PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 6: PLANT STRUCTURES AND THEIR FUNCTIONS (PACK 2)

SCORE	PERCENTAGE
/65	%

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Q1.

A student is growing algae to make algal balls to investigate how light intensity affects photosynthesis.

A small culture of algae is added to a large bottle of distilled water.

Air is then bubbled through and the bottle is placed in front of a light source.

After 4 weeks, enough algae have grown for the student to make algal balls.

Figure 6 shows the apparatus used.



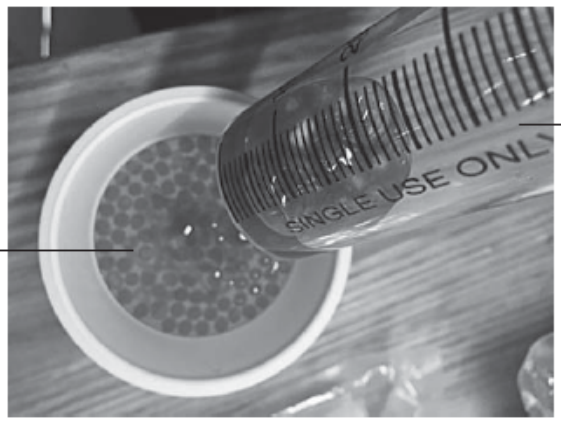
By permission of 'Science and Plants for Schools' – http://www.saps.org.uk/

Figure 6

To make the algal balls, the algae are mixed with sodium alginate.

The student uses a syringe to add the mixture drop by drop into calcium chloride solution, which causes the algal balls to form.

Figure 7 shows this process.



Source from: https://twitter.com/mapward/status/686680082274885632

Figure 7

(i) State why the algal balls need to be washed before being used.

(1)

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(ii) State **one** relevant safety precaution that should be used when making the algal balls.

(1)

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(Total for question = 2 marks)

Q2.

A student compared the number of stomata on the upper and lower surfaces of a leaf.

She completed a leaf peel as shown in Figure 5.

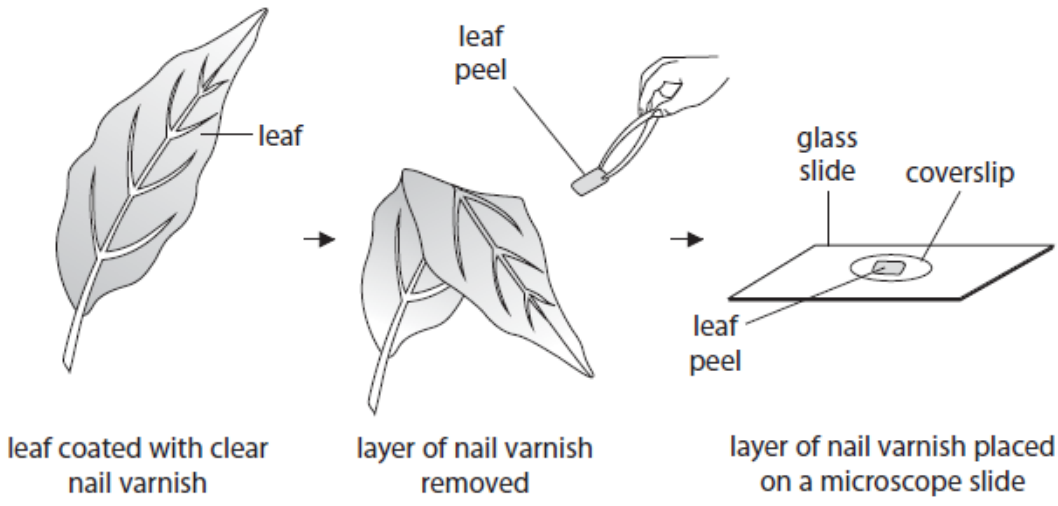


Figure 5

The layer of nail varnish shows an impression of the cells on the surface of the leaf.

The student drew a biological diagram of the leaf peel taken from the underside of the leaf.

Figure 6 shows this diagram.

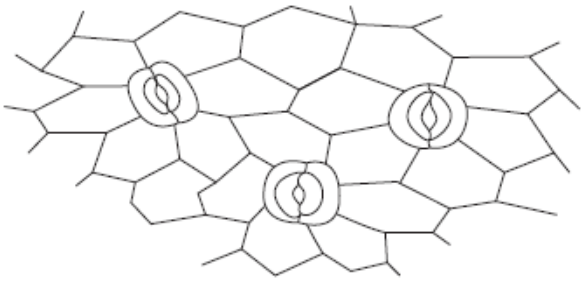


Figure 6

(i) State the number of stomata visible on Figure 6.

(1)

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(ii) The student observed that the stomata were open.

Describe how stomata open.

(3)

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(iii) The leaf peel from the upper surface of this leaf showed no stomata.

Explain why it is an advantage to the plant to have this distribution of stomata in the upper and lower surfaces of the leaf.

(2)

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(Total for question = 6 marks)

Q3.

Auxins are plant hormones.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

Auxins cause the shoot of a plant to grow towards light in a process called

(1)

☒ **A** negative gravitropism

☒ **B** negative phototropism

☒ **C** positive gravitropism

☒ **D** positive phototropism

(ii) Explain how auxins cause the shoot of a plant to grow towards light.

(2)

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Q4.

Climacteric fruits are fruits that can ripen after they have been removed from the plant.

(i) Which plant hormone can be used to ripen climacteric fruit?

(1)

☒ **A** auxin

☒ **B** ethene

☒ **C** gibberellin

☒ **D** insulin

(ii) When climacteric fruits ripen, they release a gas during respiration.

Which gas is released by these fruits during respiration?

(1)

- ☒ **A** carbon dioxide
- ☒ **B** carbon monoxide
- ☒ **C** oxygen
- ☒ **D** nitrogen

(Total for question = 2 marks)

Q5.

The effect of applying weed killer containing plant hormones to fields of wheat was investigated.

In field A, the weed killer was applied each year for five years.

In field B, no weed killer was applied for the five years.

Each field was 1000 m^2 and all other conditions remained the same.

The results are shown in Figure 14.

field	wheat yield in kg per 100 m^2				
	2015	2016	2017	2018	2019
A	54	52	48	49	50
B	32	28	34	33	34

Figure 14

Comment on the effect of using weed killer containing plant hormones in this investigation.

(3)

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(Total for question = 3 marks)

Q6.

A scientist investigated the role of gibberellins in seed germination.

The scientist placed 20 cress seeds on agar jelly containing gibberellins.

The scientist counted the number of seeds that had germinated after 5 days.

Figure 10 shows the results.

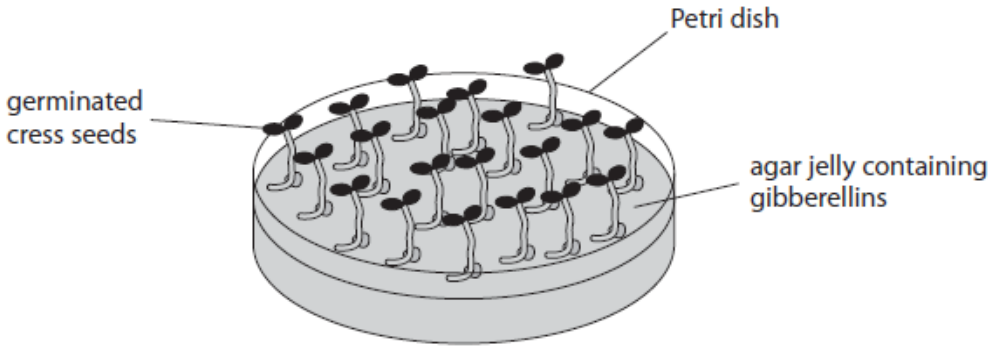


Figure 10

State **two** commercial uses of gibberellins not including their role in germination.

(2)

1 .....

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2 .....

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(Total for question = 2 marks)

Q7.

(i) Water enters a plant through root hair cells.

Root hair cells have

(1)

☒ **A** a small surface area and thin cell walls

☒ **B** a small surface area and thick cell walls

☒ **C** a large surface area and thin cell walls

☒ **D** a large surface area and thick cell walls

(ii) Explain how water in the root is transported to the leaves of the plant.

(2)

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(Total for question = 3 marks)

Q8.

A student compared the number of stomata on the upper and lower surfaces of a leaf.

She completed a leaf peel as shown in Figure 5.

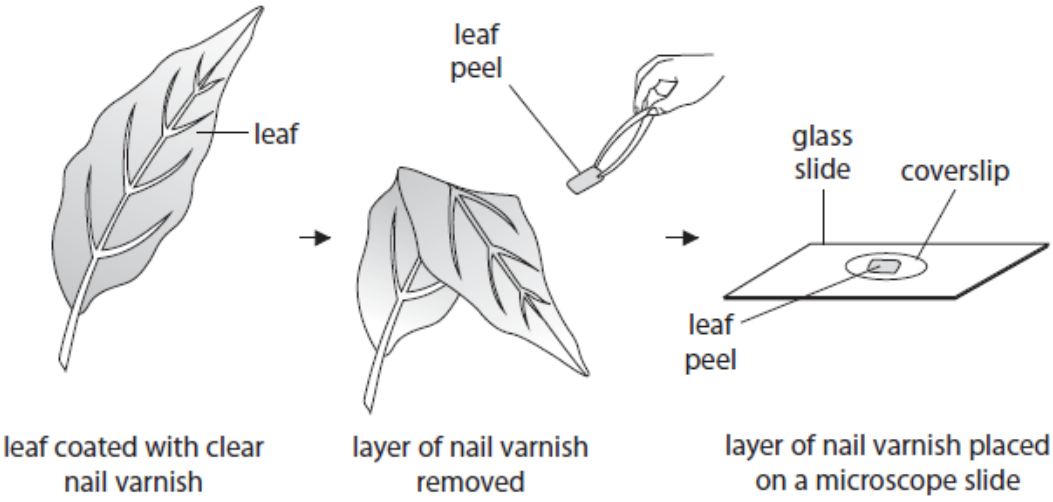


Figure 5

The layer of nail varnish shows an impression of the cells on the surface of the leaf.

(i) State why a coverslip is placed on top of the leaf peel.

(1)

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(ii) Explain why the leaf peel rather than the whole leaf was viewed with a microscope.

(2)

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(Total for question = 3 marks)

Q9.

A student is growing algae to make algal balls to investigate how light intensity affects photosynthesis.

A small culture of algae is added to a large bottle of distilled water.

Air is then bubbled through and the bottle is placed in front of a light source.

After 4 weeks, enough algae have grown for the student to make algal balls.

Figure 6 shows the apparatus used.



By permission of 'Science and Plants for Schools' – http://www.saps.org.uk/

Figure 6

The student placed some algal balls into each of five small glass bottles containing hydrogencarbonate indicator.

Each bottle was sealed with a lid and placed at a different distance from a light source.

Hydrogencarbonate indicator changes colour due to the amount of carbon dioxide in the solution.

The investigation was left for 50 minutes and the colour of the hydrogencarbonate solution was recorded.

Figure 8 shows this investigation.

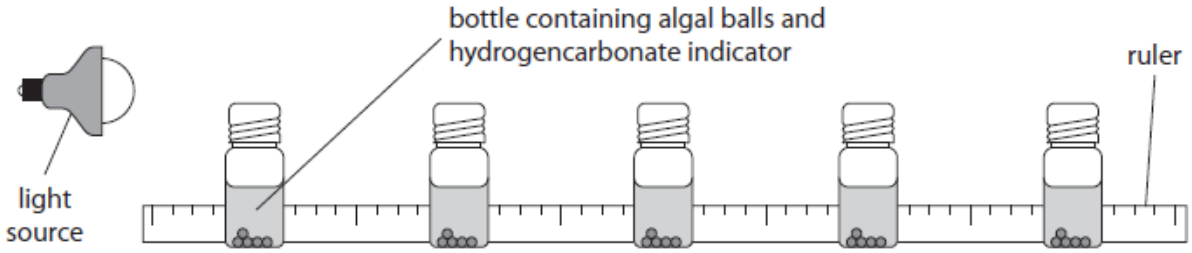


Figure 8

(i) State **two** variables the student will need to control in this investigation.

(2)

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2 .....

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(ii) At the start of the investigation the hydrogencarbonate indicator was red in colour.

Figure 9 shows the colour of hydrogencarbonate indicator in solutions that have different pH.

colour	pH
yellow	7.6
orange	8.0
red	8.4
magenta	8.8
purple	9.2

Figure 9

Explain why the hydrogencarbonate indicator in the bottle nearest to the light source turned purple.

(3)

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(Total for question = 5 marks)

Q10.

Figure 2 shows an area of woodland with some small plants growing in the ground between the trees.



(Source: © Maksym Holovinov/Shutterstock)

Figure 2

The mineral ions are absorbed from the soil into the roots of plants.

Describe how these mineral ions are transported from the roots to the leaves of the plants.

(2)

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(Total for question = 2 marks)

Q11.

Figure 16 shows the effect of light intensity and temperature on the rate of photosynthesis.

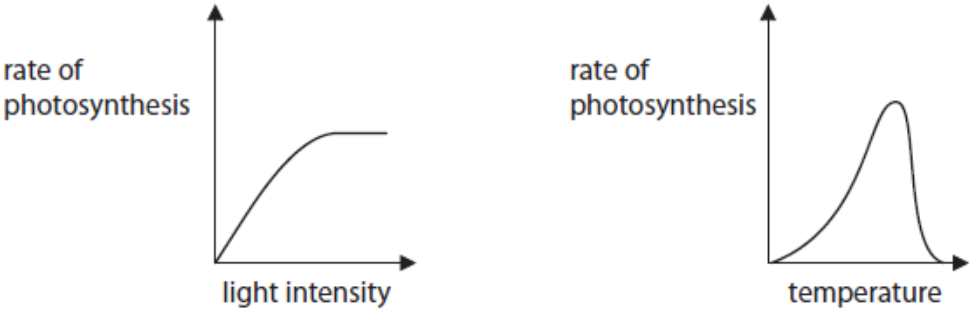


Figure 16

(i) Describe the effect of light intensity on the rate of photosynthesis.

(2)

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(ii) Explain the effect of temperature on the rate of photosynthesis.

(2)

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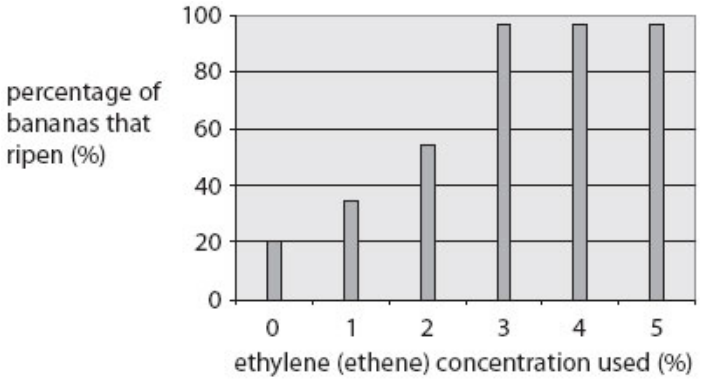
(Total for question = 4 marks)

Q12.

Auxins are plant hormones.

Ethylene (ethene) is a plant hormone that stimulates the ripening of fruit.

The graph shows the effect of ethylene (ethene) concentration on the ripening of bananas after three days.



(i) Describe the effect of ethylene (ethene) on the ripening of bananas.

(1)

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(ii) Explain which concentration of ethylene (ethene) a supermarket should use to be most cost effective when ripening bananas.

(2)

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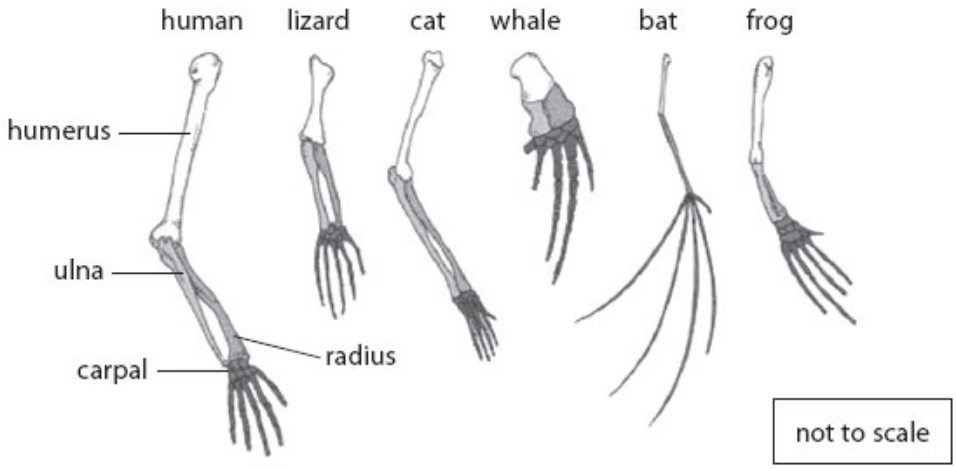
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Q13.

The diagrams show the limbs of six organisms.



(a) Many scientists believe that these six organisms evolved from one common ancestor.

Describe the evidence shown in the diagrams that supports this belief.

(3)

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(b) Fossils can provide evidence for evolution.

Explain why the fossil record is incomplete.

(2)

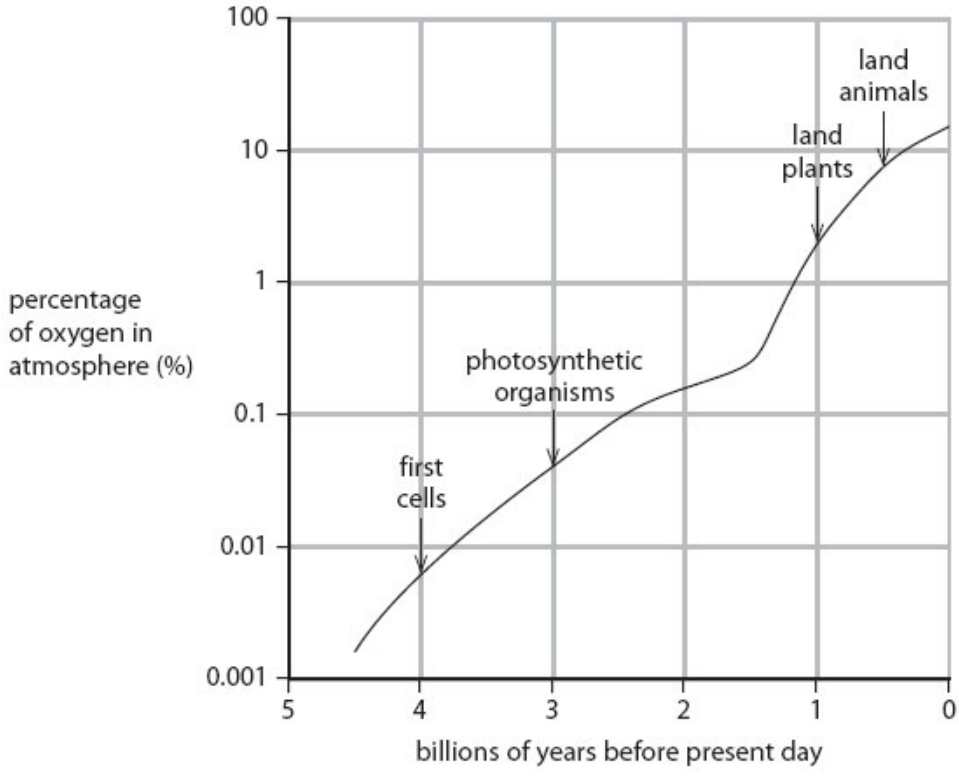
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(c) The graph suggests that the level of oxygen in the atmosphere was important for the evolution of many living organisms.



(i) How much oxygen was needed in the atmosphere for the evolution of land animals?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** 0.009%

☒ **B** 0.09%

☒ **C** 0.9%

☒ **D** 9.0%

(ii) Suggest how photosynthesis could have changed the gas content of the atmosphere.

(2)

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(iii) Suggest why such a high percentage of oxygen in the atmosphere was needed for large land animals to evolve.

(2)

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(Total for Question = 10 marks)

Q14.

* Figure 15 shows a pot plant before it fell over and the same pot plant two weeks after it fell over.

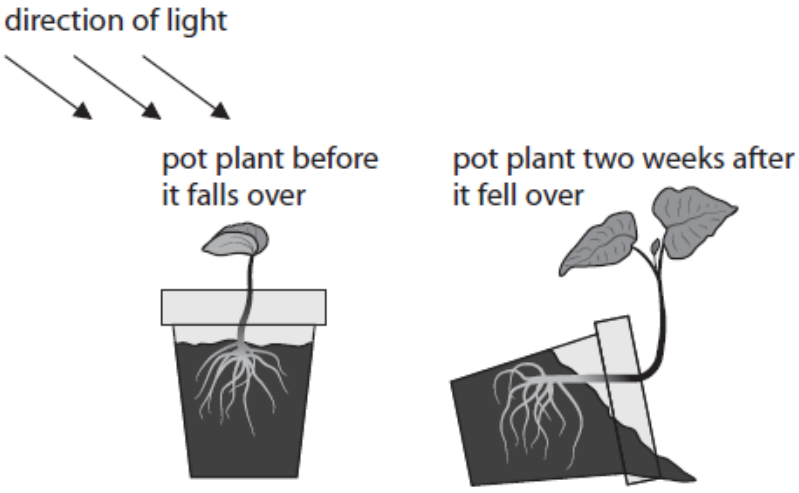


Figure 15

Explain how hormones in the roots and shoots of plants caused this directional growth.

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(Total for question = 6 marks)

Q15.

* Marram grass is a plant that grows on exposed areas of sand dunes.

Figure 19 shows marram grass growing and a cross section through a leaf of marram grass.

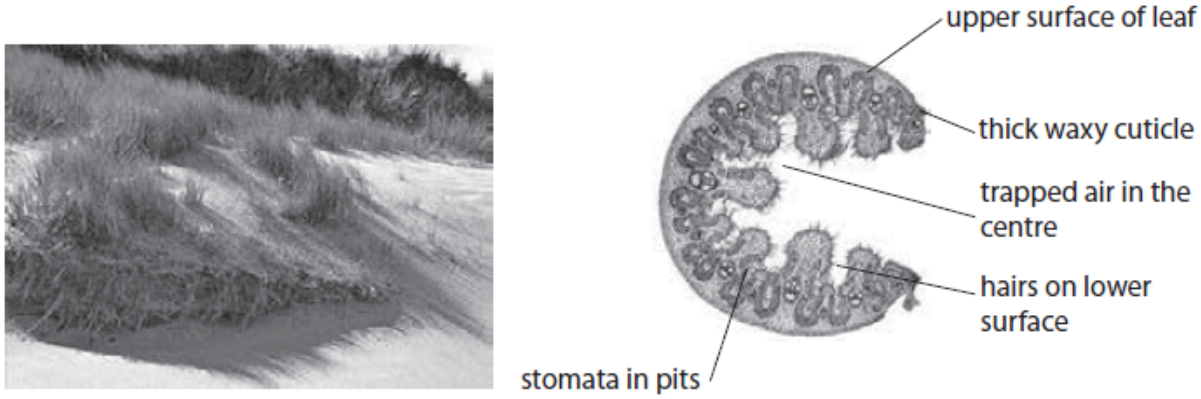


Figure 19

Explain how marram grass is adapted to survive in the hot, windy and dry conditions of a sand dune.

(6)

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(Total for question = 6 marks)

Q16.

Explain how phototropism is controlled in plant shoots.

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(Total for question = 3 marks)

Q17.

Some weed killers contain plant hormones.

Explain how plant hormones work as weed killers.

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(Total for question = 3 marks)

Q18.

* Explain how substances are moved through a plant by transpiration and translocation.

(6)

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(Total for question = 6 marks)

Q19.

* (Reforestation has a beneficial effect on air composition and biodiversity.

Animal conservation projects can also have a beneficial effect on biodiversity.

Explain the beneficial effects of reforestation and animal conservation projects.

(6)

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(Total for question = 6 marks)

Q20.

Figure 2 shows an area of woodland with some small plants growing in the ground between the trees.



(Source: © Maksym Holovinov/Shutterstock)

Figure 2

A scientist recorded the mean light intensity and the mean number of small plants per m^2 for six 25 m^2 areas of the woodland.

Figure 3 shows the results.

area of woodland	mean light intensity in lux	mean number of small plants per m^2
A	1500	2.7
B	1300	1.6
C	1000	1.1
D	800	0.6
E	550	0.3
F	350	0.1

Figure 3

(i) Explain the effect of light intensity on the number of small plants per m^2.

(2)

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(ii) State **one** variable the scientist should have controlled to make sure the light intensity measurements could be compared.

(1)

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(Total for question = 3 marks)