Solutions

Each answer shows the steps, then the **result**.

2.1

- $M_r(CO_2) = 12 + (2 \times 16)$
- 44

2.2

- relative atomic mass is the **average mass of an atom** compared with $\frac{1}{12}$ the mass of a carbon-12 atom

2.3

- $2(1) + 16 =$ **18**

2.4

- add the A_r of every atom: one Ca, two O and two H

$$M_r = 40 + 2(16 + 1) = \mathbf{74}$$

3.1 C

- $M_r(CaCO_3) = 40 + 12 + (3 \times 16) =$ **100**
- A and B miss oxygen atoms; D overcounts

3.2

- $M_r(NH_4NO_3) = (2 \times 14) + (4 \times 1) + (3 \times 16)$
- $28 + 4 + 48 =$ **80**

3.3

(a)

- 12 g is $\frac{1}{4}$ of 48 g

$$m(\mathrm{MgO}) = \frac{1}{4} \times 80 \text{ g} = \mathbf{20} \text{ g}$$

(b)

- mass of oxygen $m_\mathrm{O} = m_\mathrm{oxide} - m_\mathrm{metal} = 80 \text{ g} - 48 \text{ g} =$ **32** g

3.4

(a)

- the masses are in proportion: 20 g is $\dfrac{20}{8.0} = 2.5$ times as much copper(II) oxide

$$\text{mass of Cu} = 2.5 \times 6.4 \text{ g} = \mathbf{16} \text{ g}$$

(b)

- M_r of CuO $= 64 + 16 = 80$

$$\%\ \mathrm{Cu} = \frac{64}{80} \times 100 = \mathbf{80}\%$$