FORM 2

CHEM MARKING SCHEME

1(a) (i). green yellow

(ii). Soluble

(iii).shiny dark grey solid

(b).(i). $MnO_{2(S)} + 4HCl_{(l)} \longrightarrow MnCl_{2(aq)} + Cl_{2(g)} + 2\ H_2O_{(L)}$

(ii). To oxidize HCl into chlorine gas

(iii). $KMnO_4$ is a stronger oxidizing agent, it easily oxidizes HCl into chlorine gas.

IV).- economical since heating is not required

-production of chlorine gas can easily be controlled

(v). iron (III) chloride/ $FeCl_3$

(vi). $3\ Cl_{2(g)} + 2\ Fe_{(s)} \longrightarrow 2FeCl3_{(s)}$

(c(i)). **hydrogen gas**

(ii). $Ca_{(s)} + 2\ H_2O_{(l)} \longrightarrow Ca(OH)_{2(aq)} + H_{2(g)}$

(iii). The calcium hydroxide formed is slightly soluble. Only a few OH^- are produced.

(iv). Calcium hydroxide is used to the presence of carbon (IV) oxide gas.

2.(a).-sodium continues to burn with a white flame.

-a white solid substance is formed.

(ii) $Na_{(s)} + Cl_{2(g)} \longrightarrow NaCl_{(s)}$

(iii) used as food additive.

(b)(i). –grey solid observed.

-Droplets of colourless liquid.

(ii). $H_{2(g)} + PbO_{(s)} \longrightarrow H_2O_{(l)} + Pb_{(s)}$

(iii). –Reducing property/ reducing agent.

(iv). For activation energy and to speed up the reaction.

3.(i). oxygen gas/ O_2

(ii). The PH would reduce. The unstable chloric (I) acid decomposes into acidic HCl.

(iii). The unstable yellow chloric (I) acid decomposes into oxygen and colourless HCl

(iv). $2HOCl_{(aq)} \xrightarrow{sunlight} 2HCl_{(aq)} + O_{2(g)}$

(v). it turns red and then bleached (colorless). *It turns red* due to the acidic HCl. The dye in the litmus paper combines with the nacent oxygen atom from the unstable chloric (I0 acid hence bleached.

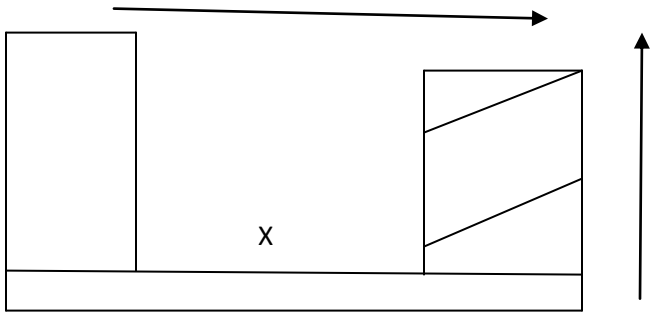
(vi). $HOCl_{(aq)} + dye_{(coloured)} \longrightarrow \boxed{dye + O}_{bleached)} + HCl_{(aq)}$

(vii)- manufacture plastics eg PVC

-water treatment

-manufacture bleaches used in paper industries (accept any other correct use)

4(a)(i).



(ii) I. transition metals. II. Non metals.

(b)(i). $MgCl_2$ ***(ignore state symbols; accept correct equation)***

I. Harmfull substance released into the environment.

II.Soot is produced when hydrocarbons burn in limited supply of oxygen.

(iii).I. Used to absorb carbon (iv) gas from the air.

II. Used to absorb moisture from the air.

(b). at A. $2H_{2(l)} + O_{2(g)} \longrightarrow 2H_2O_{(l)}$

At B. $Zn_{(s)} + 2HCl_{(aq)} \longrightarrow ZnCl_{2(aq)} + H_{2(g)}$

(ii)(a). – to drive away the air initially in the tube to avoid oxidation of hot magnesium.

- **To produce steam to react with heated magnesium.**

(b). K- hydrogen gas/H_2

***(C)*. It is less dense than air**

(d). $H_2O_{(g)} + Mg_{(s)} \longrightarrow MgO_{(S)} + H_{2(g)}$

(e) .a. Upward delivery/ downward displacement of air.

b. Downward delivery/upward displacement of air.

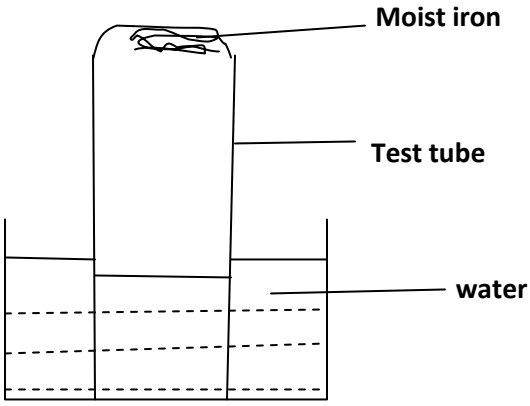
(ii). Method (b). carbon (iv) oxide is denser than air.

5. (a). curve B. pure substances have sharp melting and boiling points.

(b). Impurities lower the melting points but raises the boiling points. Of substances.

(c).-Hydrogen; acetylene/ ethyne.

6.(i)



(ii). Their colour changed from grey to red brown. They reacted with moisture/water and air to form rust.

(iii). Rusting destroys appearance of materials.. it also weakens them.

(iv).cool to -200^{0}c and carry out fractional distillation to obtain nitrogen.

(v). lime raises the soil PH/reduces the acidity of the soil/.