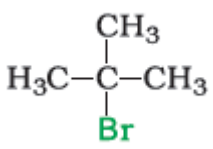
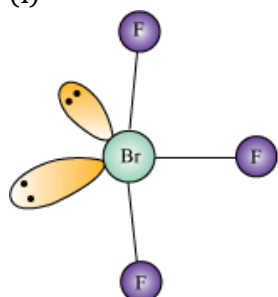
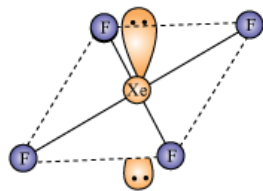
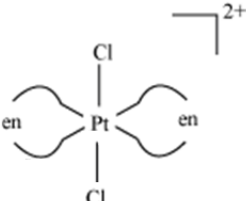
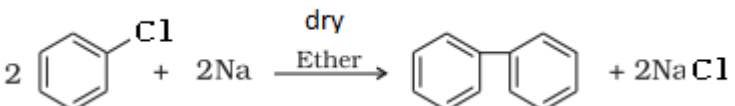
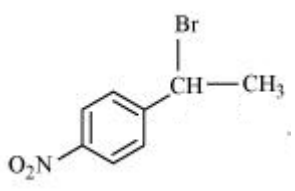
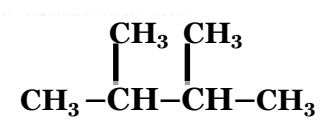
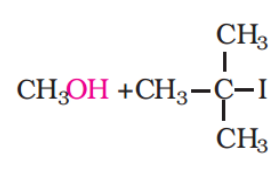
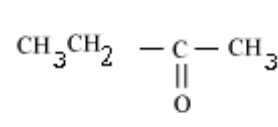


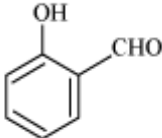
CHEMISTRY (043) MARKING SCHEME 2016

SET-56/3/C

Q	VALUES POINTS	MARKS
1	Like charged particles cause repulsion / Brownian movement / solvation	1
2	(i) Molecular Solid - I ₂ (ii) Ionic Solid - NaCl (Any other suitable example)	½ + ½
3	NO ₂	1
4		1
5	2- Phenylethanol	1
6	(i) [Co (NH ₃) ₆] Cl ₃ (ii) Hexaamminecobalt(III) chloride	1 1
7	(i) Gas B , Higher the value of K _H lower is the solubility of gas / $p = K_H \cdot x$ (ii) Negative deviation from Raoult's law	½ + ½ 1
8	(i)  (ii) 	1+1
	OR	
8	(i) $2\text{Fe}^{3+} + \text{SO}_2 + 2\text{H}_2\text{O} \longrightarrow 2\text{Fe}^{2+} + \text{SO}_4^{2-} + 4\text{H}^+$ (ii) $\text{XeF}_4 + \text{SbF}_5 \longrightarrow [\text{XeF}_3]^+ [\text{SbF}_6]^-$	1 1

9	<p>(i)</p> $\text{Ar/R} - \overset{\text{O}}{\parallel} \text{C} - \text{NH}_2 + \text{Br}_2 + 4\text{NaOH} \longrightarrow \text{Ar/R} - \text{NH}_2 + \text{Na}_2\text{CO}_3 + 2\text{NaBr} + \text{H}_2\text{O}$ <p>(ii)</p> $\text{Ar/R} - \text{NH}_2 + \text{CHCl}_3 + 3\text{KOH} \xrightarrow{\Delta} \text{Ar/R} - \text{NC} + 3\text{KCl} + 3\text{H}_2\text{O}$ <p>(where R=alkyl group , Ar=aryl group)</p>	1 1
10	<p>(i) Zero order reaction, Molecularity is 2 / bimolecular reaction</p> <p>(ii) $\text{mol L}^{-1} \text{s}^{-1}$</p>	$\frac{1}{2} + \frac{1}{2}$ 1
11	<p>(i) sp^3d^2 , paramagnetic, high spin</p> <p>(ii)</p> 	$1 + \frac{1}{2} + \frac{1}{2}$ 1
12	<p>(i) Starch - Polymer of α -D- glucose units / Polymer of α - glucose units. Cellulose – polymer of β-D -glucose units / polymer of β -glucose units.</p> <p>(ii) Phosphodiester linkage</p> <p>(iii) Fibrous protein – Keratin / myosin / collagen Globular protein - haemoglobin / insulin</p>	1 1 $\frac{1}{2} + \frac{1}{2}$
13	<p>(i) On vulcanization , sulphur forms cross links at the reactive sites of double bond, the rubber gets stiffened.</p> <p>(ii) Ethylene glycol / $\text{HO} - \text{CH}_2 \text{CH}_2 - \text{OH}$, Terephthalic acid / $\text{HOOC} - \text{C}_6\text{H}_4 - \text{COOH}$</p> <p>(iii) Neoprene < Polythene < Terylene</p>	1 1 1
14	<p>(i)</p> 	1

	<p>(ii) $\text{CH}_3\text{CH}=\text{CH}_2 \xrightarrow{\text{HBr / peroxide}} \text{CH}_3\text{CH}_2\text{CH}_2\text{Br} \xrightarrow{\text{NaI/acetone}} \text{CH}_3\text{CH}_2\text{CH}_2\text{I}$</p> <p>(iii) $\text{CH}_3\text{CH}_2\underset{\text{Br}}{\text{CH}}\text{CH}_3 \xrightarrow{\text{Alc.KOH}} \text{CH}_3\text{CH}=\text{CHCH}_3$</p>	<p>1</p> <p>1</p>
	OR	
14	<p>(i)</p>  <p>(ii)</p>  <p>(iii) $\text{CH}_3\text{CH}_2\text{NC}$</p>	<p>1</p> <p>1</p> <p>1</p>
15	<p>(i) Aniline is a Lewis base while AlCl_3 is lewis acid. They combine to form a salt.</p> <p>(ii) Due to combined + I and solvation effects.</p> <p>(iii) Due to presence of H-bonding in primary amines.</p>	<p>1</p> <p>1</p> <p>1</p>
16	<p>(a)</p>  <p>(b)</p> 	<p>1</p> <p>1</p>

	(c) <div style="text-align: center;">  </div>	1
17	i) Because stability of higher oxidation state decreases as we move down the group / S is more stable in higher (+6) oxidation state whereas Te is more stable in +4 oxidation state. (ii) Due to absence of d orbital. (iii) Because I – Cl bond is weaker than I-I bond.	1 1 1
18	$\Delta T_b = i K_b \cdot m$ $i=2$ $= i \times K_b \times \frac{w_2 \times 1000}{M \times W_1}$ $= 2 \times 0.52 \text{ K kg mol}^{-1} \times \frac{4 \text{ g} \times 1000 \text{ g/kg}}{120 \text{ g/mol} \times 100 \text{ g}}$ $= \frac{2 \times 0.52}{3}$ $= 0.346 \text{ K}$ <p>Boiling point of water = 373.15 K / 373 K</p> $T_b = T_b^\circ + \Delta T_b$ $= 373.15 \text{ K} + 0.346 \text{ K} \quad / \quad 373 \text{ K} + 0.346 \text{ K}$ $= 373.496 \text{ K} \quad / \quad 373.346 \text{ K}$	½ 1 ½ 1
19	(i) Mond's Process (ii) The melting point of alumina is very high. It is dissolved in cryolite which lowers the melting point and brings conductivity / acts as a solvent. (iii) Limestone is decomposed to CaO ,which removes silica impurity of the ore as slag. <div style="text-align: center; margin-top: 10px;"> OR $\text{CaCO}_3 \xrightarrow{\Delta} \text{CaO} + \text{CO}_2$ $\text{CaO} + \text{SiO}_2 \longrightarrow \text{CaSiO}_3$ <p style="text-align: center;">Slag</p> </div>	1 1 1
20	i) Liquid loving/ solvent loving. ii) Potential difference between the fixed layer and diffused / double layer of opposite charges iii) Some substances at higher concentration exhibit colloidal behaviour due to formation of aggregates. The aggregated particles thus formed are called associated colloids or	1 1

	micelles	1
21	<p>Given: Initial pressure, $P_o = 0.30$ atm $P_t = 0.50$ atm $t = 300$ s</p> <p>Rate constant, $k = \frac{2.303}{t} \log \frac{P_o}{2P_o - P_t}$</p> <p>$= \frac{2.303}{300 \text{ s}} \log \frac{0.30}{2 \times 0.30 - 0.50}$</p> <p>$= \frac{2.303}{300 \text{ s}} \log \frac{0.30}{0.60 - 0.50}$</p> <p>$= \frac{2.303}{300 \text{ s}} \log \frac{0.30}{0.10}$</p> <p>$= \frac{2.303}{300 \text{ s}} \log 3$</p> <p>$= \frac{2.303}{300 \text{ s}} \times 0.4771$</p> <p>$= \frac{1.099}{300 \text{ s}}$</p> <p>$= 0.0036 \text{ s}^{-1} \quad / 3.66 \times 10^{-3} \text{ s}^{-1}$ (deduct $\frac{1}{2}$ mark if unit is not written)</p>	<p>1</p> <p>1</p> <p>1</p>
22	<p>$z = 2$</p> <p>$d = \frac{z \times M}{a^3 \times N_o}$</p> <p>$N = z \times M / d \times a^3$</p> <p>$N = 2 \times 300 \text{ g} / [7.5 \text{ g cm}^{-3} (5 \times 10^{-8} \text{ cm})^3]$</p> <p>$N = 6.4 \times 10^{23} \text{ atoms}$</p> <p>OR</p> <p>$d = \frac{z \times M}{a^3 \times N_o}$</p> <p>$7.5 = \frac{2 \times M}{(500)^3 \times 10^{-30} \times 6.022 \times 10^{23}}$</p> <p>$M = \frac{7.5 \times 125 \times 10^{-24} \times 6.022 \times 10^{23}}{2}$</p> <p>$= 282.3 \text{ g/mol}$</p> <p>$282.3 \text{ g} = 6.022 \times 10^{23} \text{ atoms}$</p> <p>$300 \text{ g} = \frac{6.022 \times 10^{23} \times 300}{282.3}$</p> <p>$= 6.4 \times 10^{23} \text{ atoms}$</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>1</p>

23	<p>(i) Caring nature, supportive, aware (or any other two suitable values)</p> <p>(ii) Antacids are the medicines used to control acidity in stomach. Ex – mixture of aluminium and magnesium hydroxide / sodium hydrogen carbonate / Zantac / Ranitidine (or any other suitable example)</p> <p>(iii) No, Excessive antacid can make the stomach alkaline and trigger the production of more acid.</p>	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$1 + \frac{1}{2}$</p> <p>$\frac{1}{2} + 1$</p>
24	<p>(a)</p> <p>i) Ability of oxygen to form multiple bond with Mn metal.</p> <p>ii) Cr^{2+} is oxidized to Cr^{3+} which has stable d^3 / t_{2g}^3 orbital configuration</p> <p>iii) Cu^{2+} has unpaired electron while Zn^{2+} has no unpaired electron.</p> <p>(b)</p> <p>i) $2\text{MnO}_2 + 4\text{KOH} + \text{O}_2 \xrightarrow{\triangle} 2\text{K}_2\text{MnO}_4 + 2\text{H}_2\text{O}$</p> <p>ii) $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{I}^- \longrightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O} + 3\text{I}_2$ (balanced equation is required)</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
	OR	
24	<p>i) Mn. It has maximum unpaired electrons.</p> <p>ii) Cr</p> <p>iii) Sc</p> <p>iv) Manganese. Mn^{3+} to Mn^{2+} results in the stable half filled (d^5) configuration.</p>	<p>$\frac{1}{2} + 1$</p> <p>1</p> <p>1</p> <p>$\frac{1}{2} + 1$</p>
25	<p>(a)</p> <p>(i) A: CH_3CHO , B: $\text{CH}_3\text{CH}=\text{N}-\text{OH}$</p> <p>(ii) A: CH_3COOH , B: CH_3COCl</p> <p>(b)</p> <p>(i) Heat both compounds with NaOH and I_2, $\text{C}_6\text{H}_5\text{COCH}_3$ forms yellow ppt of CHI_3 whereas $\text{C}_6\text{H}_5\text{CHO}$ does not.</p> <p>(ii) Add ammonical solution of silver nitrate (Tollen's reagent) to both the compounds, HCOOH gives silver mirror but CH_3COOH does not. (or any other suitable test)</p> <p>(C) $\text{CH}_3\text{CHO} < \text{CH}_3\text{CH}_2\text{OH} < \text{CH}_3\text{COOH}$</p>	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p>
	OR	

25	<p>(a)</p> $\text{>C=O} \xrightarrow[-H_2O]{NH_2NH_2} \text{>C=NH}_2 \xrightarrow[\text{heat}]{KOH/\text{ethylene glycol}} \text{>CH}_2 + N_2$ <p>(b) $C_6H_5COCH_3 < CH_3COCH_3 < CH_3CHO$</p> <p>(c) Because of resonance in carboxylic group the carbonyl group loses a double bond character.</p> <p>(d) $CH_3CH_2CH=CH-CH_2CHO$</p> <p>(e) A : CH_3CH_2CHO B : CH_3COCH_3</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>$\frac{1}{2} + \frac{1}{2}$</p>
26	<p>a) $E_{\text{cell}} = E_{\text{cell}}^0 - \frac{0.0591 \text{ V}}{n} \log \frac{[Al^{3+}]^2}{[Cu^{2+}]^3}$</p> <p>$E_{\text{cell}}^0 = E_{\text{cell}} + \frac{0.0591 \text{ V}}{n} \log \frac{[Al^{3+}]^2}{[Cu^{2+}]^3}$</p> <p>$E_{\text{cell}}^0 = 1.98 \text{ V} + \frac{0.0591 \text{ V}}{6} \log \frac{(0.01)^2}{(0.01)^3}$</p> <p>$E_{\text{cell}}^0 = 1.98 \text{ V} + \frac{0.0591 \text{ V}}{6} \log 10^2$</p> <p>$E_{\text{cell}}^0 = 1.98 \text{ V} + \frac{0.0591 \text{ V}}{6} \times 2 \times \log 10 \quad [\because \log 10 = 1]$</p> <p>$E_{\text{cell}}^0 = 1.98 \text{ V} + \frac{0.0591 \text{ V}}{6} \times 2$</p> <p>$E_{\text{cell}}^0 = 1.98 \text{ V} + 0.0197 \text{ V}$</p> <p>$E_{\text{cell}}^0 = 1.9997 \text{ V}$</p> <p>(b) A, because its E^0 value is more negative.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1+1</p>
	OR	
26	<p>(a) $\Lambda_m^c = \kappa \times 1000 / C$</p> <p>$= 3.905 \times 10^{-5} \times 1000 / 0.001$</p> <p>$= 39.05 \text{ S cm}^2/\text{mol}$</p>	<p>$\frac{1}{2}$</p> <p>1</p>

	$\text{CH}_3\text{COOH} \rightarrow \text{CH}_3\text{COO}^- + \text{H}^+$ $\Lambda^\circ \text{CH}_3\text{COOH} = \lambda^\circ \text{CH}_3\text{COO}^- + \lambda^\circ \text{H}^+$ $= 40.9 + 349.6$ $\Lambda^\circ \text{CH}_3\text{COOH} = 390.5 \text{ S cm}^2/\text{mol}$ $\alpha = \frac{\Lambda_m}{\Lambda_m^\circ}$ $= 39.05 / 390.5$ $= 0.1$ <p>(b) Device used for the production of electricity from energy released during spontaneous chemical reaction and the use of electrical energy to bring about a chemical change.</p> <p>The reaction gets reversed / It starts acting as an electrolytic cell & vice – versa.</p>	<p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p>
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