Moles 2 – Reacting mass calculations
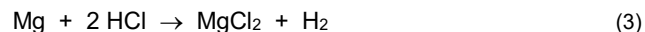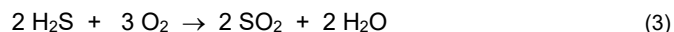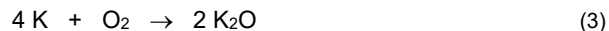
1) What mass of hydrogen is produced when 192 g of magnesium is reacted with hydrochloric acid?

$$Mg + 2 HCl \rightarrow MgCl_2 + H_2$$

(3)

2) What mass of oxygen is needed to react with 8.5 g of hydrogen sulphide (H_2S)?

$$2 H_2S + 3 O_2 \rightarrow 2 SO_2 + 2 H_2O$$

(3)

3) What mass of potassium oxide is formed when 7.8 g of potassium is burned in oxygen?

$$4 K + O_2 \rightarrow 2 K_2O$$

(3)

4) Railway lines are welded together by the Thermitt reaction, which produces molten iron. What mass of iron is formed from 1 kg of iron oxide?

$$Fe_2O_3 + 2 Al \rightarrow 2 Fe + Al_2O_3$$

(3)

5) What mass of oxygen is required to oxidise 10 g of ammonia to NO?

$$4 NH_3 + 5 O_2 \rightarrow 4 NO + 6 H_2O$$

(3)
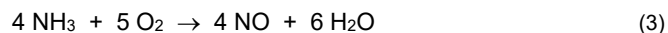
6) What mass of aluminium oxide is produced when 135 g of aluminium is burned in oxygen?

$$2 Al + 3 O_2 \rightarrow Al_2O_3$$

(3)

7) What mass of iodine is produced when 7.1 g of chlorine reacts with excess potassium iodide?

$$Cl_2 + 2 KI \rightarrow 2 KCl + I_2$$

(3)

8) What mass of hydrogen is needed to react with 32 g of copper oxide?

$$CuO + H_2 \rightarrow Cu + H_2O$$

(3)

9) What mass of oxygen is formed when 735 g of potassium chlorate decomposes?

$$2 KClO_3 \rightarrow 2 KCl + 3 O_2$$

(3)

10) What mass of hydrogen is produced when 195 mg of potassium is added to water?

$$2 K + 2 H_2O \rightarrow 2 KOH + H_2$$

(3)
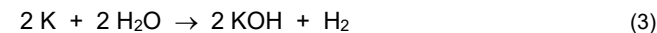
11) How much calcium oxide is produced by heating 50 g of calcium carbonate?

$$CaCO_3 \rightarrow CaO + CO_2$$

(3)

12) What mass of magnesium oxide is formed when 6 g of magnesium reacts with oxygen?

$$2 Mg + O_2 \rightarrow 2 MgO$$

(3)

13) What mass of carbon dioxide is produced when 5.6 g of butene (C_4H_8) is burnt.

$$C_4H_8 + 6 O_2 \rightarrow 4 CO_2 + 4 H_2O$$

(3)
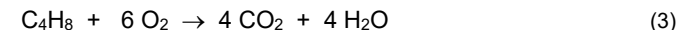
14) The pollutant sulphur dioxide can removed from the air by reaction with calcium carbonate in the presence of oxygen. What mass of calcium carbonate is needed to remove 1 tonne of sulphur dioxide?

$$2 CaCO_3 + 2 SO_2 + O_2 \rightarrow 2 CaSO_4 + 2 CO_2$$

(3)

15) 5.00 g of hydrated sodium sulphate crystals $(Na_2SO_4.nH_2O)$ gave 2.20 g of anhydrous sodium sulphate on heating to constant mass. Work out the relative molecular mass (M_r) of the hydrated sodium sulphate and the value of n.

$$Na_2SO_4.nH_2O \rightarrow Na_2SO_4 + n H_2O$$

(3)
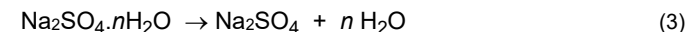
16) 5.00 g of a mixture of $MgSO_4.7H_2O$ and $CuSO_4.5H_2O$ was heated at 120°C until a mixture of the anhydrous salts was formed, which weighed 3.00 g. Calculate the percentage by mass of $MgSO_4.7H_2O$ in the mixture.

(4)