

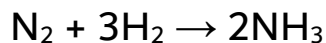
MARK SCHEME

GCSE

CHEMISTRY

Reacting Masses - 2

1. Calculate the mass of nitrogen that reacts with 30 g of hydrogen.



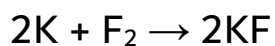
$$\text{moles H}_2 = \text{mass}/M_r = 30/2 = 15 \text{ mol}$$

$$\text{moles N}_2 = 15/3 = 5 \text{ mol}$$

$$\text{mass N}_2 = M_r \times \text{moles} = 28 \times 5 = 140 \text{ g}$$

Answer: 140 g

2. Calculate the mass of fluorine that reacts with 3.9 g of potassium.



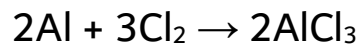
$$\text{moles K} = \text{mass}/M_r = 3.9/39 = 0.10 \text{ mol}$$

$$\text{moles F}_2 = 0.10/2 = 0.050 \text{ mol}$$

$$\text{mass F}_2 = M_r \times \text{moles} = 38 \times 0.050 = 1.9 \text{ g}$$

Answer: 1.9 g

3. What mass of chlorine reacts with 8.1 g of aluminum?



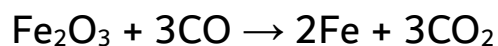
$$\text{moles Al} = \text{mass}/M_r = 8.1/27 = 0.30 \text{ mol}$$

$$\text{moles Cl}_2 = 3.2 \times 0.30 = 0.96 \text{ mol}$$

$$\text{mass Cl}_2 = M_r \times \text{moles} = 71 \times 0.96 = 68.16 \text{ g}$$

Answer: 68.16 g

4. What mass of iron can be made from 20 kg of iron(III) oxide?



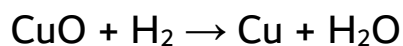
$$\text{moles Fe}_2\text{O}_3 = \text{mass}/M_r = 20000/160 = 125 \text{ mol}$$

$$\text{moles Fe} = 2 \times 125 = 250 \text{ mol}$$

$$\text{mass Fe} = M_r \times \text{moles} = 56 \times 250 = 14000 \text{ g}$$

Answer: 14000 g

5. What mass of hydrogen is needed to react with 31.8 mg of copper(II) oxide?



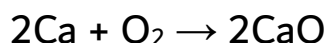
$$\text{moles CuO} = \text{mass}/M_r = 0.0318/79.5 = 0.00040 \text{ mol}$$

$$\text{moles H}_2 = 0.00040 \text{ mol}$$

$$\text{mass H}_2 = M_r \times \text{moles} = 2 \times 0.00040 = 0.00080 \text{ g}$$

Answer: 2.64g

6. Calculate the mass of calcium that can react with 40 g of oxygen.



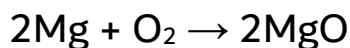
$$\text{moles O}_2 = \text{mass}/M_r = 40/32 = 1.25 \text{ mol}$$

$$\text{moles Ca} = 2 \times 1.25 = 2.50 \text{ mol}$$

$$\text{mass Ca} = M_r \times \text{moles} = 40 \times 2.50 = 100 \text{ g}$$

Answer: 100 g

7. Calculate the mass of oxygen needed to react 9.60 g of magnesium to form magnesium oxide.



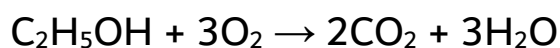
$$\text{moles Mg} = 9.60/24 = 0.400 \text{ mol}$$

$$\text{moles O}_2 = 0.400/2 = 0.200 \text{ mol}$$

$$\text{mass O}_2 = 32 \times 0.200 = 6.40 \text{ g}$$

Answer: 6.40 g

8. What mass of ethanol could burn in 100 g of oxygen?



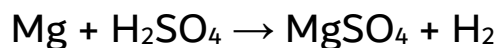
$$\text{moles O}_2 = 100/32 = 3.125 \text{ mol}$$

$$\text{moles C}_2\text{H}_5\text{OH} = 3.125/3 = 1.04 \text{ mol}$$

$$\text{mass C}_2\text{H}_5\text{OH} = 46 \times 1.04 = 47.9 \text{ g}$$

Answer: 47.9 g

9. What mass of hydrogen is formed when 2.00 g of magnesium reacts with sulfuric acid?



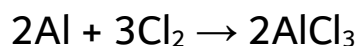
$$\text{moles Mg} = 2.00/24 = 0.0833 \text{ mol}$$

$$\text{moles H}_2 = 0.0833 \text{ mol}$$

$$\text{mass H}_2 = 2 \times 0.0833 = 0.167 \text{ g}$$

Answer: 0.167 g

10. What mass of aluminium reacts with 50.0 g of chlorine to form aluminium chloride?



$$\text{moles Cl}_2 = 50.0/71 = 0.704 \text{ mol}$$

$$\text{moles Al} = 0.704 \times 2/3 = 0.469 \text{ mol}$$

$$\text{mass Al} = 27 \times 0.469 = 12.7 \text{ g}$$

Answer: 12.7 g