Solutions

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

2.1

$$\text{magnification} = \frac{\text{image size}}{\text{actual size}}$$

2.2

- $1\text{ mm} = 1000\ \mu\text{m}$

$$0.05\text{ mm} \times 1000 = \mathbf{50}\ \mu\text{m}$$

2.3

- $2.5 \times 1000 = \mathbf{2500}\ \mu\text{m}$

2.4

- $750 \div 1000 = \mathbf{0.75}\text{ mm}$

3.1 C

- magnification is a **ratio**, so it has **no unit**
- A, B and D are length units

3.2

(a)

$$40\ \mu\text{m} = \frac{40}{1000}\text{ mm} = \mathbf{0.04}\text{ mm}$$

(b)

$$\text{magnification} = \frac{\text{image size}}{\text{actual size}} = \frac{20\text{ mm}}{0.04\text{ mm}} = \times\mathbf{500}$$

3.3

- actual = image/magnification

$$\frac{8.0\text{ mm}}{400} = 0.02\text{ mm}$$

- $0.02 \times 1000 = \mathbf{20}\ \mu\text{m}$

3.4

- convert to the same unit: $35\text{ mm} = 35\,000\ \mu\text{m}$
- magnification $= \dfrac{\text{image size}}{\text{actual size}} = \dfrac{35\,000}{7}$
- magnification $= \times\mathbf{5000}$

3.5

- actual size $= \dfrac{\text{image size}}{\text{magnification}} = \dfrac{45}{0.5}$
- actual length $= \mathbf{90}\text{ mm}$