

(10Marks)

150

8. b. 1.

- i. A chloride ppt found PbCl_2 , AgCl , Hg_2Cl_2 , Cu_2Cl_2
- ii. Amphoteric metal may present.
- iii. A chromium salt / Cr^{3+} , Salt with a white ppt (Amphoteric metal may present Zn)
- iv. Zn is present
- v. Cr is present
- vi. Zn is present
- vii. AgCl ppt Ag^+ salt found / Cu is found
- viii. Confirms Ag is found. (8x4=32 Marks)

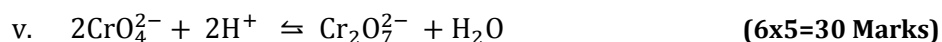
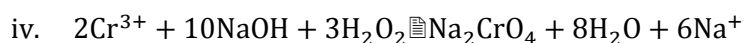
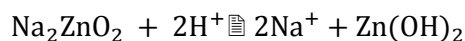
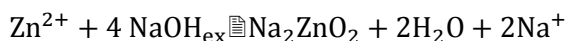
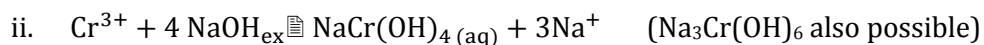
Metals : Zn, Cr, Cu

(3 x 5 = 15 Marks)

Salt Ag^+ salt

(5 Marks)

2.

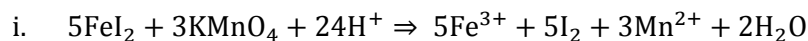


3. A - CrCl_3 / $[\text{CrCl}_3(\text{H}_2\text{O})_3]$ / $\text{Cr}_{(\text{aq})}^{3+}$ - Green

B - $\text{NaCr}(\text{OH})_4$ - Green

C - $\text{Cr}_2\text{O}_7^{2-}(\text{aq})$ - Orange (6x3=18 Marks)

c.



ii. $n \text{MnO}_4^- = 0.2 \text{mol dm}^{-3} \times 50 \times 10^{-3} \text{dm}^3 = 10 \times 10^{-3} \text{mol}$

$n \text{MnO}_4^- : n \text{I}_2 = 3 : 5$

$n \text{I}_2 = \frac{10}{3} \times 5 \times 10^{-3} \text{mol} = \frac{50}{3} \times 10^{-3} \text{mol}$

$n \text{I}_2 : n \text{Na}_2\text{S}_2\text{O}_3 = 1 : 2$

$n \text{Na}_2\text{S}_2\text{O}_3 = \frac{\frac{100}{3} \times 10^{-3} \text{mol}}{0.2 \text{mol dm}^{-3}} = 133.34 \text{cm}^3$

$n \text{Fe}^{3+} : n \text{MnO}_4^- = 5 : 3$

$n \text{Fe}^{3+}_{(\text{aq})} = \frac{10}{3} \times 5 \times 10^{-3} \text{mol}$

$\frac{50}{3} \times 10^{-3} \text{mol}$

(20 Marks)

iii. $n \text{Mn}^{2+} = n \text{MnO}_4^-_{(\text{aq})} = 10 \times 10^{-3} \text{mol}$

Total weight = $10 \times 10^{-3} \text{mol} \times 54 \text{gmol}^{-1} + \frac{50}{3} \times 10^{-3} \text{mol} \times 54 \text{gmol}^{-1} = 1.4734 \text{g}$

(10 Marks)

9. a.

- | | | | |
|-----------------------------------|------------------------|-----------------------------------|------------------|
| i. 1 - Seawater | 6 - NaHCO ₃ | 11 - CaCO ₃ | 16 - Coconut oil |
| ii. 2 - NaCl | 7 - Heat | 12 - Coaltar | |
| iii. 3 - con NaCl _(aq) | 8 - CaO | 13 - CaC ₂ | |
| iv. 4 - NaOH | 9 - CO ₂ | 14 - Ca(OH) ₂ | |
| v. 5 - Soap | 10 - 900°C | 15 - NH ₄ ⁺ | |

150

(15x4 = 70 Marks)

(1) Solvay process **(3 Marks)**

(2) Solubility KHCO₃ is High No precipitate **(5 Marks)**



b.

i. NO, NO₂, CO₂, CO, SO₂, C_xH_y **(10 Marks)**

ii. C dust, Pb Dust, PbO dust **(5 Marks)**

iii. NO₂, SO₂ **(5 Marks)**

iv. CO₂ solution pH > 5.1

acid rain pH < 5.1 **(10 Marks)**

v. NO, NO₂, CO₂, CO, H₂O, SO₂ **(10 Marks)**

vi. No, G.H keep the temperature normally. Excess G.H is increase tempratane

(10 Marks)

vii. NO₂, NO, C_xH_y **(10 Marks)**

viii. Aldehyde, PAN / PBN

(10 Marks)

10. a.

i. Cathode - Cu Anode - Zn **(2 x 5 = 10 Marks)**

ii. Positive electrode - Cu Negative electrode - Zn **(5 Marks)**

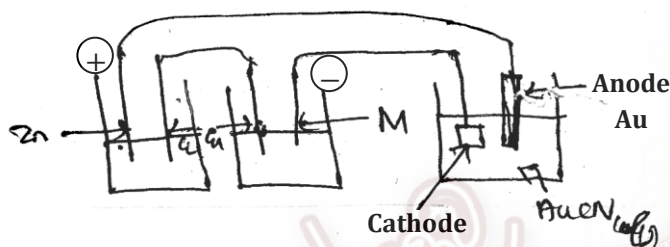
iii. Current flow Cu → Zn

Electron flow Zn → Cu **(10 Marks)**

- iv. $E^\theta = E^\theta_{\text{cathode}} - E^\theta_{\text{anode}}$
 $= E^\theta_{\text{Cu}^{2+}/\text{Cu}_{(s)}} - E^\theta_{\text{Zn}^{2+}/\text{Zn}_{(s)}}$
 $= +0.34\text{V} - (-0.76\text{V}) = +1.1\text{V}$ (10 Marks)
- v. No change because $\text{Zn}^{2+}_{(aq)}$ No change (5 Marks)
- vi. Complete the electrical circuit without changing in electrolytes (5 Marks)
- vii. KCl , NaNO_3 ionic compounds and soluble in water (5 Marks)
- viii. (1) EMF - No change
 (2) EMF - No change
 (3) EMF - No change
 (4) EMF - No change (10 Marks)

60

b.



(10 Marks)

- i. 2.61V (5 Marks)
- ii. Anode : $\text{Au}_{(s)} \rightarrow \text{Au}^{+}_{(aq)} + e$
 Cathode : $\text{Au}^{+}_{(aq)} + e \rightarrow \text{Au}_{(s)}$ (5 Marks)
- iii. No change in concentration of solution and E.M.F (5 Marks)

c.

- i. $V = IR$
 $I = \frac{V}{R} = \frac{2.61\text{V}}{0.522\Omega} = 5\text{A}$ (10 Marks)
- ii. Volume placed = $25\text{mm} \times 50\text{mm} \times 0.1\text{mm} = 125 \times 10^{-9} \text{m}^3$ (5 Marks)
 Mass of Au = $125 \times 10^{-9} \text{m}^3 \times 19300\text{Kg m}^{-3} = 2.4125 \times 10^{-9} \text{Kg} = 2.4125\text{g}$ (10 Marks)
- iii. $n \text{Au} = \frac{2.4125\text{g}}{197\text{g mol}^{-1}} = 0.012 \text{mol}$
 $Q = It = 0.012\text{mol} \times 96500\text{C mol}^{-1} = 5\text{A} \times t$
 $t = 236.35 \text{seconds}$ (10 Marks)

iv.

- 1) $2\text{KMnO}_4 \xrightarrow{\Delta} \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$
- 2) $\text{NH}_4\text{NO}_2 \xrightarrow{\Delta} \text{N}_2 + 2\text{H}_2\text{O}$
- 3) $3\text{NH}_4\text{NO}_3 + 8\text{NaOH} + 8\text{Al} \longrightarrow 6\text{NH}_3 + 8\text{NaAlO}_2 + \text{H}_2\text{O}$
- 4) $2\text{Cr}(\text{OH})_3 + 10\text{NaOH} + 3\text{Br}_2 \longrightarrow 2\text{Na}_2\text{CrO}_4 + 6\text{NaBr} + 8\text{H}_2\text{O}$
- 5) $\text{S} + \text{conc. HNO}_3 \longrightarrow \text{H}_2\text{SO}_4 + 6\text{NO}_2 + 2\text{H}_2\text{O}$
- 6) $4\text{NH}_3 + \text{Cl}_2 \longrightarrow 3\text{NH}_4\text{Cl} + \text{NCl}_3$ (6 X 5 = 30 Marks)

90

150