

Past-paper walk-through

Adaptive features ■ 18.2

eXercise

Questions in this set

- 0610/22 N25 Q34 ■ 1 mark
- 0610/23 N25 Q34 ■ 1 mark
- 0610/21 J25 Q32 ■ 1 mark
- 0610/22 J25 Q34 ■ 1 mark
- 0610/23 J25 Q34 ■ 1 mark
- 0610/42 J25 Q4 ■ 10 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 34

0610/22 N25 ■ Q34 ■ 1 mark

34 What are features of hydrophytes which have leaves that float?

- A** long root system
- B** many stomata on upper surface of leaves
- C** hairy leaves
- D** small air spaces in the spongy mesophyll

Solution 34

Answer: **B**

Why

- A floating leaf takes in gases from the air above it, not from the water below.
- So its stomata are on the *upper* surface, unlike a land plant's.
- It also needs large air spaces to keep it buoyant, and it needs no long root system in water.

Question 34

0610/23 N25 ■ Q34 ■ 1 mark

- 34** Which term is used to describe a characteristic that helps an organism to survive and reproduce in its environment?
- A** adaptive feature
 - B** competition
 - C** observable feature
 - D** phenotype

Solution 34

Answer: **A**

Why

- An adaptive feature is an inherited characteristic that improves survival and reproduction.
- Competition is the struggle for a resource, not a characteristic.
- An observable feature or phenotype may or may not be adaptive.

Question 32

0610/21 J25 ■ Q32 ■ 1 mark

32 The table shows some features of leaves.

Which leaf is adapted to survive in hot, dry habitats?

	number of stomata	thickness of waxy cuticle	surface area of leaf
A	many	thick	small
B	many	thin	large
C	few	thick	small

Question 32

✓	few	thick	small
D	few	thin	large

Solution 32

Answer: **C**

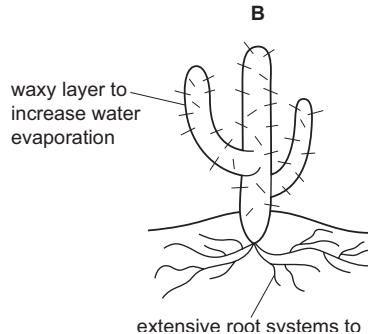
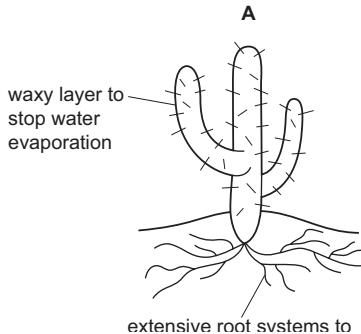
Why

- A hot, dry habitat means the leaf must lose as little water as possible.
- Fewer stomata and a thicker waxy cuticle both cut water loss.
- A smaller surface area also reduces evaporation.

Question 34

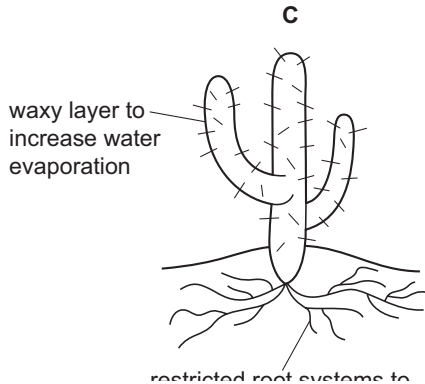
0610/22 J25 ■ Q34 ■ 1 mark

34 Which diagram of a xerophyte is labelled correctly?

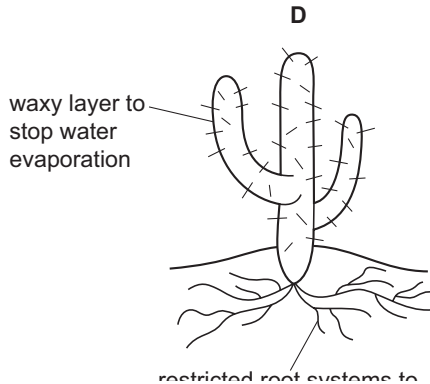


Question 34

maximise water uptake



maximise water uptake



Question 34

restricted root systems to
minimise water uptake

restricted root systems to
minimise water uptake

Solution 34

Answer: **A**

Why

- A xerophyte is adapted to *reduce* water loss, so a waxy layer must stop evaporation, not increase it.
- Extensive roots maximise the water taken up from a dry soil.
- So look for the diagram whose labels both work in the direction of conserving water.

Question 34

0610/23 J25 ■ Q34 ■ 1 mark

34 Which statements describe an adaptive feature in an organism?

- 1 It helps an organism to survive and reproduce in its environment.
- 2 It always shows continuous variation.
- 3 It is inherited.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

Solution 34

Answer: **C**

Why

- An adaptive feature helps the organism survive and reproduce where it lives – statement 1.
- It is inherited, since it must be passed to the offspring to matter – statement 3.
- It need not show continuous variation, so statement 2 is wrong.

Question 4

0610/42 J25 ■ Q4 ■ 10 marks

4 Xerophytes are plants that show adaptive features for dry habitats.

(a) Complete the sentence to define the term adaptive feature.

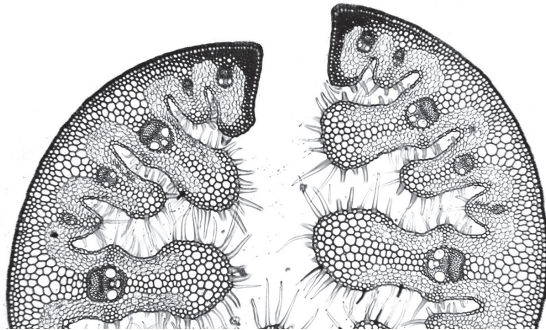
Question 4

Question 4

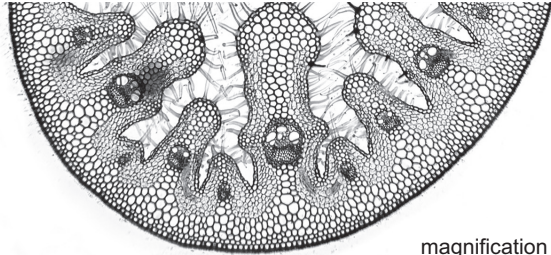
[2]

(b) Marram grass is a xerophytic plant.

Fig. 4.1 is a photomicrograph of a cross-section of a marram grass leaf.



Question 4



magnification $\times 10$

Fig. 4.1

Using Fig. 4.1, describe the visible features that identify this as a xerophyte leaf.

Question 4

- (c) (i) The mean cell wall thickness of an epidermal cell from one species of xerophyte is $1.276\mu\text{m}$.

Convert $1.276\mu\text{m}$ to mm.

Question 4

- (ii) State the name of the carbohydrate molecule used to build cell walls in xerophytes.

Question 4

- (iii) Suggest **one** way the stem of a xerophyte is adapted for dry habitats.

Question 4

(d) Fig. 4.2 is a diagram showing the root systems of two different species of xerophyte.

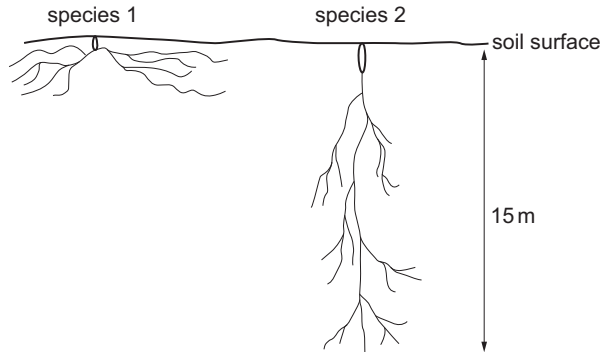


Fig. 4.2

Question 4

,

Question 4

Describe the **two** root systems shown in Fig. 4.2 **and** suggest how each one is an adaptation for living in a dry environment.

Question 4

[Total: 10] _

Solution 4

(a)

Mark scheme

- inherited ;
- survive (and) reproduce / breed / produce offspring ;
- 2
- either order

Solution 4

(b) Mark scheme

- any two from:
- curled / rolled, leaf ;
- inner surface is folded ;
- hairs / AW ;
- few / sunken, stomata OR stomata in, pits / AW ;
- thick cuticle ;
- 2

Solution 4

(c)(i)

Mark scheme

- $0.001276 / 1.276 \times 10^{-3} \text{ (mm)} ;$
- 1

Solution 4

(c)(ii)

Mark scheme

- cellulose ;
- 1
- 0610/42
- May/June 2025
- Guidance

Solution 4

(c)(iii) Mark scheme

- any one from:
- swollen / thick (stem) OR water storage / succulent ;
- chloroplasts / site of photosynthesis ;
- thick (waxy) cuticle ;
- AVP ;
- 1
- A wide stem

Solution 4

(d) Mark scheme

- any three from:
- species 1:
 - 1
 - roots, shallow / close to the surface OR spread, out(wards) / over a
 - wide area (of the soil surface) ;
 - 2
 - to absorb water immediately after rainfall / from the (soil) surface ;
- species 2:

Solution 4

- 3
- deep / long (vertically), root ;
- 4
- to absorb, ground / deep, water (in the soil) ;
- 3
- Guidance