



eduresourceza.com

- 1.1 C ✓
- 1.2 B ✓
- 1.3 D ✓
- 1.4 A ✓
- 1.5 B ✓
- 1.6 A ✓
- 1.7 B ✓
- 1.8 A ✓
- 1.9 C. ✓
- 1.10 A ✓

Question 2

2.1. Sharing of at least 1 pair of electron between 2 non-metals. ✓

2.2.1 SiO₂ ✓

2.2.2 I₂ ✓

2.2.3 PH₃ ✓

2.2.4 Kr ✓

2.2.5 KBr ✓

2.2.6 NH₄Cl ✓

2.2.7 Pt ✓

2.2.8 H₂O ✓

2.3 weak force of attraction between molecules or atoms of Noble gases ✓

2.4. H₂O has H-bond forces between molecules. I₂ has induced dipole forces between molecules. ✓

H-bond forces are stronger & require more energy to break. ✓
 due to larger mol. size of iodine — a greater dipole moment is created due to the large electron density. ✓
 This... requires in a stronger force & is why iodine is solid but is sublimates. ✓

Question 3

3.1 calcium hydroxide (Ca(OH)₂) ✓

3.2 $n = 0.1$ ✓

$$= 0.1 \times 0.5$$

$$= 0.05 \text{ moles}$$

$$\therefore N = n \cdot N_A$$

$$= 0.05 \times 6.02 \times 10^{23} \text{ no of molecules}$$

$$\therefore 2 = 0.1 \times 10^{23} \text{ in every molecule}$$

$$\therefore 3,612 \times 10^{23} (\text{OH}^-) \text{ ion in solution}$$

3.3. Ionic ✓

3.4. OH^- — attracted to the H^+ ion ✓

of water (-ve ion attracted to +ve side of H₂O) ✓

3.5 V.D. Waals force ✓

ion-dipole force ✓

3.6 $K_{sp} < 1$ $\therefore$ small number ✓

shows that more reactant than product. ✓

$\therefore$ strength of forces between ions in ppt > forces of ions in solution $\therefore$ insoluble. ✓ does not dissociate completely.

④

Question 5

5.1 Exo ✓

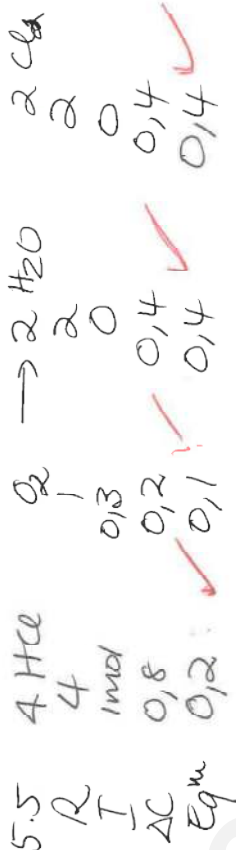
 ΔH neg. ✓

Greater ✓

gradient is steeper ✓

Eqn ✓

5.4. $K_c = \frac{[Cl_2]^2 [H_2O]^2}{[HCl]^4 [O_2]}$ ✓



$$\therefore C = \frac{1}{V} \cdot \frac{0,2}{5} = 0,04 \text{ mol} \cdot \text{dm}^{-3} HCl$$

$$\frac{0,1}{3} = 0,02 \text{ mol} \cdot \text{dm}^{-3} O_2$$

$$\frac{0,4}{5} = 0,08 \text{ mol} \cdot \text{dm}^{-3} Cl_2 + H_2O$$

$$K_c = \frac{(0,08)^2 (0,08)^2}{(0,04)^4 (0,02)}$$

$$= 800 \rightarrow$$

5.6. When an external stress is applied to a system in dynamic chem eqm, the eqm point will change in such a way to counteract the stress.

③

4.1.1. Net change of chemical potential of the system. ✓

4.1.2. High energy, unstable, temporary transition state between the reactants & products ✓

4.2 (i) correct orientation ✓

(ii) enough energy ($> E_a$) for rxn to take place ✓



3.2. • temp (increases) } must say

• finer granules } how

• more conc HCl } (B)

4.4.1. C ✓

4.4.2. D. ✓

5.7. S. Amount of water (product)

is increased

R. L.C.P states that the reverse reaction will be favoured to reduce the amount of H_2O

R. the amount of $HCl + O_2$ will increase.

Question 6

6.1. proton donor

6.2. Reaction of an ion from a salt with water



6.4.

H_2SO_4 - will stay ionized as

its a strong acid

NH_4OH will partially dissociate as its a weak base.

$[OH^-] < [H^+]$ in solution

it will be ACIDIC SAT.

6.5. $\frac{n_b}{n_a} = \frac{C_b V_b}{C_a V_a}$

$$\therefore V_b = \frac{n_b \times C_a V_a}{n_a} = \frac{2}{1} \times \frac{0.01 \times 50}{0.12} = 5 \text{ ml NaOH}$$

6.6. The pH graph shows a strong acid of pH 1. 11 ml of the titrant is required before a steep change / gradient is observed. The titration is a strong base of pH 12.

6.7. Temp starts at $24.5^\circ C$ rises constantly & peaks at 25.7 then decreases / lowers at a constant rate.

6.8. Conductivity is higher when lots of H^+ ions present. Conductivity is at a min. when equivalent point is reached as $[OH^-] = [H^+]$ As pH rises, conductivity increases again due to excess OH^- ions

6.9. Equivalent Point

Question 7.

7.1. unreactive + absorbs H_2

effectively
catalyzes the reaction between
 H_2 & H^+ .
(don't accept metal)

7.2.1. In the $\times \frac{1}{2}$ cell Co^{2+} ions build up, creating a positive charge. Anions from the salt bridge will flow to the anode to maintain electrical neutrality.

7.2.2. decrease the internal resistance but won't affect the emf.
NO effect on EMF. (✓)

7.3. loss of electrons ✓

7.4.1. $-0.28V$ ✓
7.4.2. $Co \rightarrow Co^{2+} + 2e^-$ ✓ (no marks if $\rightleftharpoons$)

7.5. ✓
 $Pt(s) / H_2(g) (1atm) / H^+(aq) (1M) // Co^{2+}(aq) (1M) / Co(s) @ 25^\circ C.$ ✓

7.6. Grothmanic ✓

Question 8

8.1. conc salt solution ✓

8.2.1. $2Cl^- \rightarrow Cl_2 + 2e^-$ ✓

8.2.2. $2NaCl + 2H_2O \rightarrow Cl_2 + H_2 + 2NaOH.$ ✓

8.3. $H_2O + 2e^- \rightarrow H_2 + 2OH^-$ ✓

$$n = \frac{V}{V_0} = \frac{40}{22.4} = 1.785$$

moles of gas

3571 (ne) : 1.785 (n_{H_2})

$$Q = nF = 3571 \times 96500$$

$$= 34464286 C$$

$$I = \frac{Q}{t} = \frac{34464286}{1 \times 3600}$$

$$= 95734 A$$

✓

Question 9

- 9.1.1. atom or group of atoms, that form the centre of chemical activity in the molecule. ✓
- 9.1.2. Series of similar compounds which have the same functional group & the same general formula, in which each member differs from the previous one by a single CH_2 unit. ✓

- 9.1.3 - double bond ✓
- carboxylic group. ✓
- 9.2.1. alkene ✓
9.2.2. 2-ethyl-pent-1-ene ✓
9.2.3. Bromination / addition of Br_2 ✓
Speed with which bromine (brⁿ on) becomes colourless/clear. ✓
- 9.3.1. 2,2-dimethylpentanol ✓
9.3.2. $2\text{C}_7\text{H}_{16}\text{O} + 21\text{O}_2 \rightarrow 14\text{CO}_2 + 16\text{H}_2\text{O}$ ✓
- 9.4. 3-bromo-2-chloro-4-methylpentane. ✓

- 9.5.1. • Propane ✓
• lower b.p. ✓
• vapourises more easily ✓
• more gas $\therefore$ higher v.p. ✓

9.5.2

longer chain length allows for more surface area & more chance of setting up temporary dipoles $\therefore$ stronger London Int^r ✓
 $\therefore$ more E required to overcome stronger IMF + b.p. increases

9.5.3

- Pentane has weak London forces between molecules ✓
• Pentanal forms H-bond forces between the molecules ✓
• H bond forces are stronger than weak London forces ✓
• more Energy is required to break the stronger IMF $\therefore$ higher b.p. ✓

Question 10

- 10.1 alcohol ✓
 10.2 hydration ✓
 10.3 Butene ✓
 10.4 ester linkage ✓
 10.5 dehydration substitution ✓
 10.6 sulphuric acid ✓
 10.7 ethanoic acid ✓
- 10.8
- $$\begin{array}{c}
 \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \\
 | & | & | & | & | & | \\
 \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{OH} & + & \text{H}-\text{C}-\text{C}(=\text{O})-\text{OH} & \xrightarrow[\text{H}_2\text{SO}_4]{\Delta} & \text{H}-\text{C}-\text{C}(=\text{O})-\text{O}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} & + & \text{H}-\text{C}-\text{OH} \\
 | & | & | & | & | & | & | \\
 \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H}
 \end{array}$$
- 10.9. same molecular formula but different structural formula. ✓
 10.10. hexanoic acid ✓