AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



EXAM QUESTION PACK

4.7.1 ADAPTATIONS, INTERDEPENDENCE AND COMPETITION (PACK 4)

SCORE	PERCENTAGE
/117	%

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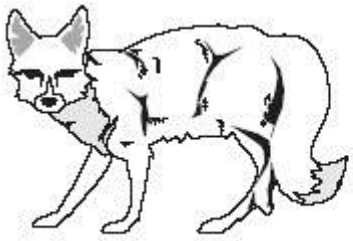
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Q1.

The drawings show an arctic fox and a fennec fox.



Arctic fox



Fennec fox

(a) The arctic fox lives in cold, snowy conditions.

Explain how each of the following helps the arctic fox to survive in these conditions.

1 Long, thick fur

_____

_____

2 A white coat

_____

_____

(2)

(b) The fennec fox lives in hot deserts.

Explain how each of the following helps it to survive in hot conditions.

1 Very large ear flaps

_____

_____

2 Hairs on the soles of its feet

_____

_____

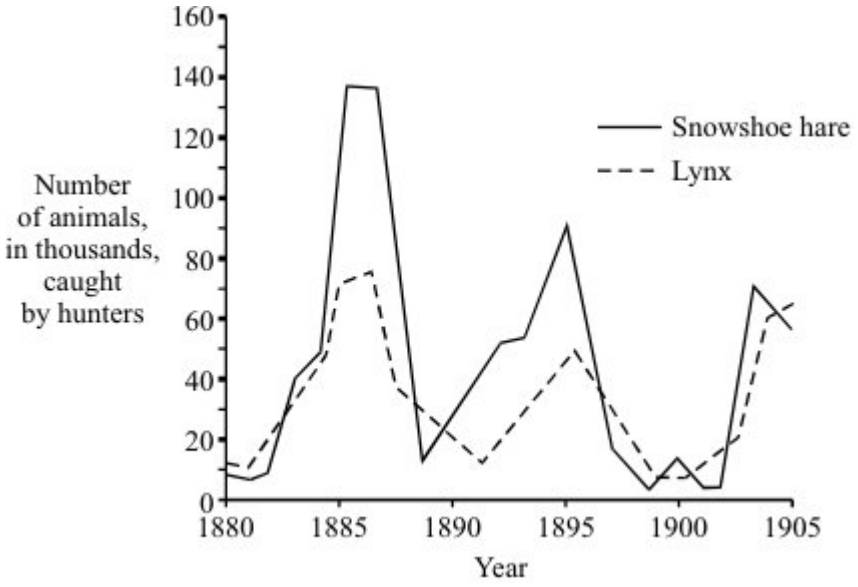
(2)

(Total 4 marks)

Q2.

The graphs give information, from a hundred years ago, about the size of the population of snowshoe hares and lynx, which live in northern Canada. Snowshoe hares are herbivores. Lynx are carnivores and prey on snowshoe hares.

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(a) Give **three** factors which can affect the size of the snowshoe hare population.

1. _____

2. _____

3. _____

(3)

(b) The graph for numbers of lynx shows a similar cycle to that of the snowshoe hares. The peaks for lynx usually occur about a year later than the peaks for the snowshoe hares. Suggest why.

_____

_____

_____

_____

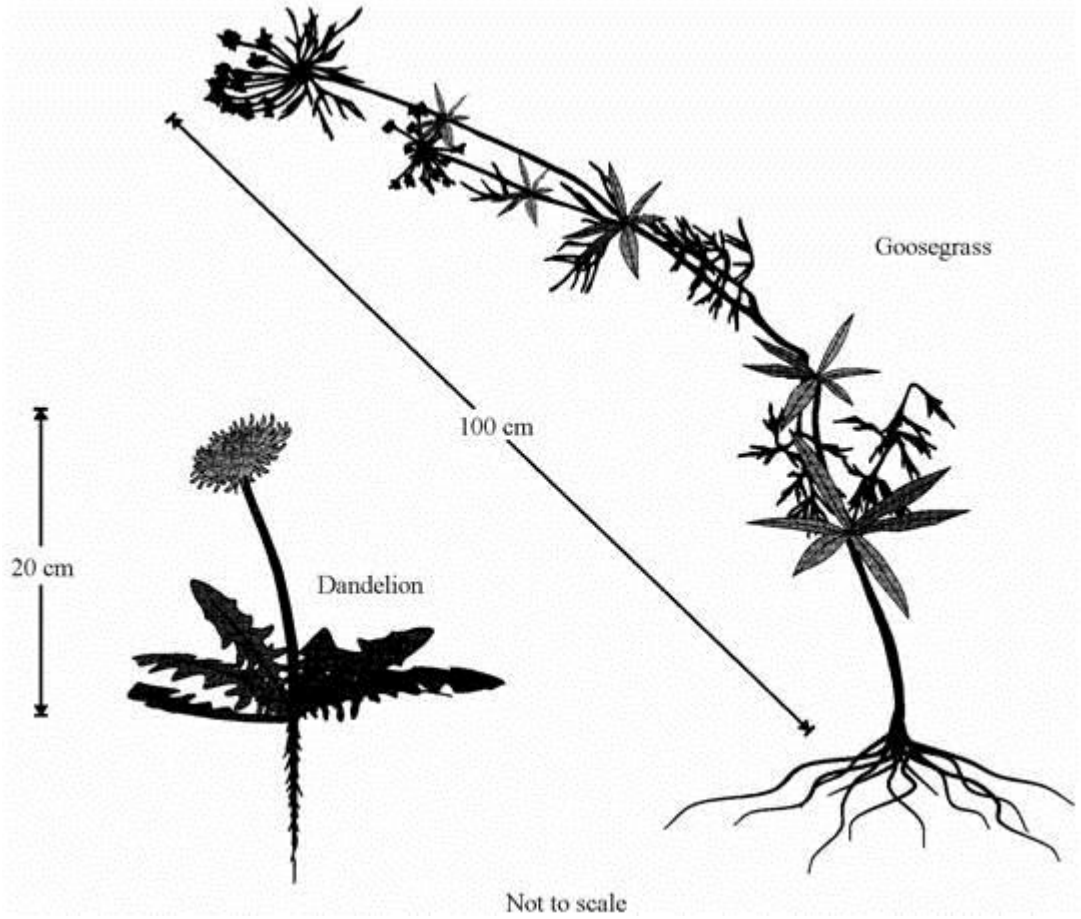
(2)

(Total 5 marks)

Q3.

Dandelions have become adapted to live in lawns and grass areas where animals graze. Goosegrass, however, has become adapted to live alongside hedgerows and cannot survive being mown.

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(a) Use the information in the drawings to suggest **one** advantage of each of the following adaptations.

(i) Dandelion leaves lie flat on the ground.

_____

_____

(1)

(ii) A dandelion has a thick tapered root.

_____

_____

(1)

(iii) Goosegrass stems are long.

_____

_____

(1)

(iv) Goosegrass roots are thin and very long.

_____

_____

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(1)

(b) Dandelions and goosegrass are different species of plants.

(i) What name is given to the unit of inheritance which controls one particular characteristic of a plant or animal?

_____

(1)

(ii) Why would you be unlikely to succeed if you tried to breed a new species of plant by crossing a dandelion with goosegrass?

_____

_____

(1)

(c) Animals as well as plants have become adapted to live in different environments.

State **one** way a polar bear has become adapted to living in the Arctic, and the reason for the adaptation.

_____

_____

_____

_____

(2)

(Total 8 marks)

Q4.

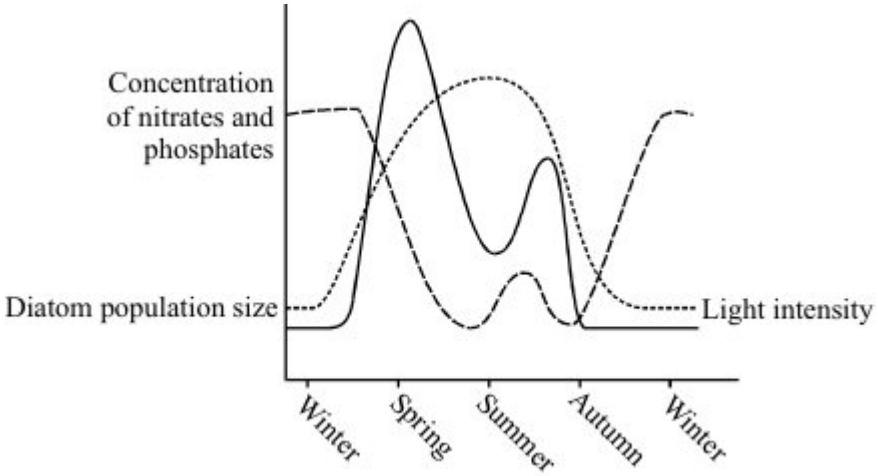
A food chain in the North Atlantic Ocean is:

diatoms → small fish → large fish

The graphs show how over a year:

- the population size of diatoms in the North Atlantic varies;
- the light intensity alters;
- the concentration of nitrate and phosphate minerals alters.

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(a) Explain why the light intensity is a major factor in controlling the numbers of diatoms.

_____

_____

_____

(2)

(b) (i) Suggest **two** reasons why the population of diatoms decreases between spring and summer.

1. _____

_____

2. _____

_____

(2)

(ii) Give **two** reasons why the population of diatoms decreases in autumn.

1. _____

_____

2. _____

_____

(2)

(c) Use the information on the graph to suggest what change causes the number of diatoms to increase in the late summer. Give a reason for the change.

_____

_____

_____

(2)

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(Total 8 marks)

Q5.

Compare the efficiency of these two food chains.

Food chain **A** grain → humans

Food chain **B** grain → bullocks → humans

In your answer, make **full use** of the following data.

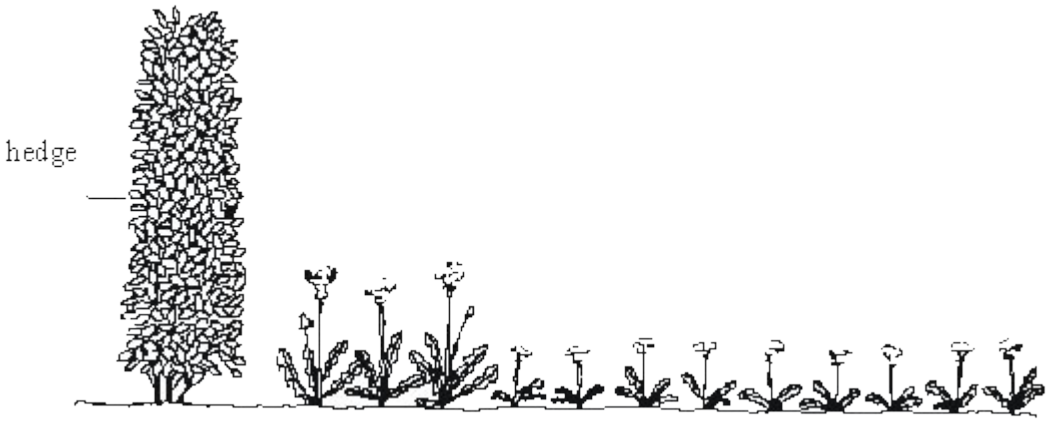
Food	Consumer	Percentage of available energy transferred as useful energy
Grain	Human	9%
Grain	Bullock	12%
Bullock	Human	10%

One kilogram of grain has 80 000 kJ of available energy.

(Total 4 marks)

Q6.

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Two students were surveying dandelions in a field. They noticed that the dandelions by the hedge were taller than the others.

One student suggested that the differences in height could have been caused by the different conditions in the field.

(a) (i) Was he correct? _____

Give reasons for your answer.

_____

_____

_____

(2)

(ii) Explain how you could test to see if his answer was correct.

_____

_____

_____

_____

(2)

(b) The hedge was cut down and removed.

What would happen to the height of the dandelions after some time?

_____

Explain your answer. _____

_____

_____

(2)

(Total 6 marks)

Q7.

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Tree on its own



Trees inside a wood

The drawing above shows the shapes of trees grown on their own and inside a wood.

(a) Write down **two** differences you can see between the tree grown on its own and those growing inside a wood

1. _____

_____

2. _____

_____

(2)

(b) Trees inside the wood have to compete with each other for the things which they need to grow.

List **three** things for which the trees compete.

1. _____

2. _____

3. _____

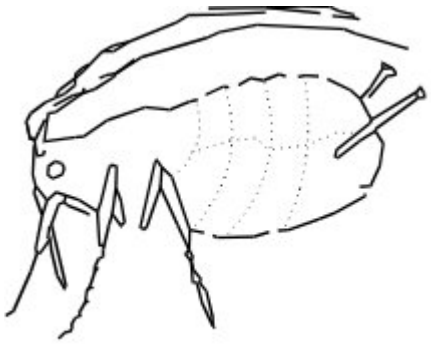
(3)

(Total 5 marks)

Q8.

The greenfly is an insect which is eaten by ladybirds.

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Greenfly

(a) (i) What do we call animals, like the ladybird, which hunt and kill other animals for food?

_____

(1)

(ii) What do we call animals, like the greenfly, which are eaten by other animals?

_____

(1)

(b) What would happen to the number of ladybirds if the numbers of greenfly suddenly dropped?

_____

(1)

Give a reason for your answer.

_____

_____

(1)

(c) Suggest **two** factors, other than the number of ladybirds, which could affect the number of greenfly.

1. _____

2. _____

(2)

(Total 6 marks)

Q9.

A particular species of snail has a shell which may be pink, yellow or brown. It may also be plain or have bands running round it.

The snails are eaten by song thrushes.

Explain why snails with plain brown shells are the most common in hedgerows.

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_____

_____

_____

_____

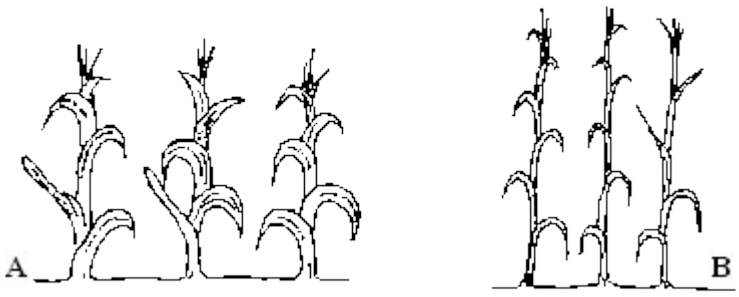
_____

_____

(Total 4 marks)

Q10.

The diagrams show maize plants grown from seeds sown at different distances from each other.



(a) Write down **two** differences you can see between plants A and B.

1. _____

_____

2. _____

_____

(2)

(b) The differences are caused by competition between the maize plants.

The maize plants are competing for **light**. The maize plants are also

competing for _____

and _____

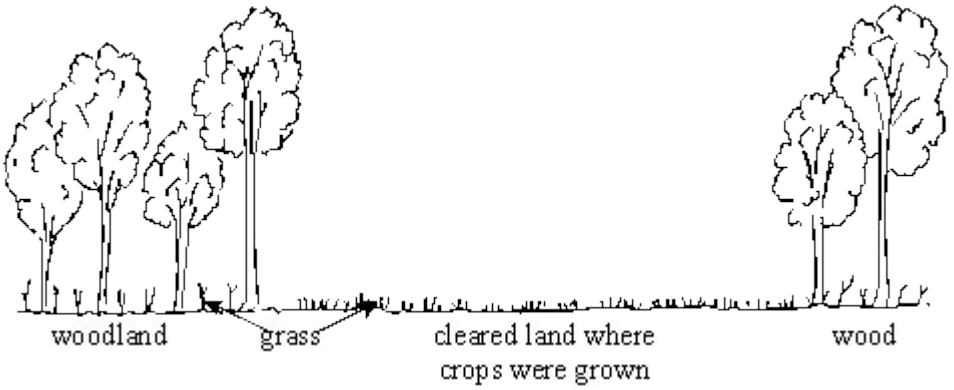
(2)

(Total 4 marks)

Q11.

In some developing countries woodland is cut down and burned. The ash acts as fertiliser. Crops are grown for three years. The land is then left as it is too poor to grow any more crops.

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(a) In the original woodland trees and plants died and grew for hundreds of years. When cleared the land grew crops for only three years. Explain this difference in as much detail as you can.

_____

_____

_____

_____

(3)

(b) What could farmers do to make crops grow on the cleared land for more than three years?

_____

_____

(2)

(Total 5 marks)

Q12.

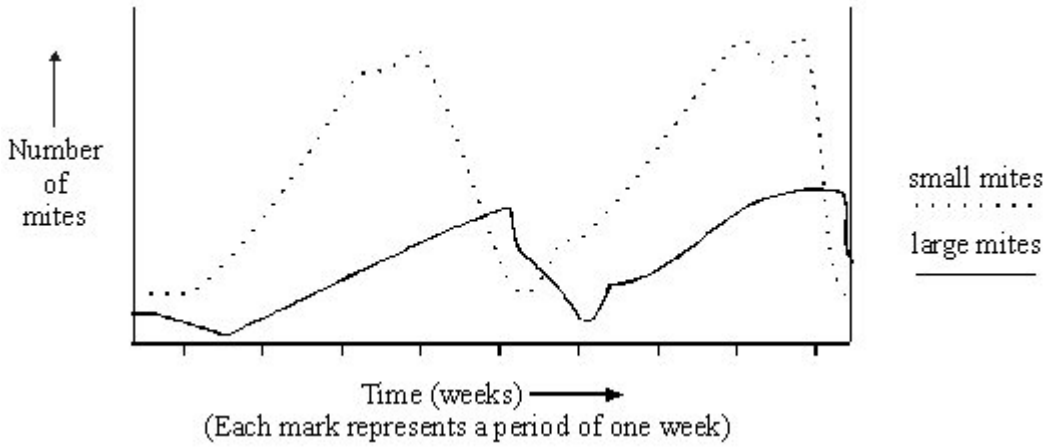
Some small mites feed on the leaves of orange plants. Larger mites feed on the smaller mites.

(a) What do we call animals, like the large mite, which eat other animals, like the small mite?

_____

(1)

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The graph shows how the number of these mites changes over a period of time.

(b) (i) What happens to the number of large mites one week after the number of small mites decreases?

_____

Suggest a reason for this.

_____

_____

_____

(3)

(ii) What happens to the number of small mites as the number of large mites increases?

_____

Suggest a reason for this.

_____

_____

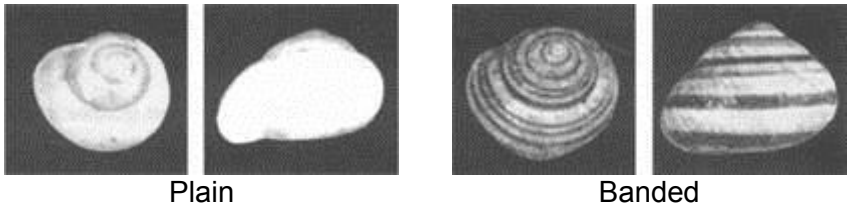
_____

(2)

(Total 6 marks)

Q13.

Cepaea nemoralis is a snail which is found on sand dunes. It may have a plain or banded shell. The snails are found on grass stalks and leaves.



Plain Banded

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A scientist collected young unbanded snails and kept them until they were fully grown and mated them.

The eggs laid produced 35 unbanded and 12 banded snails.

(a) Explain these figures as fully as you can. You may use a genetic diagram if you wish to make your answer clearer.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(7)



Variation in colour



Variation in banding

(b) The snail shells show a lot of variation in colour. They are yellowy/green, brown, pink or cream. The banding varies from a single wide band to a mixture of thick and thin bands.

Describe briefly the factors which have produced this variation and explain how these factors may themselves have arisen.

_____

_____

_____

_____

_____

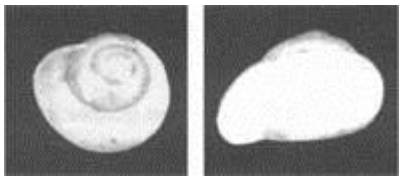
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(4)

(Total 11 marks)

Q14.

Cepaea nemoralis is a snail which is found on sand dunes. It may have a plain or banded shell. The snails are found on grass stalks and leaves.



Plain



Banded

When a scientist collected snails on the sand dunes he got 450 banded
280 unbanded.

Snails are eaten by birds. Sand dunes have clumps of grasses growing on them.

Suggest why there were more banded than unbanded snails on the sand dunes.

_____

_____

_____

_____

_____

_____

_____

(Total 4 marks)

Q15.

Earthworms are important soil organisms. When they burrow, they help to bring air into the soil as well as improving drainage. Earthworms also bury leaves in the soil. These decay making the soil more fertile. Earthworms in turn are eaten by voles, moles, foxes, badgers and birds.

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New Zealand flatworm

In some parts of the United Kingdom, earthworms are being killed by New Zealand flatworms. The animals are spreading quickly and have no natural enemies.

The flatworms do not make their own burrows. They only use the burrows made by the earthworms in order to attack them.

(a) Explain, as fully as you can, why it is important to control or get rid of these New Zealand flatworms in Britain.

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(b) Suggest **one** possible way, giving **one** advantage and **one** disadvantage, that this New Zealand flatworm could be controlled.

_____

_____

_____

_____

_____

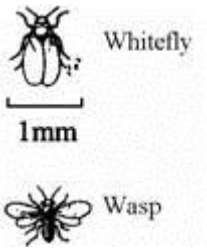
(3)

(Total 7 marks)

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Q16.

Whitefly are pests and harm plants in glasshouses.
A small wasp can be used to control the whitefly.



The wasp can only lay its eggs in the larvae of whiteflies.
The wasp larva eats the body of the whitefly larva.
It then changes into a new wasp and flies off.

(a) Choose words from the list to complete the sentences below.

decomposer **predator** **prey** **producer**

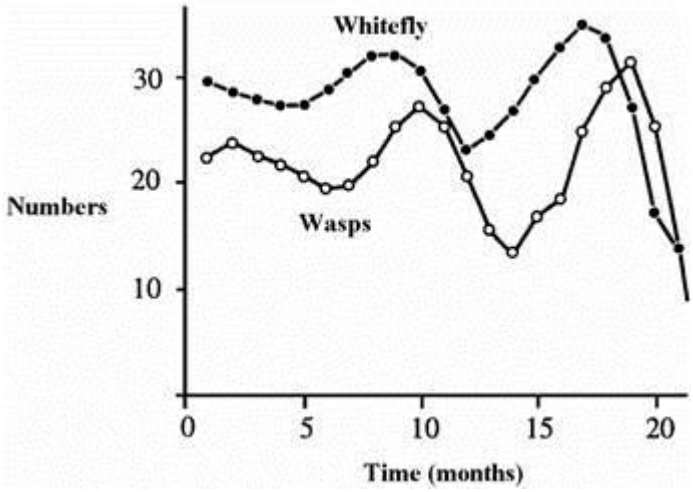
The wasp larva feeds on the whitefly larva.

The wasp is a _____

The whitefly is known as the wasp's _____

(2)

(b) The graph shows how the numbers of whitefly and wasps change over several months.



What happens to the number of wasps between 15 and 20 months?

_____

Why do you think this happens? _____

_____

_____

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_____

(4)

(c) What would happen to the wasps if there were no larvae in which to lay their eggs?

_____

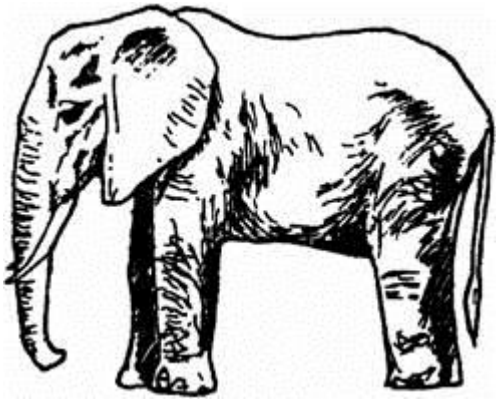
(1)

(Total 7 marks)

Q17.

The elephant is likely to become extinct in parts of Africa.

Use the information below to explain **three** reasons why.



* The African elephant eats lots of trees and other plants for food.
* In Africa the human population is increasing and more food is needed to feed the extra people.
* More trees are cut down for fuel and to clear land for growing crops.
* Elephants are killed by poachers who want the ivory from their tusks.
* A herd of elephants needs a large area in which to live and feed.

1. _____

_____

2. _____

_____

3. _____

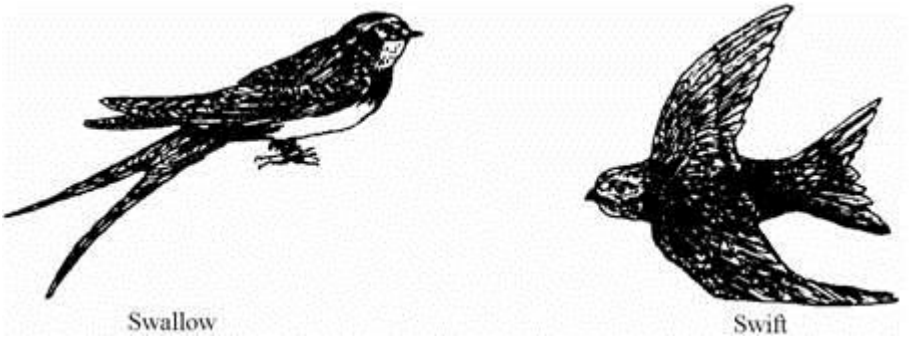
_____

(Total 3 marks)

Q18.

Study the following information, then answer the questions.

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- Swallows and swifts spend the summer in Britain and the winter in Africa.
- Swallows feed on insects near the ground.
- Swifts feed on insects high in the air.
- Swallows come back to Britain in spring before swifts.
- In spring the ground starts to warm up. When it is warm it makes the air rise. Insects are carried up in this air.

(a) Suggest two reasons why swifts and swallows fly to Africa for the winter.

1. _____

2. _____

(2)

(b) How do swifts and swallows avoid competing for food?

_____

_____

(1)

(c) Suggest why swifts come back to Britain later than swallows.

_____

_____

_____

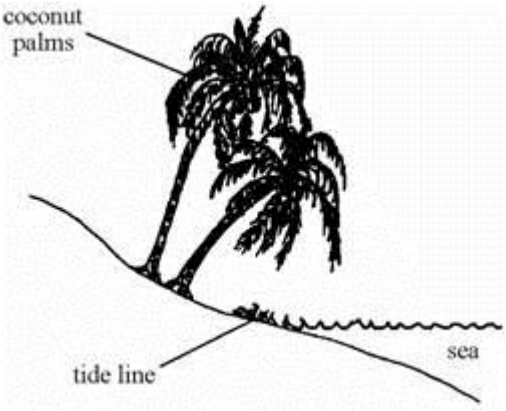
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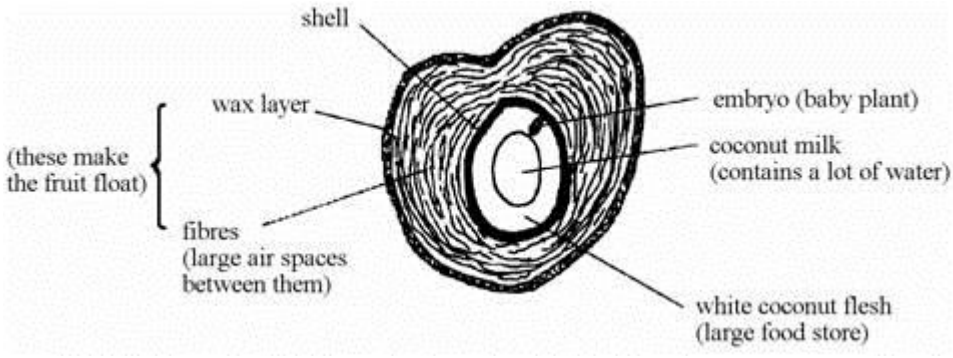
(Total 5 marks)

Q19.

Coconut palms grow just above the tide line on beaches of tropical islands.

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Section through a coconut fruit

The sea carries the fruit to new parts of the beach.
The embryo then puts out its first root.
Fresh water and nutrients are very deep down under the sandy beach.

Explain **three** ways in which the coconut palm is adapted so that its embryo plants can spread and survive.

1. _____

_____

2. _____

_____

3. _____

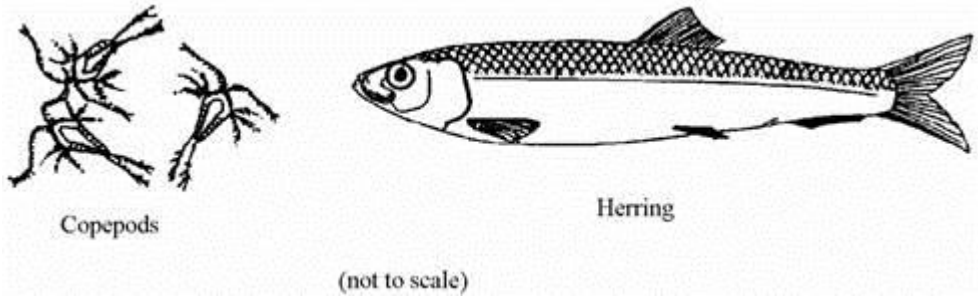
_____

(Total 3 marks)

Q20.

Copepods are tiny animals which live in the sea.

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During the day they live deep down near the sea bed.
At night they move up to the surface where they feed on tiny plants.
When the sun rises they move down to the bottom again.

(a) Suggest why the tiny **plants** live near the surface of the sea.

_____

_____

(2)

(b) Herring feed on copepods.

Where will herring be found during the day? Give a reason for your answer.

_____

_____

_____

(2)

(Total 4 marks)

Q21.

Kangaroo rats live in the hot, dry deserts of North America.
Their only water comes from the food they eat.
In these regions daytime temperatures are around 45°C.
At night temperatures can fall to below 30°C.



Explain how each of the following features makes these animals well adapted to survive in deserts.

(a) They are a sandy colour.

_____

(b) They are active at night and stay in burrows underground by day.

_____

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(c) They produce dry droppings and very little urine. They do not sweat.

_____

(d) Their large ears, feet and tail give their bodies a large surface area.

_____

_____

(4)

(Total 4 marks)

Q22.

Brown trout are fish that kill and eat other animals.

(a) Choose a word from this list to complete the sentence below.

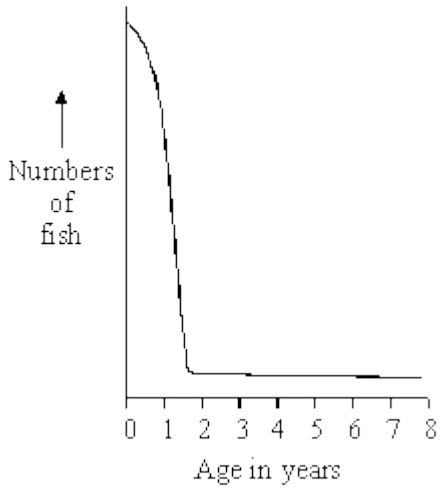
competitors **consumers** **prey** **producers**

Trout are predators, the animals they eat are their _____ .

(1)

(b) The graph shows the ages of the brown trout found in the river Tees.

There was no serious pollution in the river during this time.



Suggest **three** reasons why few brown trout live to be over two years old.

1. _____

2. _____

3. _____

(3)

(Total 4 marks)

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