Solutions

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

2.1

- net movement of water from **higher** to **lower water potential**
- through a **partially permeable membrane**

2.2

- water moves in by osmosis and the cell becomes **turgid**

2.3

- net movement of **water molecules**
- from higher to lower **water potential**
- through a **partially permeable membrane**

2.4

- water enters and the vacuole swells, pushing the contents against the wall
- the **cell wall** is strong, so the cell becomes **turgid** instead of bursting

2.5

- surface water would be included in the mass
- that would make the change look **larger** than the water moved by osmosis

3.1 B

- in a concentrated solution water **leaves** the cell, so it becomes **flaccid**
- A and C are in dilute solution; D is false

3.2

(a)

- the mass **increases**
- because water moves **into** the cells by osmosis

(b)

- it **loses mass** / becomes shorter and floppy

3.3

- turgid cells **press out** on the cell walls
- this firmness **holds the plant up straight**

3.4

(a)

$$\frac{5.55\text{ g} - 5.00\text{ g}}{5.00\text{ g}} \times 100 = +\mathbf{11.0}\%$$

$$\frac{4.40\text{ g} - 5.00\text{ g}}{5.00\text{ g}} \times 100 = -\mathbf{12.0}\%$$

(b)

- pure water has a **higher water potential** than the cell sap
- water moves **in** by osmosis, down the gradient
- the cylinder **gains mass**

(c)

- no change at about 0.3 **mol dm**$^{-3}$ (between 0.2 and 0.4)
- the external solution then has the **same water potential** as the cell sap

(d)

- contents **shrunken** and pulled away from the wall
- membrane no longer pressed against it
- the cell is **plasmolysed**

(e)

- an animal cell has **no cell wall**, so the membrane **bursts**
- a plant cell's strong wall resists, so it only becomes **turgid**

(f)

- any **two** of: temperature / volume of solution / time / size and source of the cylinders