

MARKING SCHEME

SAMPLE PAPER 1

233 / 1

CHEMISTRY

PAPER 1

MARKING SCHEME.

1. Add water to mixture (1) ;

Filter ✓ ½ obtain copper (II) oxide ✓ ½ residue ;

Evaporates ✓ ½ filtrate ; obtain potassium ✓ ½ chloride

2. a) - Zn^{2+} ✓ ½

- Cl^- ✓ ½

b) $Pb^{2+}_{(aq)} + 2Cl^{-}_{(aq)} \longrightarrow PbCl_{2(s)}$ ✓

c) $\left[Zn (NH_4) \right]^{2+}$ ✓

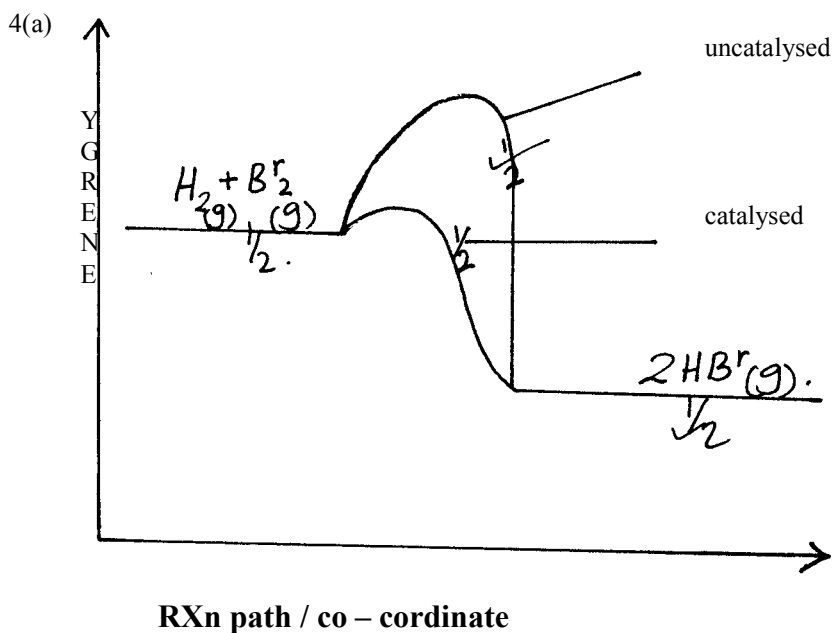
3. a) i) Chlorine gas // bubbles of chlorine ✓ ½

ii) Hydrogen gas ✓ ½

b) $2Cl^{-}_{(aq)} \longrightarrow Cl_{2(g)} + 2e^{-}$ // ✓1

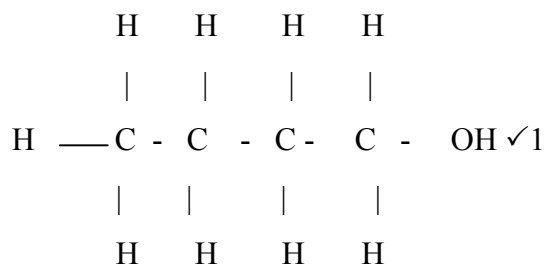
OR

$2 Cl^{-}_{(aq)} - 2e^{-} \longrightarrow Cl_{2(g)}$



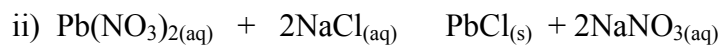
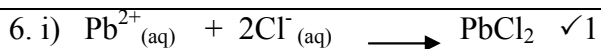
b) No \checkmark $\frac{1}{2}$ effect on production of HBr ; similar volume
of \checkmark $\frac{1}{2}$ reactants and production

5. a)



b) Alcohol // Alkanols $\checkmark 1$

c) Butyl propanoate $\checkmark 1$



moles of $PbCl_2$ formed

$$\frac{3.86}{278} \checkmark \frac{1}{2} = 0.139 \text{ moles}$$

278

Mole ratio NaCl : $PbCl_2$

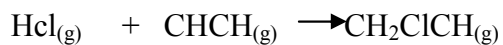
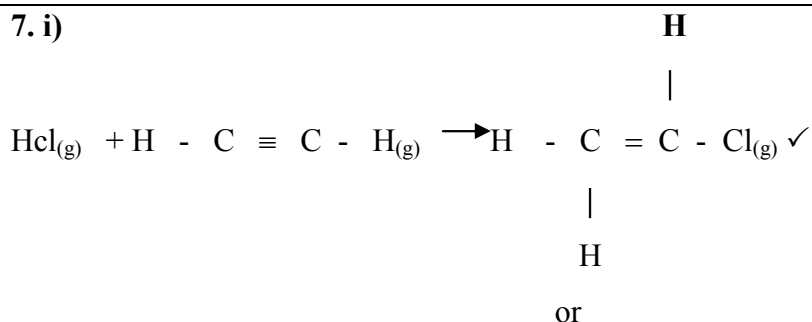
$$2 : 1 \checkmark \frac{1}{2}$$

$$\text{Moles of NaCl} = 0.139 \times \underline{2} = 0.0278$$

Volume of NaCl

$$\frac{1000 \times 0.0278 \checkmark \frac{1}{2}}{0.25} = 111.2 \text{ cm}^3 \checkmark \frac{1}{2}$$

7. i)

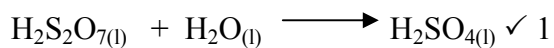
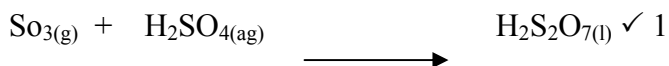
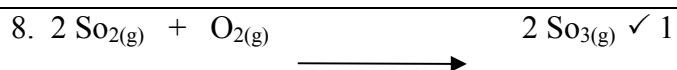


ii) Monochloroethene \checkmark 1

or

I-Chloroethene or Vinylchloride

iii) Polyvinyl chloride \checkmark 1 (pvc)



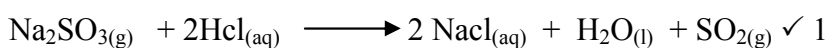
9. a) Wrong method \checkmark $\frac{1}{2}$ of gas collection;

Chloride is denser than \checkmark $\frac{1}{2}$ air collected by downward delivery

b) Con Hcl \checkmark 1

c) Absorp fumes of hydrogen chloride \checkmark 1 gas from conc. Hcl acid

10.



$$\text{Moles of Na}_2\text{SO}_3 = \frac{5.1}{126} = 0.04 \checkmark \frac{1}{2}$$

Moles of SO₂ produced 0.04 // Ratio of moles 1 : 1 ✓ ½

$$\text{Volumes of gas } 24000 \times 0.04 \checkmark \frac{1}{2} \\ = 960\text{cm}^3$$

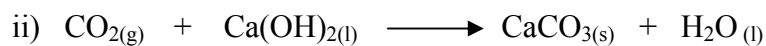
11. a) i) - $\frac{1208}{4} = 302\text{kJ} \checkmark 1$

ii) Moles of ammonia $\frac{2.4}{24} = 0.1 \checkmark \frac{1}{2}$ moles

$$0.1 \times 302 = \checkmark \frac{1}{2} 30.2 \text{ kJ}$$

b) -// red hot platinum // red hot copper wire //
- Platinum rhodium

12. i) - Copper (II) oxide changes from black to brown
// red brown ✓ 1 // reddish brown in combustion tube //
brown solid in combustion tube
- A white ppt forms in boiling tube ✓ 1



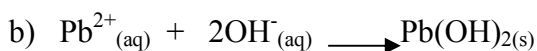
iii) Unreacted Co if allowed out is poisonous // pollutant // dangerous ✓ // to convert it to the less harmful CO₂ gas

13. a) H – Thermite rxn ✓ // Electrolysis
G – Chemical reduction with ✓ C or Co

b) Haematite // Fe₂O₃ ✓

14. a) J- Ammonium chloride ✓ // Any ammonium salt

V – Pb(OH)₂ // lead ✓ hydroxide



15. $\theta = It$

$$5 = (19 \times 60) + 18 = 5790 \text{ coulombs} \checkmark 1$$

$$\text{moles of m} = \frac{1.04 \checkmark \frac{1}{2}}{52} = 0.02$$

0.02 moles deposited by 5790c

$$1 \text{ moles deposited by } \frac{5790}{0.02} = 289500 \text{c} \checkmark \frac{1}{2}$$

$$\text{Number of faradays} = \frac{289500}{96500} = 3 \checkmark \frac{1}{2}$$

charge on ion +3

Formula of metal chloride $\text{MCl}_3 \checkmark \frac{1}{2}$

16. a) - Colour of solution changes from colourless ✓ ½

to blue // copper metal goes into solution

- Grey deposits of metal Q // a solid ✓ ½ deposit of Q

b) E^θ of cell positive // Cu^{2+} stronger ✓ 1 reducing agent than Q
hence oxidised

17. i) Gas A – Nitrogen (I) Oxide // Dinitrogen Oxide // N_2O

ii) Gas insoluble in warm water but fairly soluble in cold water

iii) Remove delivery tube from water B4 stop heating ✓ 1 prevent suck ✓ 1 back of water to boiling tube

$$18. \frac{\text{Time of } N_2}{\text{Time of B}} = \sqrt{\frac{\text{Molecular mass of } N_2}{\text{Molecular mass of B}}}$$

$$\frac{20}{30} = \sqrt{\frac{28}{B}}$$

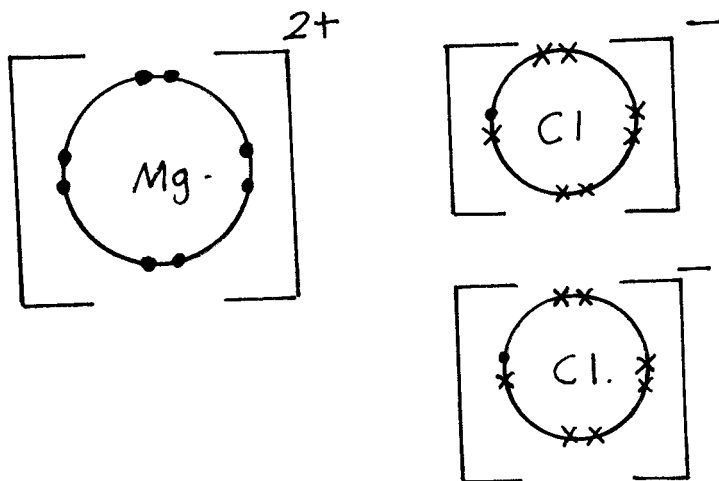
$$20\sqrt{B} = 30\sqrt{28}$$

$$\sqrt{B} = \frac{30\sqrt{28}}{20}$$

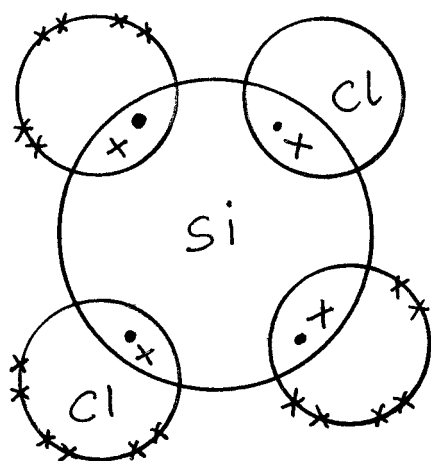
$$B = \left(\frac{30\sqrt{28}}{20} \right)^2 = \frac{900 \times 28}{400}$$

$$= 63 \text{ g}$$

19.a)



b)



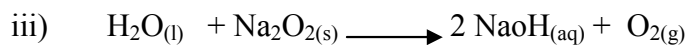
20. a) $60 \text{ t}^{1/2}$ $30 \text{ t}^{1/2}$ $15 \text{ t}^{1/2}$ $7.5 \text{ t}^{1/2}$ $3.75 \checkmark^{1/2}$

$$\left. \begin{array}{l} 4 \text{ t}^{1/2} = 32 \text{ days} \\ \text{t}^{1/2} = \frac{32}{4} \end{array} \right\} = 8 \checkmark^{1/2} \text{ days}$$

b) $233 \text{ Pa} \begin{pmatrix} 4 \\ \alpha \checkmark^{1/2} \\ 2 \end{pmatrix} \begin{matrix} 271 \\ 83 \end{matrix} \xrightarrow{2 \begin{pmatrix} 0 \\ \beta \checkmark^{1/2} \\ -1 \end{pmatrix}} \begin{matrix} 217 \\ 85 \end{matrix} \text{ Z} \checkmark$

21. i) Liquid m = water

ii) $\text{CO}_2 \checkmark^{1/2}$ formed by burning candle,
slightly soluble $\checkmark^{1/2}$ forming an acidic $\checkmark^{1/2}$
solution



22. i) Temporary hardness $\checkmark^{1/2}$

ii) $\text{CaCO}_3 // \text{MgCO}_3 \checkmark^{1/2}$

iii) Soap is insoluble \checkmark^1 in water with large amount
of NaCl

iv) Presence of HCO_3^- of Mg^{2+} and $\checkmark \frac{1}{2}$ or Ca^{2+}

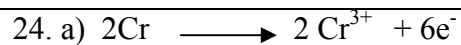
23. a) i) $+3 + p - 2 \times 3 = 0$

$$p = +3$$

ii) $+3 + p - 8 = 0$

$$p = +5$$

b) Ammonia // NH_3 \checkmark ; oxidation state of Nitrogen increased from -3 \checkmark to 0 (zero)



b) $E_{\text{cell}} = E^0_{\text{RHS}} - E^0_{\text{LHS}} \checkmark 1$

$$0.30\text{V} = 0.44 - \text{LH}_3$$

$$0.30 + 0.44 = -\text{LH}_3$$

$$\text{LH}_3 = \underline{-0.74\text{V}} \checkmark 1$$

25. a) Bubble of hydrogen $\checkmark \frac{1}{2}$ gas at cathode,

Bubble of oxygen $\checkmark \frac{1}{2}$ gas at anode

b) I – Broghter \checkmark 1 than II, NaOH a stronger \checkmark 1 alkali than Ammonia solution

26. i) Zinc blend // Zinc sulphide // ZnS ✓ 1

ii) carbon (IV) Oxide // CO₂ // Carbon dioxide ✓ 1

iii) Sulphur (IV) ✓ 1 Oxide produced is an air pollutant ;

CO₂ produced causes gaseous imbalance:

control method

-Have sister plant for production of sulphuric acid ✓ 1

for use of SO₂

- Recycle CO₂ into smelting furnace.