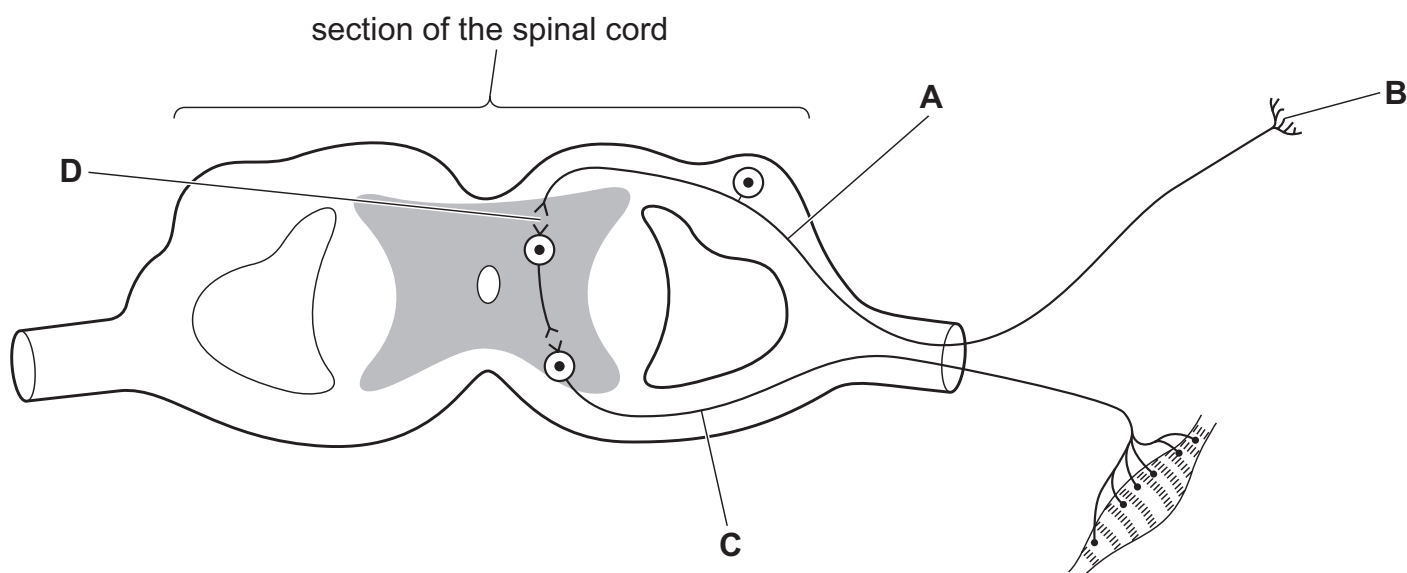


- 21** When moving from an area with low light intensity to an area with high light intensity, how do the circular and radial muscles of the iris react?

	circular muscles	radial muscles
A	contract	no change
B	contract	relax
C	relax	contract
D	relax	no change

- 18** The diagram shows the parts of the nervous system involved in a reflex arc.

Which letter identifies a synapse?



- 20** Which effect does adrenaline have on blood glucose concentration and pulse rate?

	blood glucose concentration	pulse rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

22 Which actions can prevent a mammal's internal body temperature falling too low?

- A** shivering and vasoconstriction
- B** shivering and vasodilation
- C** sweating and vasoconstriction
- D** sweating and vasodilation

- 5 A student investigated the effect of humidity on water vapour loss in plant leaves. As water vapour was lost, the mass of the leaves decreased.

Similar-sized leaves were collected from one species of plant.

The leaves were divided into two groups, **A** and **B**. The leaves in group **A** were placed in a low humidity environment and the leaves in group **B** were placed in a high humidity environment. The leaves in each group were kept in their environment for 12 hours.

The temperature in each environment was maintained at 20 °C.

The mass of the leaves in each group was measured at the start of the investigation and then every hour throughout the 12-hour period.

The student calculated the mass of water vapour lost as a percentage of the starting mass of the leaves for each group.

Fig. 5.1 shows the student's results.

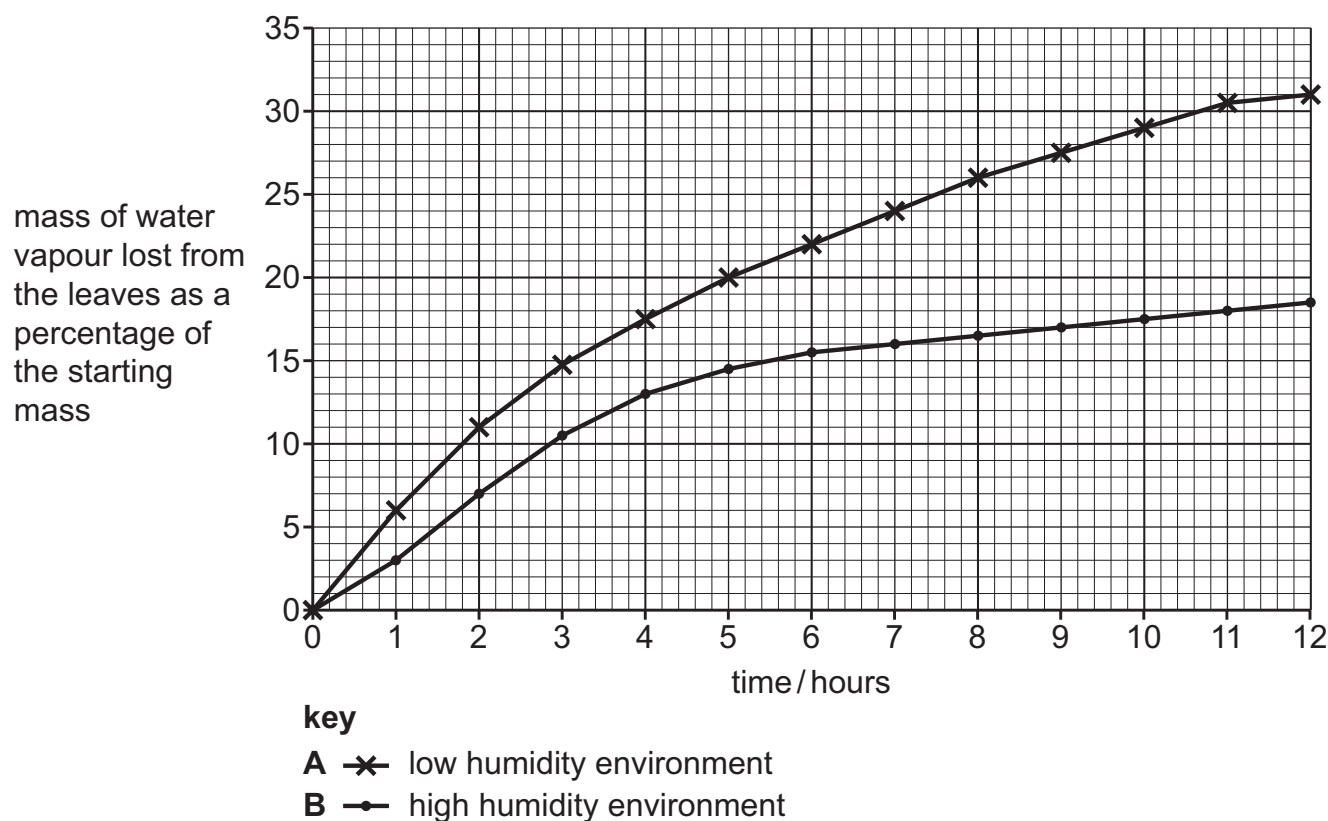


Fig. 5.1

- (a) (i) State the name of the process by which water vapour is lost from plant leaves.

..... [1]

(ii) Compare **and** explain the effects of high and low humidity shown in Fig. 5.1.

[5]

(iii) The students repeated the investigation at a temperature of 35°C.

The leaves were kept in a low humidity environment.

Draw a line **on the graph** in Fig. 5.1 to predict the results of this investigation.

(b) Humans also lose water vapour from their bodies by sweating.

(i) Explain how sweating helps a person to maintain a constant internal body temperature.

[3]

(ii) State **one** other way that humans lose water vapour from their bodies.

[1]

[Total:11]

5 (a) (i) State the balanced chemical equation for photosynthesis.

..... [2]

(ii) Chlorophyll is needed for photosynthesis.

State the name of the mineral ion needed to make chlorophyll.

..... [1]

(iii) State the name of the carbohydrate used for energy storage in a plant.

..... [1]

(b) A plant shoot was placed in a light-proof box. A hole was cut in one side of the box and a light was shone into the box.

Fig. 5.1 shows the plant shoot at the start of the investigation and after one week.

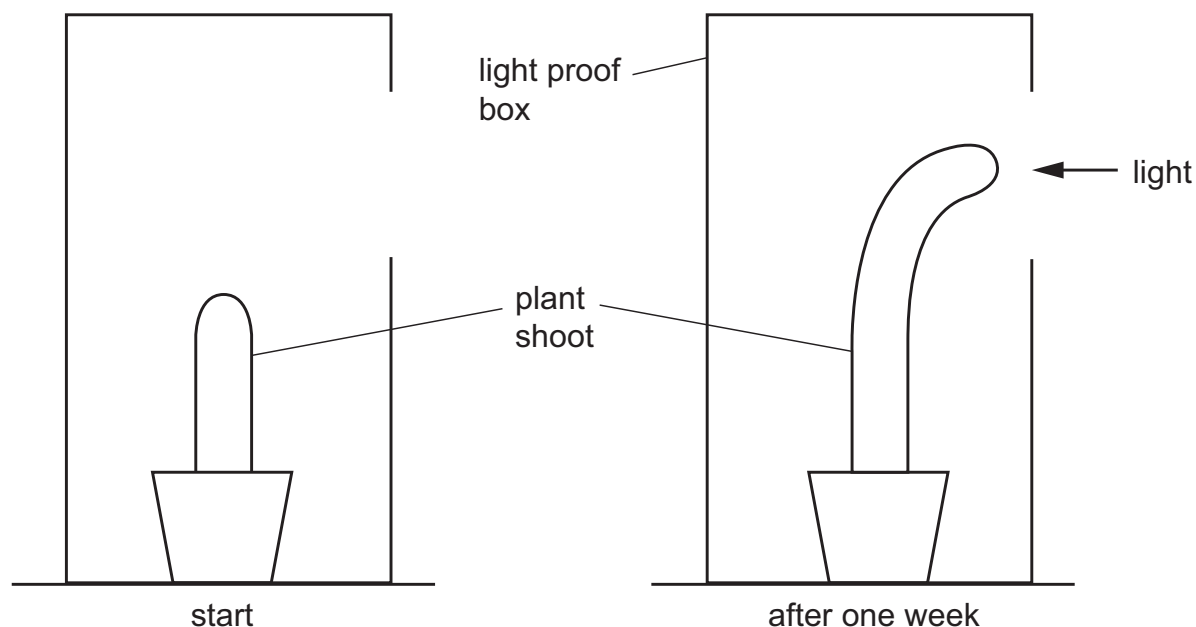


Fig. 5.1

(i) Identify the tropic response shown by the plant shoot in Fig. 5.1.

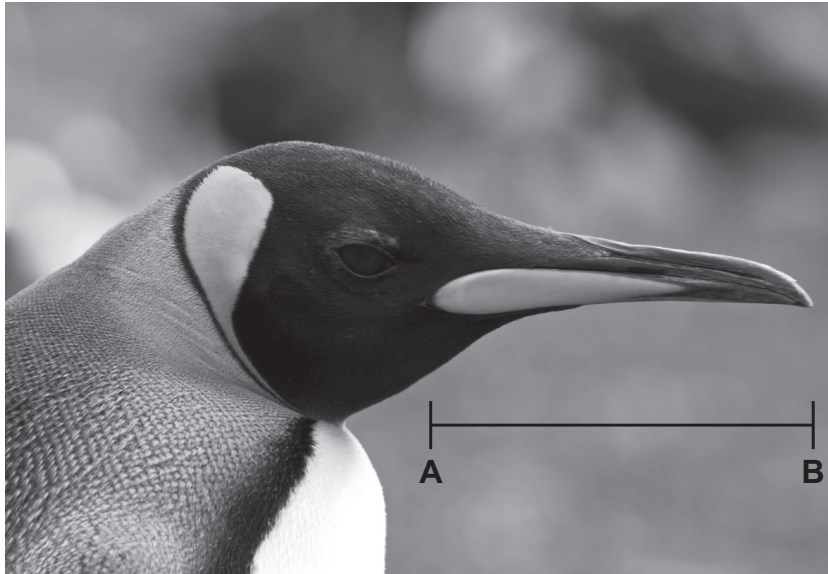
..... [1]

[4]

[2]

7

- 3 (a)** Fig. 3.1 is a photograph of the head of a king penguin.



magnification $\times 0.42$

Fig. 3.1

- (i)** Make a large drawing of the head of the king penguin shown in Fig. 3.1.

(ii) The length of line **AB** represents the length of the penguin’s beak.

Measure the length of line **AB** in Fig. 3.1.

length of line **AB** mm

Use your measurement and the formula to calculate the actual length of the penguin’s beak.

magnification =
$$\frac{\text{length of line **AB** in Fig. 3.1}}{\text{actual length of the penguin’s beak}}$$

Give your answer to **one** decimal place.

Space for working.

..... mm

[3]

(b) Fig. 3.2 shows the heads of a gentoo penguin and a black-footed penguin.



gentoo



black-footed

not to scale

Fig. 3.2

Other than size, state **two** ways the gentoo penguin differs from the black-footed penguin in Fig. 3.2.

1

.....

2

.....

[2]

(c) Penguins are covered in feathers. The feathers reduce heat loss by insulating the birds from the cold.

A beaker of hot water can be used to represent a penguin.

Plan an investigation to determine the effect of the thickness of an insulating material on heat loss in a beaker of hot water.

..... [6]

[6]

[Total: 15]

21 A specific eye condition can cause permanent contraction of the ciliary muscles.

Which row is correct for an eye **with** this condition compared to an eye without this condition?

	suspensory ligaments	refraction of light rays onto the retina
A	slack	less
B	slack	more
C	taut	less
D	taut	more