

## AIR AND COMBUSTION MARKING SCHEME

1. 1989 Q11 P1

Mg is above copper in reactivity series

2. 1992 Q18 P1

(a) (i) MgO

(ii)  $\text{Cl}_2\text{O}$  /  $\text{ClO}_2$  /  $\text{Cl}_2\text{O}_6$  /  $\text{ClO}_2\text{O}_7$

(b)  $\text{Cl}_2\text{O}(\text{g}) + \text{H}_2\text{O}(\text{l}) \longrightarrow 2\text{HClO}_3(\text{aq})$

$\text{ClO}_2 + \text{H}_2\text{O} \longrightarrow \text{HClO}_3(\text{aq})$

$\text{Cl}_2\text{O}_6(\text{g}) + \text{H}_2\text{O} \longrightarrow \text{HClO}_3(\text{aq})$

$\text{Cl}_2\text{O}_7(\text{g}) + \text{H}_2\text{O} \longrightarrow 2\text{HClO}_4(\text{aq})$

3. 2001 Q19 P1

The burning magnesium produces more heat energy than the burning splint. The heat energy from magnesium is enough to break the sulphur oxygen bond setting free oxygen magnesium uses freed oxygen to continue burning.

4. 2003 Q16 P1

a)  $3\text{Mg}(\text{s}) + \text{N}_2(\text{g}) \longrightarrow \text{Mg}_3\text{N}_2(\text{s})$

b) Argon / Neon (name of a rare gas)

Because they are inert and not likely to have reacted with any of the reagents.

5. 2005 Q23 P1

$\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightarrow 2\text{CO}(\text{g})$

$\text{Fe}_2\text{O}_3 + 3\text{CO}(\text{g}) \rightarrow 2\text{Fe}(\text{s}) + 3\text{CO}_2(\text{g})$

6. 2005 Q2 P2

- To remove any oxide film on it i.e. layer of magnesium oxide.
- A white solid formed which is magnesium oxide
- The increase in mass was due to the oxygen which combines with magnesium.
- $2\text{Mg}(\text{s}) + \text{O}_2(\text{g}) \xrightarrow{\text{heat}} 2\text{MgO}(\text{s})$
- The filtrate is magnesium hydroxide which is an alkaline.

There was no change in blue litmus paper but red litmus paper turned blue.

From equation in (d)

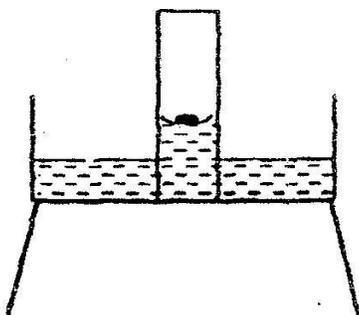
1 Mole of Magnesium atom combines with a mole of oxygen atom.

OR

	Mg	Oxygen
Mass	2.4	1.6
Molar mass	24	16
No. of moles	$\frac{2.4}{24} = 0.1$	$\frac{1.6}{16} = 0.1$ moles
Mole ratio	1	: 1
No. of moles of oxygen used	$= 1.6 = 0.1$ moles	
	1 mole	$= 24,000\text{cm}^3$
	0.1 mole	$= 24,000 \times 0.1$
Volume of oxygen used	$= 2,400\text{cm}^3$	

7. 2006 Q2 P1

a)



b) Calibrate the gas jar before the start of experiment

(1 mark)

8. 2007 Q1a P1

- Cost
- Availability
- Effects to the environment
- Heating value
- Ease of storage

9. 2009 Q4 P1

(a) Water (l)

(b) The second / other product of burning candle is carbon (IV) oxide (l). It can be prevented from getting into the environment by passing it through a hydroxide solution/ alkaline solution e.g. K.O.H NaOH or aqueous ammonia (l). (2 marks)  
To form  $K_2CO_3$

10. 2009 Q21 P1

Magnesium phosphate

(reject formula)

11. 2012 Q1 P1

(a) -carbon (iv) oxide  
Or Carbon dioxide  
Or  $CO_2$

OR - carbon(ii) oxide  
or carbon monoxide  
or CO

(b)  $CO_2$  – Refrigeration  
- Fire extinguisher  
- Fizzy drinks  
- Food preservative  
- Photosynthesis  
- Solvay process  
- Cloud seedlings

CO - extraction of metals  
- manufacture of ethanol  
- manufacture of fuels (water gas)

12. 2012 Q24 P1

(a) there is  $\left( \begin{array}{l} \text{no air} \\ \text{no } O_2 \end{array} \right)$  due to boiling

(b) 1. Al forms a protective  $Al_2O_3$  layer.

2. Al being more reactive than iron rusts fast / sacrificial or cathodic protection

