Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

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

2.1

- the probability of an organism **surviving and reproducing** in its environment

2.2

- it is **cooler** at night / air more humid
- so less water **evaporates** and diffuses out of the open stomata

2.3

- the lower surface is **in water**; the upper surface is in **air** for gas exchange

2.4

- smaller **surface area**, so less water lost
- protect it from being **eaten** by animals

2.5

- thick fur **insulates** / traps air; small ears have a small **surface area**
- so **less heat** is lost to the cold surroundings

2.6

- it is surrounded by water, so does **not need to reduce water loss**

3.1

D

3.2

D

3.3

(a)

- **Y**
- all its stomata are on the **upper** surface, which is in the air

(b)

- $\frac{250}{50 + 250} \times 100$
- $= \mathbf{83}\%$

(c)

- **few** stomata, only on the **lower** surface
- so **less water vapour** is lost by transpiration

3.4

(a)

- the outer surface faces the **sun and wind**, where evaporation is fastest
- the inner surface is in **humid** air, so loses little water anyway

(b)

- hairs and pits trap **humid / still air** near the stomata
- wind cannot blow the water vapour **away**
- smaller **concentration gradient**, so less **diffusion** of water vapour

(c) in **dry** / windy / hot conditions

(d) reach **water** deep in the sand

(e)

- it has no large **air spaces**, so its roots would lack **oxygen**
- its features reduce water loss and do not help it live in water