH}_2-\text{CH}-\text{CN} \end{array}$</p> <p>(b) $\text{HCHO} \succ \text{CH}_3\text{CHO} \succ \text{CH}_3\text{COCH}_3$</p> <p>(c) On heating with NaOH/I_2, $\text{C}_6\text{H}_5\text{COCH}_3$ gives yellow ppt of CHI_3 whereas $\text{C}_6\text{H}_5\text{CHO}$ does not.</p> <p>(or any other distinguishing test)</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
25	<p>$E_{\text{Cell}} = (E^{\circ}_{\text{C}} - E^{\circ}_{\text{A}}) - 0.059/2 \text{ V} \log [\text{Mg}^{2+}] / [\text{Ag}^+]^2$ $= [.80 - (-2.37)] - 0.059/2 \text{ V} \log [10^{-2} / (10^{-4})^2]$ $= 3.17 - 0.0295 \text{ V} \times \log 10^6$ $= 3.17 - 0.0295 \text{ V} \times 6$ $= 3.17 - 0.1770$ $= 2.9930 \text{ V}$ $\Delta G = -nFE_{\text{Cell}}$ $= -2 \times 96500 \text{ C mol}^{-1} \times 2.9930 \text{ V}$ $= -577649 \text{ J mol}^{-1}$ $= -577.649 \text{ kJ mol}^{-1}$</p> <p style="text-align: center;">OR</p> <p>$\Lambda_m = (k/M) \times 1000 \text{ Scm}^2 \text{ mol}^{-1}$ $= (4.95 \times 10^{-5} / 0.001) \times 1000 \text{ Scm}^2 \text{ mol}^{-1}$ $= 49.5 \text{ Scm}^2 \text{ mol}^{-1}$</p> <p>$\alpha = \Lambda_m / \Lambda_m^{\circ}$ $\Lambda_m^{\circ} = \lambda_{\text{CH}_3\text{COO}^-}^{\circ} + \lambda_{\text{H}^+}^{\circ}$ $= (40.9 + 349.6) \text{ Scm}^2 \text{ mol}^{-1}$</p>	<p>1</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p>

	$= 390.5 \text{ Scm}^2 \text{ mol}^{-1}$ $\alpha = 49.5/390.5$ $= 0.127 \text{ or } 12.7\%$	1
	b) Which converts energy of combustion of fuels directly into electrical energy. Advantages: high efficiency, pollution free	1 1
26	(i) +3 oxidation state of Eu is more stable. (ii) Due to d-d transition / unpaired electrons in d orbitals. (iii) Due to completely filled d-orbitals which leads to weak metallic bond.	1 1 1
	(b) (i) $2\text{KMnO}_4 \xrightarrow{\Delta} \text{K}_2\text{MnO}_4 + \text{O}_2 + \text{MnO}_2$	1
	(ii) $\text{Cr}_2\text{O}_7^{2-} + 14 \text{H}^+ + 6 \text{Fe}^{2+} \rightarrow 2 \text{Cr}^{3+} + 6 \text{Fe}^{3+} + 7 \text{H}_2\text{O}$	1
	OR	
26	(a) (i) because small size atoms like B, C, H, N occupy interstitial sites in the lattice of transition elements. (ii) Because Cr^{3+} has the stable t_{2g}^3 configuration whereas Mn^{2+} has stable $3d^5$ configuration (half filled). (iii) Due to involvement of d-electrons in metallic bonding.	1 1 1
	(b) Misch metal is an alloy which consists of a lanthanoid metal (95%) and iron (5%) and traces of S, C, Ca and Al.	1
	USE- It is used in Mg-based alloy to produce bullets, shell and lighter – flint.	1