**1** Cactus plants are adapted to survive in hot, dry conditions. They have shallow, widespread root systems, the ability to store water in their stems, spines for shade, a waxy coating and no leaves.



(a) Explain how having no leaves can help a cactus plant reduce water loss.

**(2)**

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(b) Suggest how a shallow, widespread root system would help a cactus to survive in desert environments.

**(2)**

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(c) Other than shading, suggest **one** advantage to cactus plants of having spines.

**(1)**

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**(Total for Question = 5 marks)**

**2** Describe an experiment you could do to find out the effect of pH on the growth of yeast.

**(6)**

**(Total for Question = 6 marks)**

**3** The photograph shows a mammal called a mountain hare.



©Author: Alan Wolfe

Mountain hares eat plants.

Foxes, cats and eagles are predators that eat mountain hares.

(a) (i) Use this information to draw a food web.

**(2)**

(ii) Give the name used to describe animals that eat plants.

**(1)**

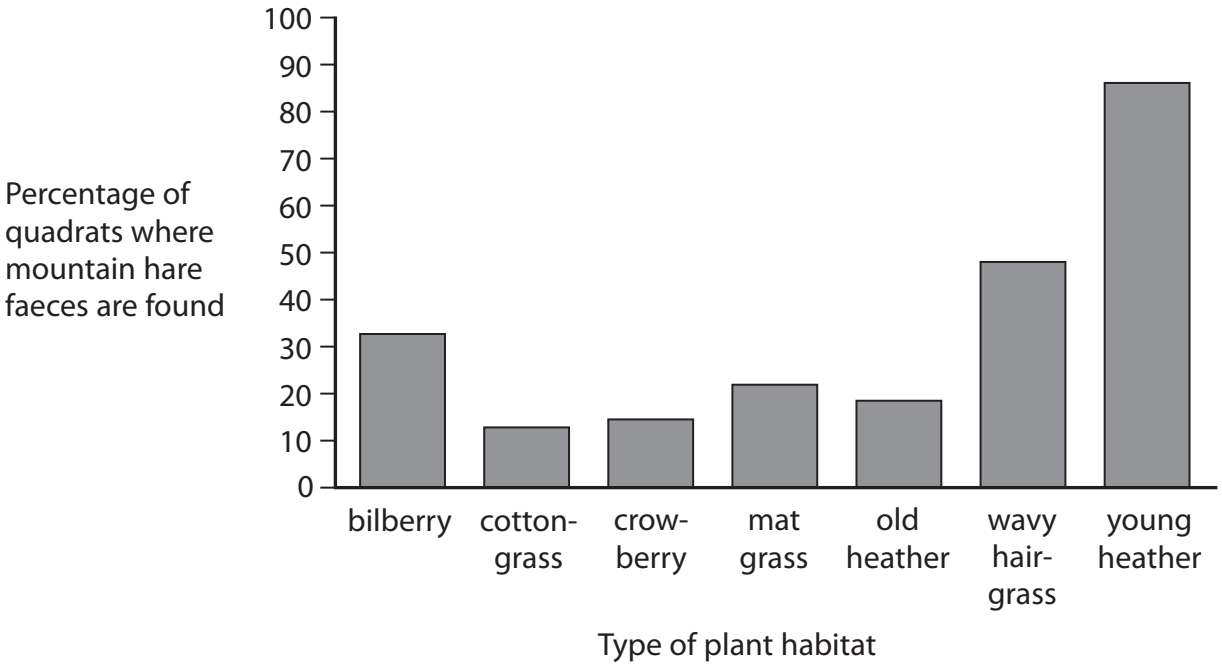
(b) Scientists want to find out which type of plant habitat mountain hares prefer.

They use quadrats to sample seven habitats.

Each habitat contains a different type of plant.

The scientists calculate the percentage of quadrats in each habitat where mountain hare faeces are found.

The graph shows the results.




(i) Name the type of plant habitat that the mountain hares like best.

**(1)**

.....

(ii) Suggest three reasons why mountain hares may prefer to eat the plants in some habitats rather than plants in other habitats.

**(3)**

1 .....

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2 .....

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3 .....

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(c) The scientists use 700 quadrats in one plant habitat and find that 224 quadrats contain mountain hare faeces.

(i) Calculate the percentage of quadrats containing mountain hare faeces in this habitat.

Show your working.

**(2)**

percentage of quadrats = ..... %

(ii) Name the type of plant habitat where the scientists collected these results.

**(1)**

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(d) The scientists use a large number of quadrats to make sure the data collected is reliable.

Describe a procedure they should follow to make sure the data collected using quadrats is valid.

**(1)**

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**(Total for Question = 11 marks)**

**4** This food chain is from a rainforest ecosystem.

trees ⟶ deer ⟶ genet ⟶ python

(a) (i) Name the primary consumer in the food chain.

**(1)**

.....

(ii) Name the tertiary consumer in the food chain.

**(1)**

.....

(b) The photograph shows a genet, which is a cat-like carnivore that lives in rainforests in Africa and Asia.



Photographer: Guerin Nicolas

Suggest how the following features help the genet to survive.

(i) large ears

**(1)**

.....

.....

(ii) spotted coat

**(1)**

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.....

(iii) ability to stand on hind legs

**(1)**

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(c) The rainforests in many countries are under threat from deforestation.

Explain the consequences of removing the rainforest on the balance of atmospheric gases.

**(2)**

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**(Total for Question = 7 marks)**