AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



EXAM QUESTION PACK

4.7.2 ORGANISATION OF AN ECOSYSTEM (PACK 4)

SCORE	PERCENTAGE
/153	%

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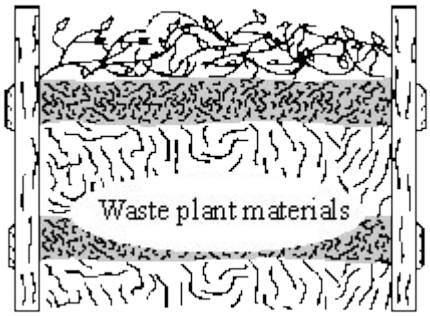
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Q1.

Compost heaps are used to recycle waste plant materials.



Complete the sentences by choosing the correct words from the box.

cool	decay	dry	grow
moist	respire	warm	

The waste plant materials _____ because they are broken down by microorganisms.

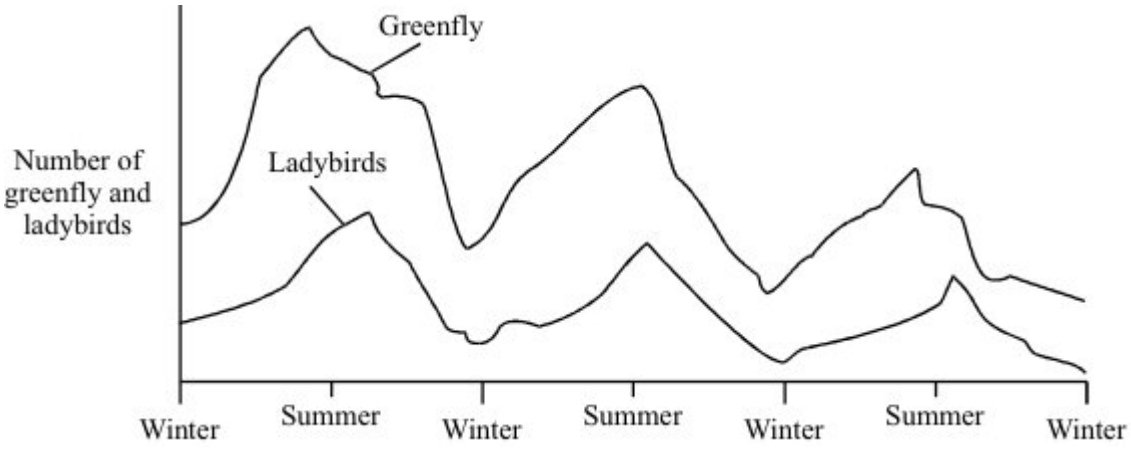
The waste plant materials are broken down faster when the conditions are _____ and _____ .

This process releases substances that can be used by other plants to _____ .

(Total 4 marks)

Q2.

Greenfly feed on rose bushes. Ladybirds (predators) feed on these greenfly. The graph shows how the population of greenfly and ladybirds in a garden change over a period of three years.



(a) *To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.*

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Describe what happened to the population of greenfly over the three years.

_____

_____

_____

_____

_____

_____

_____

_____

(3)

(b) Give **one** factor that limits the number of ladybirds.

_____

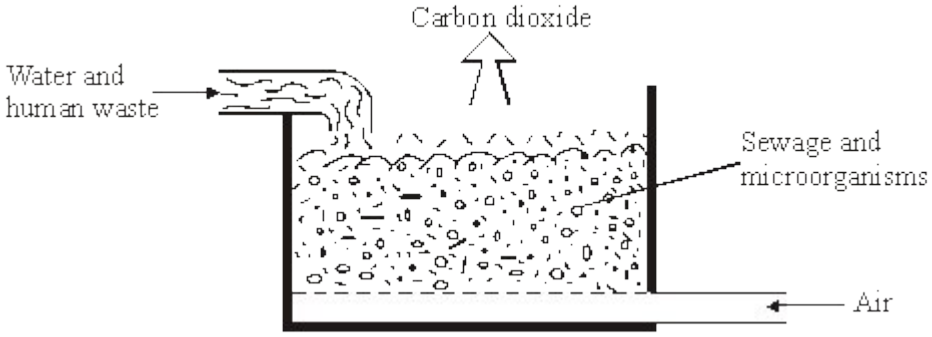
_____

(1)

(Total 4 marks)

Q3.

In a sewage works, human waste is broken down by microorganisms.
Air is blown through this sewage.



To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

Carbon dioxide is formed from the mixture of sewage, microorganisms and air. Explain how.

_____

_____

_____

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_____

_____

_____

(3)

(Total 3 marks)

Q4.

A food chain has four organisms, **A**, **B**, **C** and **D**.

A → B → C → D

The table shows the amount of energy transferred by each organism in one year.

Organism	Energy transferred in kJ per year
A	87 000
B	14 000
C	1600
D	70

Explain, as fully as you can, why organism **D** would transfer much less energy than organism **A**.

_____

_____

_____

_____

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_____

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_____

_____

(Total 5 marks)

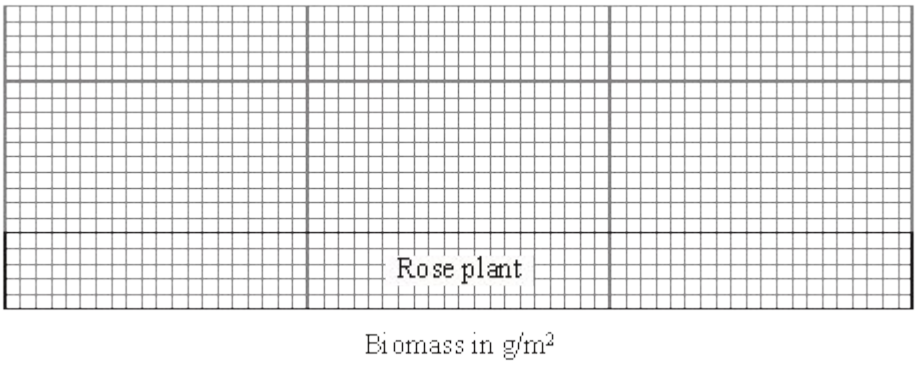
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Q5.

Energy is stored in the materials that make up organisms. These materials are called biomass.

Organisms in food chain	Rose plant	→	Greenfly	→	Ladybird	→	Blackbird
Biomass in g/m^2	600		50		10		1

(a) Complete the pyramid of biomass for this food chain. The rose plant has been done for you. You should draw the rest of the pyramid to the same scale. (5 small squares = 50 g/m^2.)



(3)

(b) What proportion of the energy in a rose plant is transferred to greenfly?

_____

_____

_____

Proportion = _____

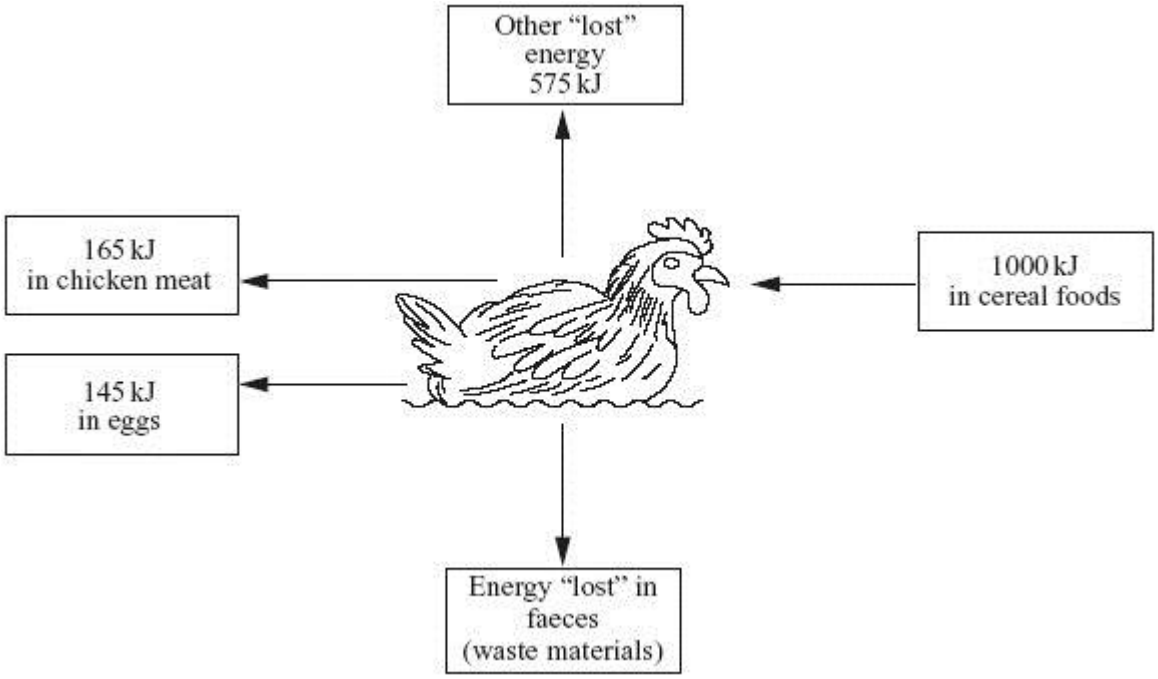
(2)

(Total 5 marks)

Q6.

Chickens are kept as farm animals to produce food. Free-range chickens are allowed to feed in a large space outside. The diagram shows how energy supplied in food to a free-range chicken is transferred.

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(a) Calculate the amount of energy "lost" in faeces.

_____

_____

Energy "lost" = _____ kJ

(1)

(b) Some farmers use the battery method. They keep large numbers of chickens in a small indoor space. The food yield from these chickens is higher than that from free-range chickens. Explain why, as fully as you can.

_____

_____

_____

_____

_____

_____

_____

_____

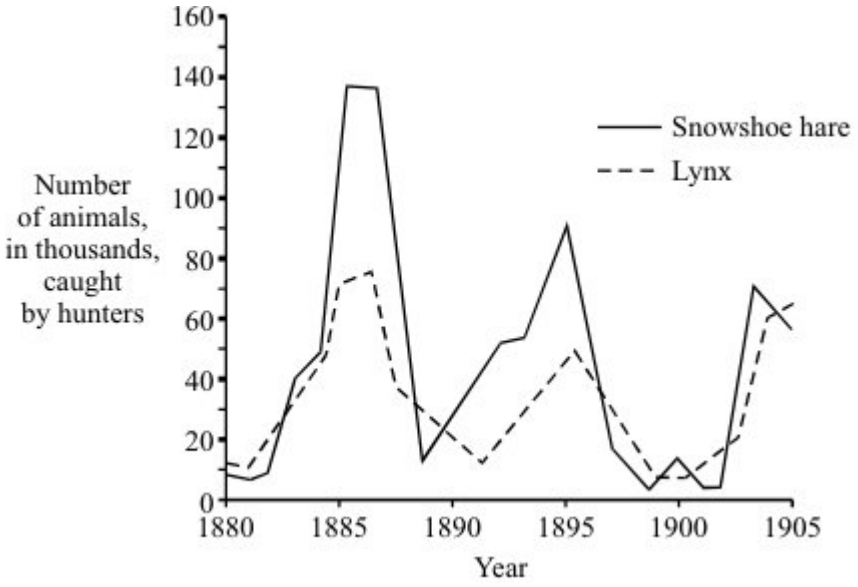
(4)

(Total 5 marks)

Q7.

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)

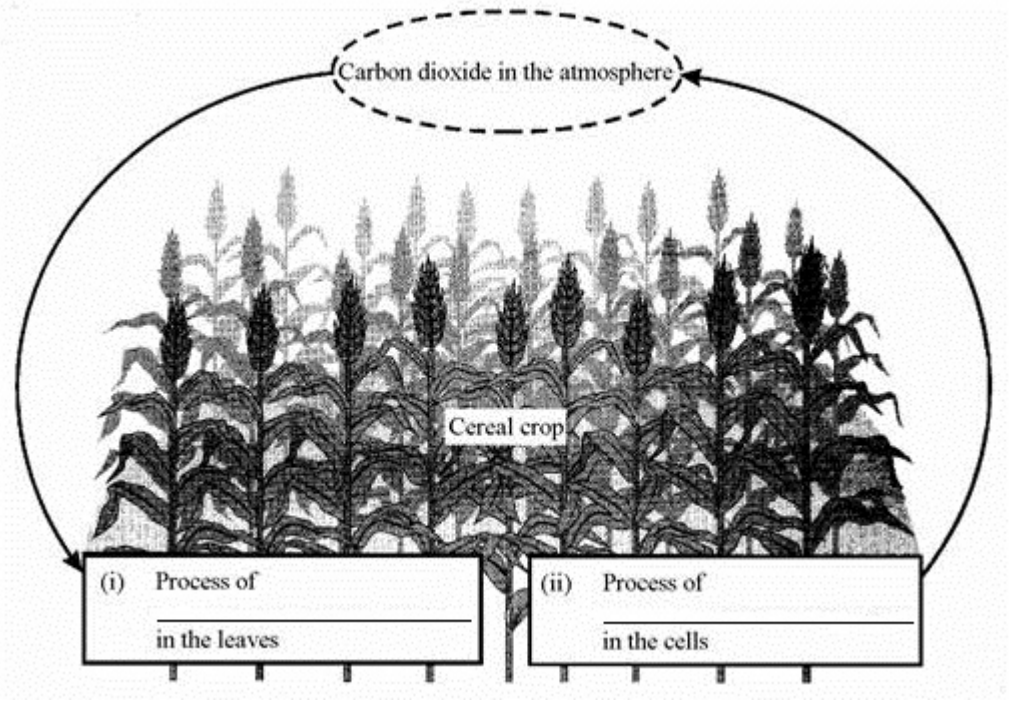
(Total 5 marks)

Q8.

(a) The diagram shows a cereal crop.

Complete spaces (i) and (ii).

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(2)

(iii) What sort of weather may cause the cereal crop to wilt?

_____

(1)

(b) Describe the process of transpiration in plants.

_____

_____

_____

_____

_____

_____

(3)

(Total 6 marks)

Q9.

(a) Use words from the box to complete the sentences about the water cycle.

boils	**condenses**	**evaporates**	**freezes**	
melts	**rain**	**sea**	**Sun**	**wind**

Water _____ from the surface of the _____ . Heat from the

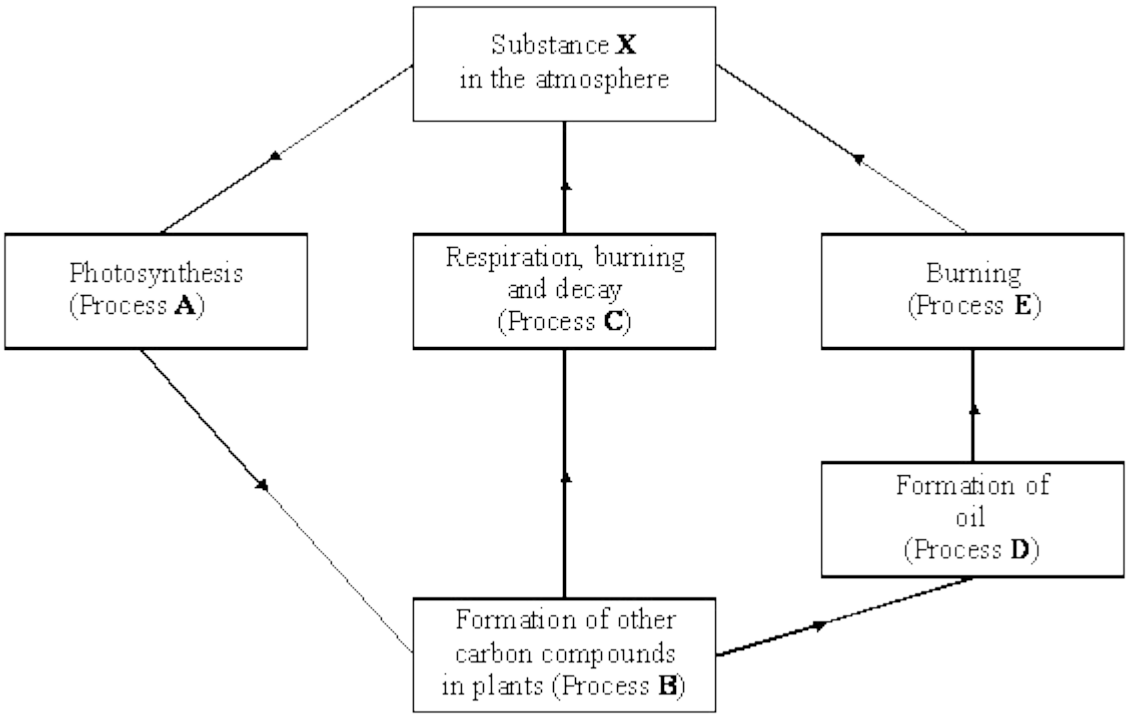
_____ speeds up this process and so does the _____ .

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Water vapour in the atmosphere cools down and _____ to form billions of tiny water droplets. Some of the droplets join together and fall as _____ .

(6)

(b) The diagram shows some processes in the carbon cycle.



(i) What is the name of substance **X**?

_____

(1)

(ii) Which process, **A**, **B, C**, **D** or **E**, takes the **longest** and approximately how long does it take?

_____

(2)

(Total 9 marks)

Q10.

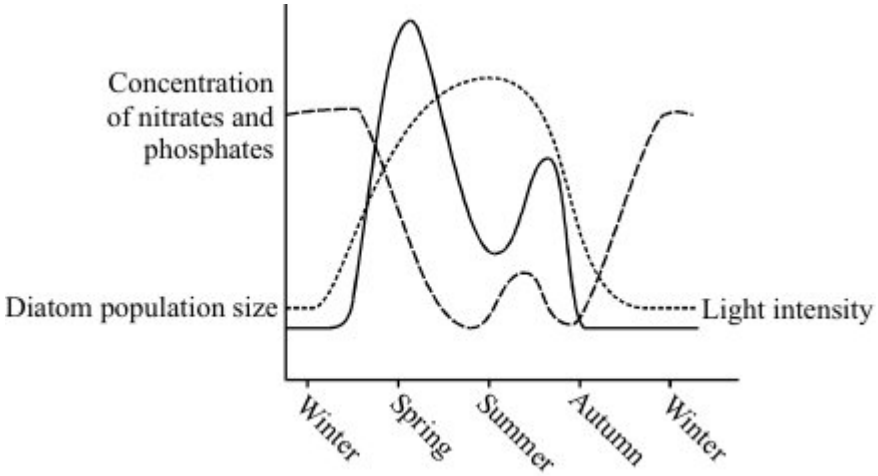
A food chain in the North Atlantic Ocean is:

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)

Q11.

(a) A gardener was told to let more air into his heap of garden waste.

Explain why this would help decay.

_____

_____

(1)

(b) Write down **two** further conditions which speed up the decay of garden waste in a compost heap.

1. _____

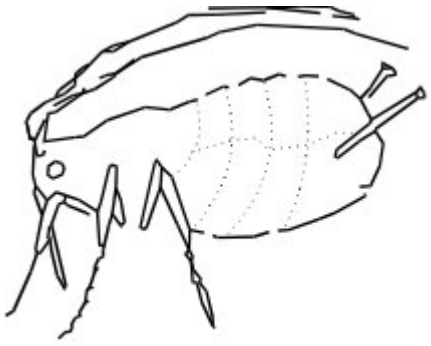
2. _____

(2)

(Total 3 marks)

Q12.

The greenfly is an insect which is eaten by ladybirds.



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)

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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. _____

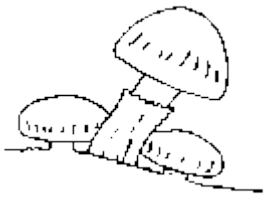
2. _____

(2)

(Total 6 marks)

Q13.

Mushrooms can be grown on compost. The compost is made by mixing straw and manure which rot down.



(a) Write down **three** things which are needed for the straw and manure to rot.

1. _____

2. _____

3. _____

(3)

(b) Some substances, like plastic, are not biodegradable.

What does this mean?

_____

_____

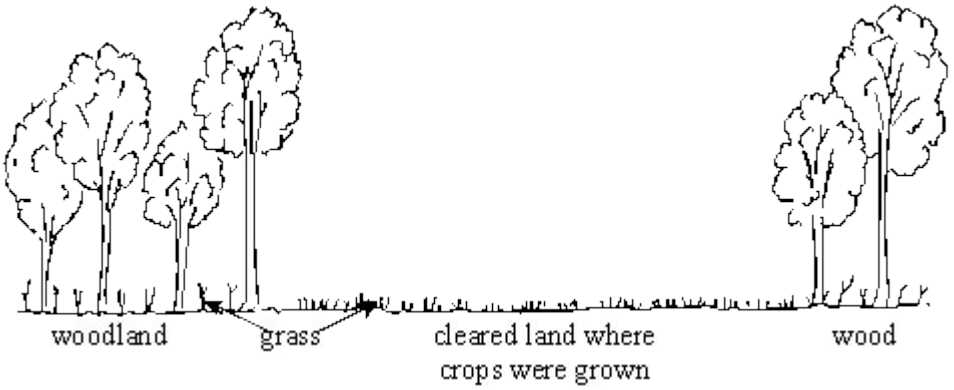
(1)

(Total 4 marks)

Q14.

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)

Q15.

(a) 1m² of a field gets about 1050MJ of light energy per year.

Only 21 500kJ of energy is stored in the new grass.

(i) How is the energy stored in the new grass?

_____

(1)

(ii) What is the % of light energy stored in the grass?

_____

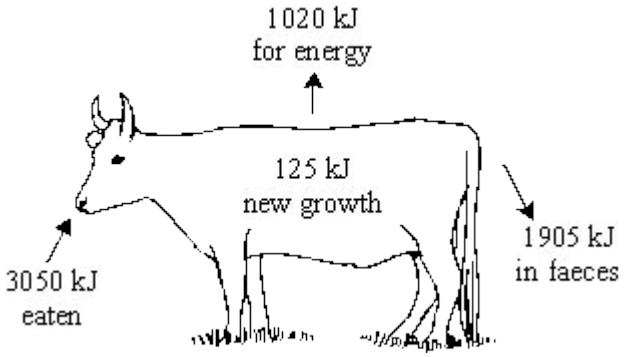
_____

_____

(1)

(b)

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The diagram shows what happens to the energy from grass in part of a field which is grazed by a bullock.

Using information in the diagram suggest why food chains are usually short.

_____

_____

_____

_____

_____

(3)

(c) Many of the animals which from part of our diet are herbivores rather than carnivores. Explain why as fully as you can.

_____

_____

_____

_____

_____

_____

(3)

(Total 8 marks)

Q16.



A farmer had too much manure to spread on his fields. He thought he would turn it into compost which had no smell.

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(a) What makes the manure decay?

_____

(1)

(b) Write down **two** conditions which will help the manure to decay faster.

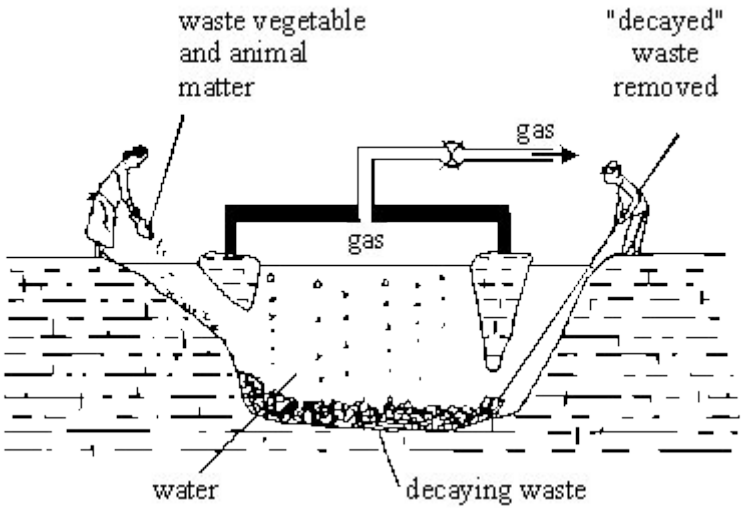
1. _____

2. _____

(2)

(Total 3 marks)

Q17.



The diagram shows how the gas from decaying plant and animal waste can be collected.

(a) (i) Name the gas collected from the decaying waste.

_____

(1)

(ii) What can the gas be used for?

_____

(1)

(b) The decayed waste produces compost.

What can the compost be used for?

_____

(1)

(Total 3 marks)

Q18.

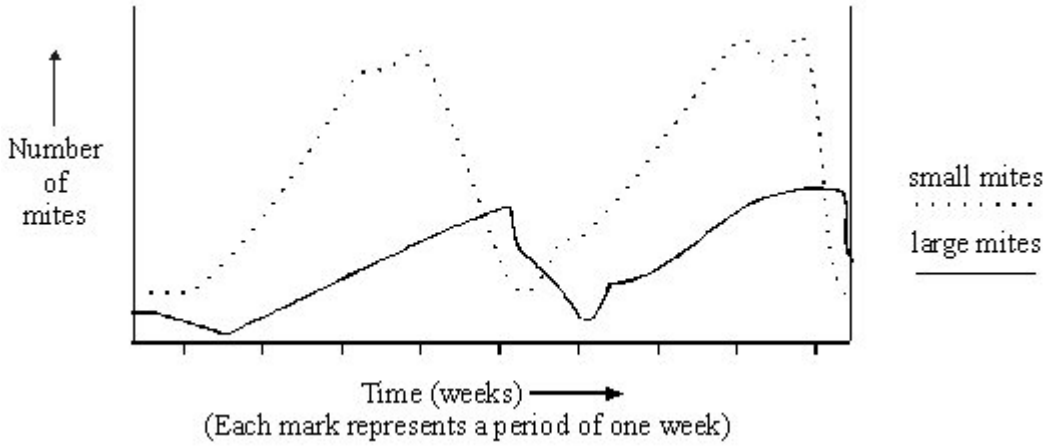
Some small mites feed on the leaves of orange plants. Larger mites feed on the smaller mites.

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

_____

(1)



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)

Q19.

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.

_____

_____

_____

_____

_____

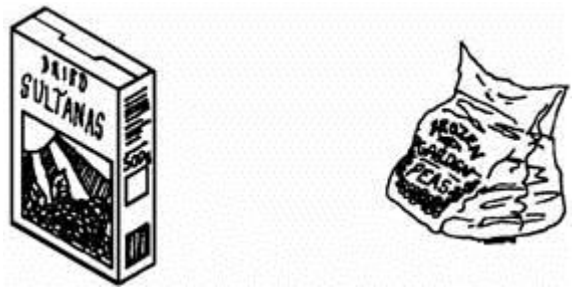
(3)

(Total 7 marks)

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Q20.

Food decays more slowly if it is kept dry or cool.



Explain why.

_____

_____

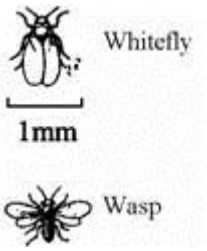
_____

_____

(Total 3 marks)

Q21.

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.

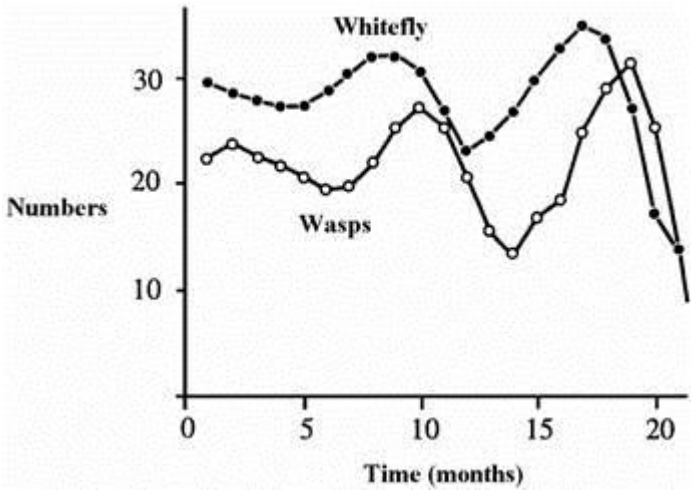
The wasp is a _____

The whitefly is known as the wasp's _____

(2)

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

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

_____

Why do you think this happens? _____

_____

_____

_____

(4)

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

_____

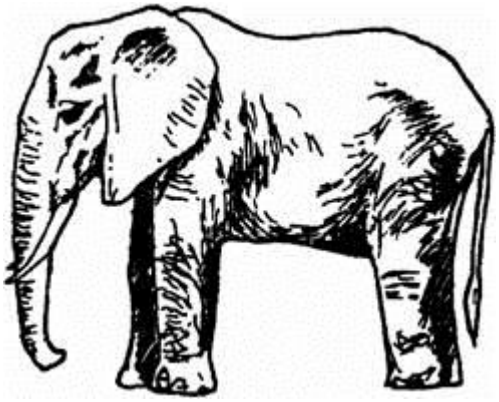
(1)

(Total 7 marks)

Q22.

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.

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* 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. _____

_____

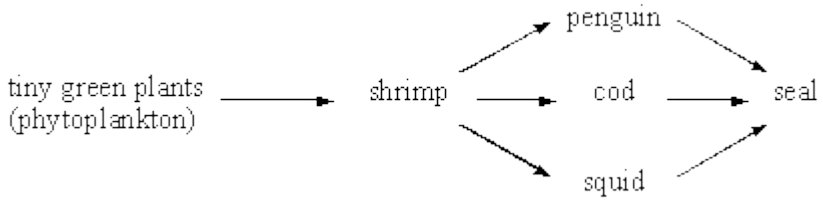
3. _____

_____

(Total 3 marks)

Q23.

Scientists have found the following food web in the Antarctic Ocean.



(a) (i) Write down the name of the producer in this web.

_____

(ii) Write down the names of **two** organisms which are prey in this web.

_____

_____

(3)

(b) Humans are removing large numbers of the cod.
Some scientists argue that this could lead to a decrease in the numbers of squid and penguins.
Others argue that the numbers of squid and penguins will stay the same.

Carefully explain each argument.

Why they might decrease.

_____

_____

_____

Why they might stay the same.

_____

_____

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_____

(2)

(c) The following information is about the biomass of the organisms in one of the food chains in the web.

tiny green plants	→	shrimp	→	cod	→	seal
1000 tonnes		100 tonnes		10 tonnes		0.5 tonne

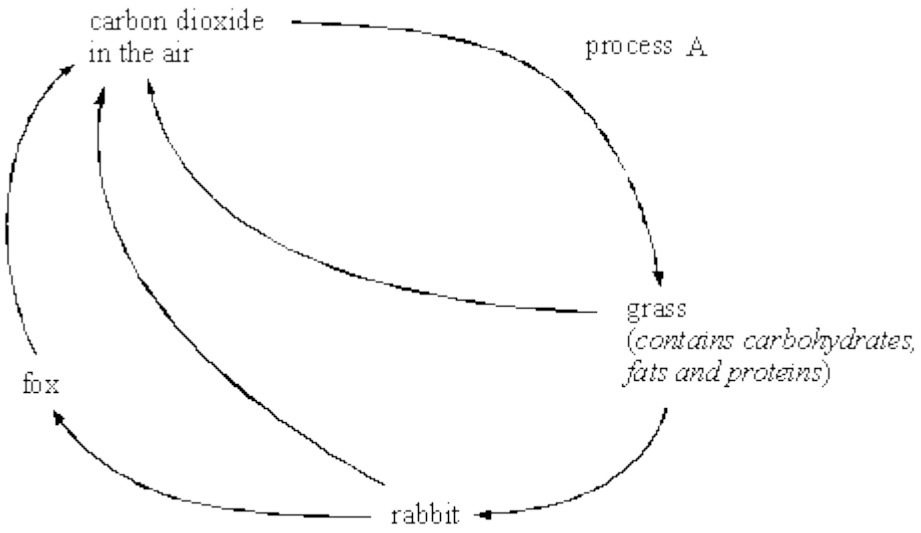
Draw and label a pyramid of biomass for this chain.

(2)

(Total 7 marks)

Q24.

The diagram shows part of the carbon cycle.



(a) Write down the name given to process A.

_____

(1)

(b) Explain, as fully as you can, how some of the carbon in the grass becomes part of the fox's body.

_____

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_____

_____

_____

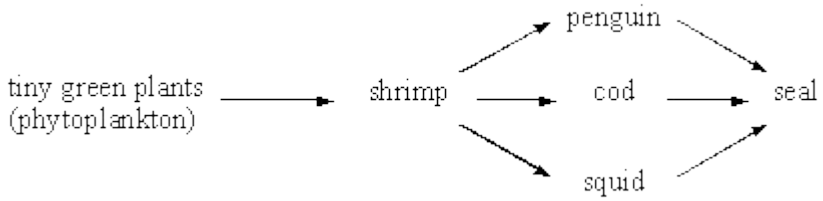
_____

(3)

(Total 4 marks)

Q25.

Scientists have found the following food web in the cold Antarctic Ocean.



(a) Humans are removing large numbers of the cod.

Some scientists argue that this could lead to a decrease in the numbers of squid and penguins.

Others argue that the numbers of squid and penguins will stay the same.

Carefully explain each argument.

Why they might decrease.

_____

_____

_____

(1)

Why they might stay the same.

_____

_____

_____

(2)

(b) The following information is about the biomass of the organisms in one of the food chains in the web.

tiny green plants	→	shrimp	→	cod	→	seal
1000 tonnes		100 tonnes		10 tonnes		0.5 tonne

Draw and label a pyramid of biomass for this chain.

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(2)

(c) Explain, as fully as you can, why the conversion of shrimp biomass into cod biomass is more efficient than that of cod biomass into seal biomass in the cold Antarctic Ocean.

_____

_____

_____

_____

(3)

(d) Boats from many countries fish the Antarctic Ocean. The cod are being overfished. If the numbers of cod are to increase, the population must be carefully managed.

(i) Suggest **two** control measures which would prevent a further drop in numbers,

_____

_____

(2)

(ii) Suggest why **one** of your control measures would be difficult to put into practice.

_____

_____

(1)

(Total 11 marks)

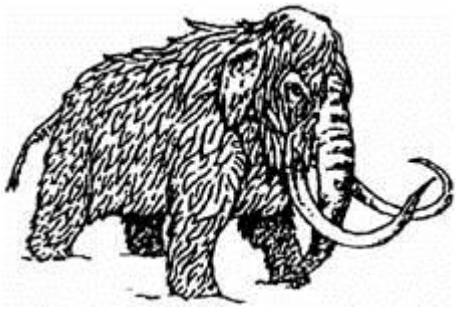
Q26.

When animals die, bacteria make them decay.
Warmth, moisture and oxygen are needed for this to happen.

(a) (i) In northern Russia whole bodies of mammoths have been found in the frozen soils.

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Explain why they did not decay.

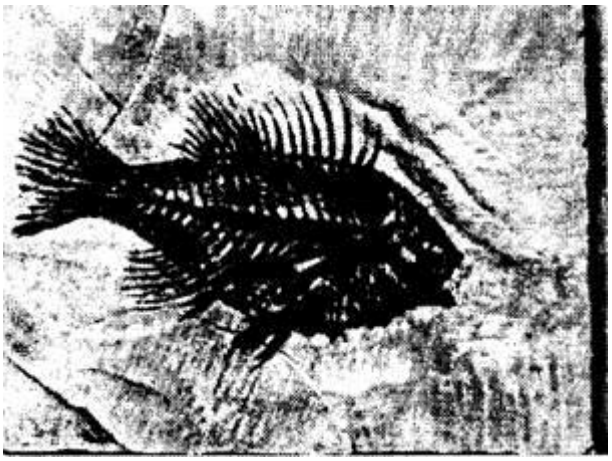


_____

_____

(1)

(ii) Fish fossils have been found in mudstone rock. Explain why they did not decay?



_____

_____

(2)

(b) Some of the mammoths had flint weapons in their bodies.

Suggest **two** things that this tells us about human evolution.

1. _____

2. _____

(2)

(c) Mammoths are now extinct. Suggest **two** reasons for this.

1. _____

2. _____

(2)

(Total 7 marks)

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Q27.

In compost heaps, dead plants are broken down by microbes.
This breakdown is much slower:

- when the weather is cold
- when the weather is dry
- when the heap is squashed down so that no air can circulate.

(a) What **three** conditions inside compost heaps are needed for microbes to work **quickly**?

1. _____

2. _____

3. _____

(3)

(b) Why is the breakdown of dead plants important for living plants?

_____

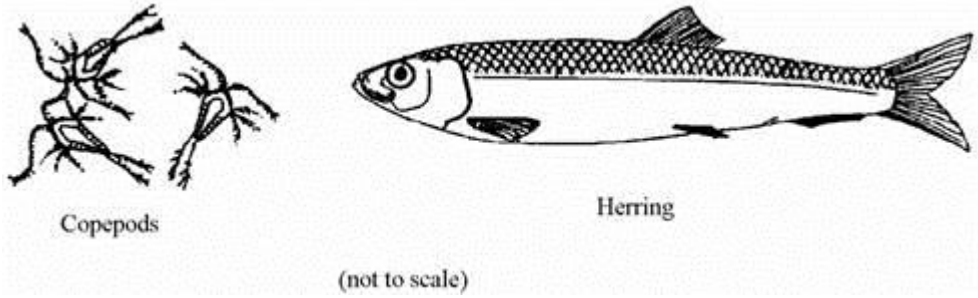
_____

(1)

(Total 4 marks)

Q28.

Copepods are tiny animals which live in the sea.



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.

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_____

_____

_____

(2)

(Total 4 marks)

Q29.

Brown trout are fish that kill and eat other animals.

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

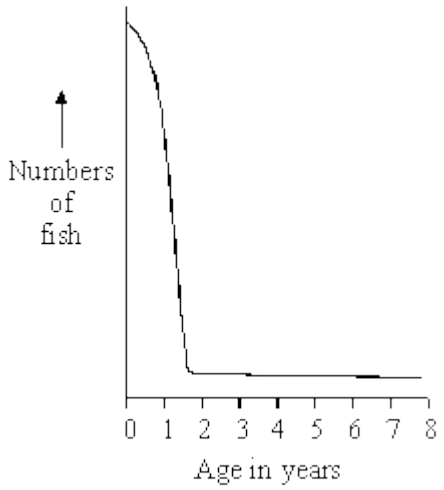
competitors **consumers** **prey** **producers**

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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