

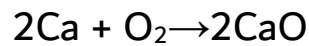
# MARK SCHEME

## **GCSE** CHEMISTRY

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### Reacting Masses - 1

1. Calculate the mass of oxygen needed to react 10.0g of calcium to form calcium oxide.



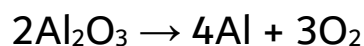
$$\text{moles Ca} = 10.0/40 = 0.250 \text{ mol}$$

$$\text{moles O}_2 = 0.250/2 = 0.125 \text{ mol}$$

$$\text{mass O}_2 = 32 \times 0.125 = 4.00 \text{ g}$$

Answer: 4.00g

2. Aluminium is extracted from aluminium oxide as shown. Calculate the mass of aluminium that can be formed from 1020 g of aluminium oxide.



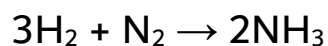
$$\text{moles Al}_2\text{O}_3 = 1020/102 = 10.0 \text{ mol}$$

$$\text{moles Al} = 2 \times 10.0 = 20.0 \text{ mol}$$

$$\text{mass Al} = 27 \times 20.0 = 540 \text{ g}$$

Answer: 540 g

3. What mass of ammonia can be made from 20.0 g of hydrogen?



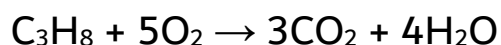
$$\text{moles H}_2 = 20.0/2 = 10.0 \text{ mol}$$

$$\text{moles NH}_3 = 10.0 \times 2/3 = 6.67 \text{ mol}$$

$$\text{mass NH}_3 = 17 \times 6.67 = 113 \text{ g}$$

Answer: 113 g

4. What mass of propane could burn in 48.0 g of oxygen?



$$\text{moles O}_2 = 48.0/32 = 1.50 \text{ mol}$$

$$\text{moles C}_3\text{H}_8 = 1.50/5 = 0.300 \text{ mol}$$

$$\text{mass C}_3\text{H}_8 = 44 \times 0.300 = 13.2 \text{ g}$$

Answer: 13.2g

5. What mass of carbon dioxide is formed when 7.41 g of copper(II) carbonate decomposes on heating?



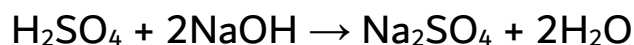
$$\text{moles CuCO}_3 = 7.41 / 123.5 = 0.0600 \text{ mol}$$

$$\text{moles CO}_2 = 0.060 \text{ mol}$$

$$\text{mass CO}_2 = 44 \times 0.060 = 2.64 \text{ g}$$

Answer: 2.64g

6. What mass of sodium hydroxide is needed to neutralise 24.5 kg of sulfuric acid?



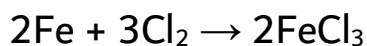
$$\text{moles H}_2\text{SO}_4 = 24500 / 98 = 250 \text{ mol}$$

$$\text{moles NaOH} = 2 \times 250 = 500 \text{ mol}$$

$$\text{mass NaOH} = 40 \times 500 = 20000 \text{ g}$$

Answer: 20000 g

7. What mass of chlorine reacts with 20.0 g of iron to form iron (III) chloride?



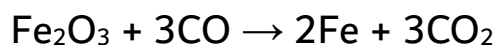
$$\text{moles Fe} = 20.0/56 = 0.357 \text{ mol}$$

$$\text{moles Cl}_2 = 0.357 \times 3/2 = 0.536 \text{ mol}$$

$$\text{mass Cl}_2 = 71 \times 0.536 = 38.0 \text{ g}$$

Answer: 38.0 g

8. What mass of carbon monoxide is needed to react with 2.08 kg of iron oxide?



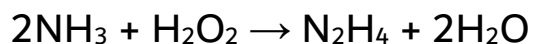
$$\text{moles Fe}_2\text{O}_3 = 2080/160 = 13.0 \text{ mol}$$

$$\text{moles CO} = 3 \times 13.0 = 39.0 \text{ mol}$$

$$\text{mass CO} = 28 \times 39.0 = 1092 \text{ g}$$

Answer: 1092 g

9. Hydrazine (N<sub>2</sub>H<sub>4</sub>) is used as a rocket fuel. It can be made by reacting ammonia with hydrogen peroxide. What mass of ammonia is needed to make 148 g of hydrazine?



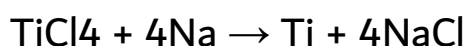
$$\text{moles N}_2\text{H}_4 = 148/32 = 4.625 \text{ mol}$$

$$\text{moles NH}_3 = 2 \times 4.625 = 9.25 \text{ mol}$$

$$\text{mass NH}_3 = 17 \times 9.25 = 157 \text{ g}$$

Answer: 157 g

10. Titanium is extracted from titanium chloride as shown. Calculate the mass of sodium needed to react with 126 g of titanium chloride.



$$\text{moles TiCl}_4 = 126/190 = 0.663 \text{ mol}$$

$$\text{moles Na} = 4 \times 0.663 = 2.65 \text{ mol}$$

$$\text{mass Na} = 23 \times 2.65 = 61.0 \text{ g}$$

Answer: 61.0 g