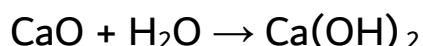


MARK SCHEME

GCSE CHEMISTRY

Limiting Reactants

1. What mass of calcium hydroxide is formed when 10.0 g of calcium oxide reacts with 10.0 g of water?



Moles of CaO = $10.0/56 = 0.179$ mol

Moles of H₂O = $10.0/18 = 0.556$ mol

0.179 mol of CaO reacts with 0.179 mol of H₂O,

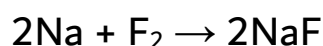
∴ H₂O is in excess; CaO is limiting reagent

moles of Ca(OH)₂ formed = 0.179 mol

mass of Ca(OH)₂ = $74 \times 0.179 = 13.2$ g

Answer: 13.2 g

2. What mass of sodium fluoride is formed when 2.30 g of sodium reacts with 2.85 g of fluorine?



Moles of Na = $2.30/23 = 0.100$ mol

Moles of F₂ = $2.85/38 = 0.075$ mol

0.100 mol of Na reacts with 0.050 mol of F₂,

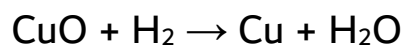
∴ F₂ is in excess; Na is limiting reagent

moles of NaF formed = 0.100 mol

mass of NaF = $42 \times 0.100 = 4.20$ g

Answer: 4.20 g

3. What mass of copper is formed when 2.00 g of copper(II) oxide reacts with 1.00 g of hydrogen?



Moles of CuO = $2.00/79.5 = 0.0252$ mol

Moles of H₂ = $1.00/2 = 0.500$ mol

0.0252 mol of CuO reacts with 0.0252 mol of H₂,

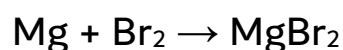
∴ H₂ is in excess; CuO is limiting reagent

moles of Cu formed = 0.0252 mol

mass of Cu = $63.5 \times 0.0252 = 1.60$ g

Answer: 1.60 g

4. What mass of magnesium bromide is formed when 1.00 g of magnesium reacts with 5.00 g of bromine?



Moles of Mg = $1.000/24 = 0.0417$ mol

Moles of Br₂ = $5.00/160 = 0.03125$ mol

0.03125 mol of Mg reacts with 0.03125 mol of Br₂,

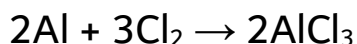
∴ Mg is in excess; Br₂ is limiting reagent

moles of MgBr₂ formed = 0.03125 mol

mass of MgBr₂ = $184 \times 0.03125 = 5.75$ g

Answer: 5.75 g

5. What mass of aluminium chloride is formed when 13.5 g of aluminium reacts with 42.6 g of chlorine?



Moles of Al = $13.5/27 = 0.500$ mol

Moles of Cl₂ = $42.6/72 = 0.600$ mol

0.400 mol of Al reacts with 0.600 mol of Cl₂,

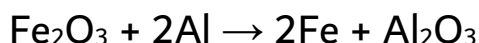
∴ Al is in excess; Cl₂ is limiting reagent

moles of AlCl₃ formed = 0.400 mol

mass of AlCl₃ = $133.5 \times 0.400 = 53.4$ g

Answer: 53.4 g

6. What mass of iron is formed when 8.00 g of iron(III) oxide reacts with 2.16 g of aluminium?



Moles of Fe₂O₃ = $8.00/160 = 0.050$ mol

Moles of Al = $2.16/27 = 0.080$ mol

0.040 mol of Fe₂O₃ reacts with 0.080 mol of Al,

∴ Fe₂O₃ is in excess; Al is limiting reagent

moles of Fe formed = 0.080 mol

mass of Fe = $56 \times 0.080 = 4.48$ g

Answer: 4.48 g