

Solutions

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

2.1

- Cell A is the **plant cell**
- any **two** of: **cell wall** (fixed shape) / **large vacuole** (space in the middle) / **chloroplasts**

2.2

- mitochondria: where **respiration** happens to **release energy**

2.3

- nucleus: holds the DNA and **controls the cell**
- cell membrane: **controls which substances enter and leave**

2.4

- magnification = image/actual

$$\frac{45 \text{ mm}}{0.15 \text{ mm}} = \times \mathbf{300}$$

2.5

- it has a **long, narrow extension**
- that gives a **large surface area** for absorbing water and mineral ions

3.1 C

- no nucleus + plasmids + a DNA loop $\rightarrow$ a **bacterial cell**
- A and B have a nucleus; D is an animal cell without a wall or plasmids

3.2

(a)

- a red blood cell **transports oxygen**

(b)

- no nucleus leaves more room for **haemoglobin**
- so it can **carry more oxygen**

3.3

- **cell $\rightarrow$ tissue $\rightarrow$ organ $\rightarrow$ organ system $\rightarrow$ organism**

3.4

(a)

$$\frac{80 \text{ mm}}{0.10 \text{ mm}} = \times \mathbf{800}$$

(b)

- actual size = image/magnification

$$\frac{4 \text{ mm}}{800} = 0.005 \text{ mm}$$

- $0.005 \times 1000 = \mathbf{5 \mu m}$

(c)

- **cell membrane; mitochondrion; chloroplast; cell wall**

(d)

- any **two** of: nucleus / mitochondria / chloroplasts / permanent vacuole
- bacterial genetic material: a **loop of DNA**, plus **plasmids**

(e)

- it sits near the **top of the leaf**, where the light is strongest
- many chloroplasts absorb as much light as possible for **photosynthesis**