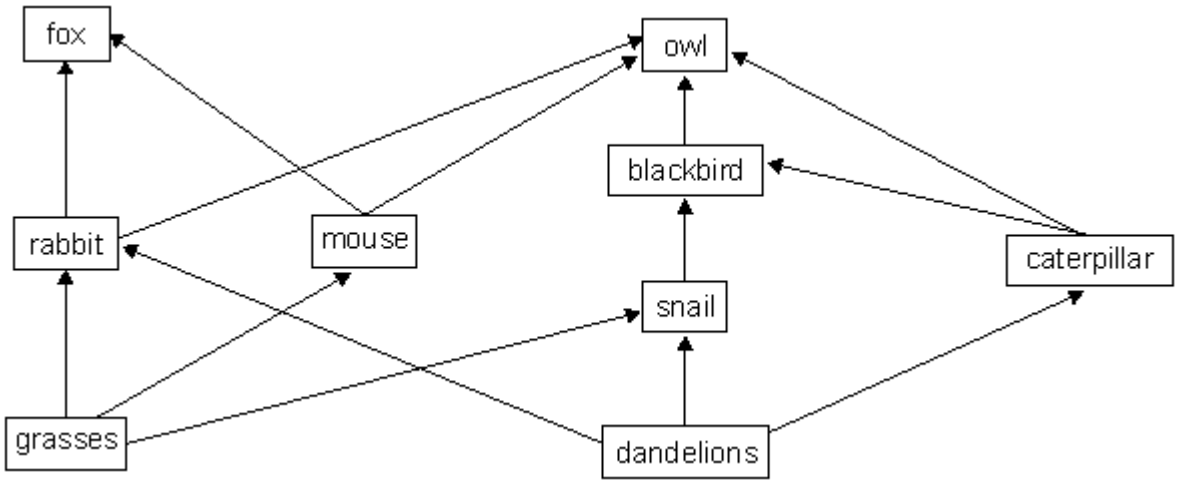
KS3 Science

Food Chains and Webs

Question Paper

Time available: 36 minutes
Marks available: 50 marks

1. The diagram below shows part of a grassland food web.



(a) One year the snail population increased in the grassland area.

How could an increase in the number of snails cause the caterpillar population to **increase?**

.....

.....

1 mark

(b) Snail poison can be used to control the number of snails. After some time, each owl contains more poison than each snail.
Explain why each owl contains more poison than each snail.

.....

.....

.....

2 marks

(c) A scientist wants to record the number of dandelion plants in the grassland area.

Describe how they could use a $1m^2$ quadrat to estimate the number of dandelions growing in the grassland area.

.....

.....

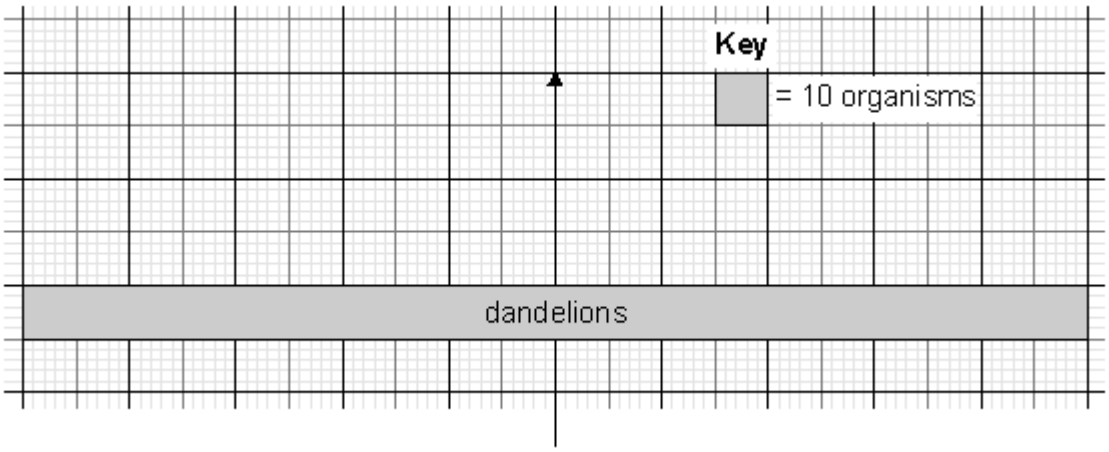
.....

2 marks

(d) The table below shows the population numbers for one food chain from the food web.

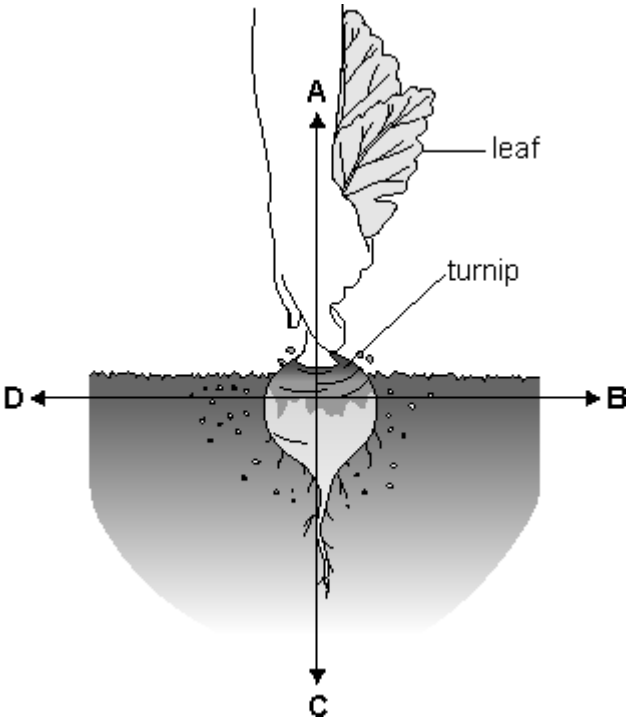
organism	number
dandelions	200
rabbits	20
foxes	4

Complete the pyramid of numbers on the graph paper below to represent this food chain.
Label the pyramid to show each animal.



2 marks
maximum 7 marks

2. The drawing below shows Rebekah **pulling** a turnip out of the ground.

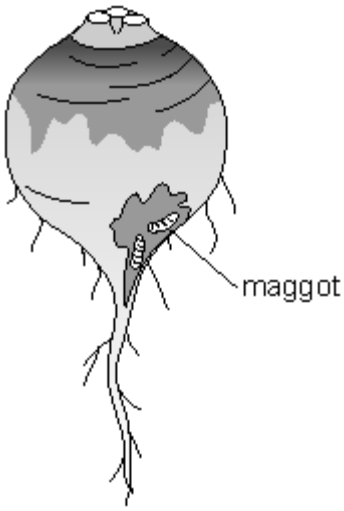


(a) Which arrow, **A**, **B**, **C** or **D**, shows the direction of force of Rebekah's hand on the turnip?

.....

1 mark

(b) The drawing below shows root maggots eating a turnip.
The maggots damage the roots.



Damaged roots do **not** grow very well.

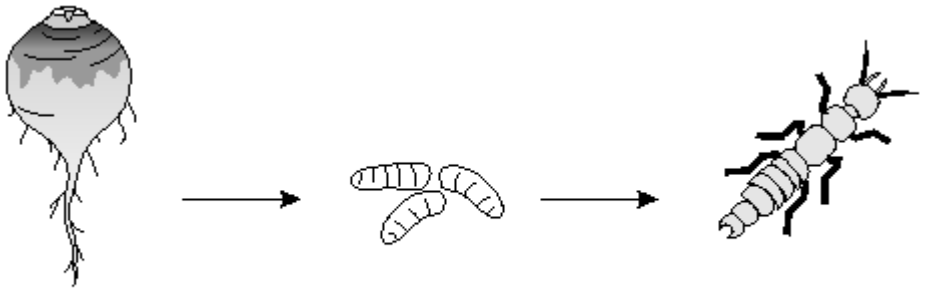
Complete the sentence below.

Damaged roots **cannot** take up as much ..... and

..... from the soil.

2 marks

(c) The drawing below shows a food chain including a rove beetle.



not to scale

Which word describes a rove beetle?
Tick the correct box.

herbivore	☐	predator	☐
prey	☐	producer	☐

1 mark

(d) Turnip plants make food by photosynthesis.

(i) Which part of a plant makes food?

.....

1 mark

(ii) What will the turnip plant use stored food for?

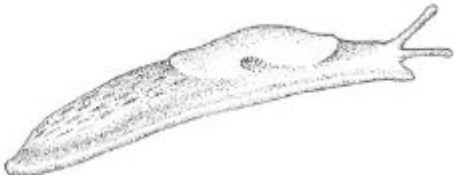
.....

1 mark
maximum 6 marks

3. The drawings below show a snail and a slug.

snail

slug



(a) Look at the drawings above.

(i) Give one way the snail and slug are **different** from each other.

.....

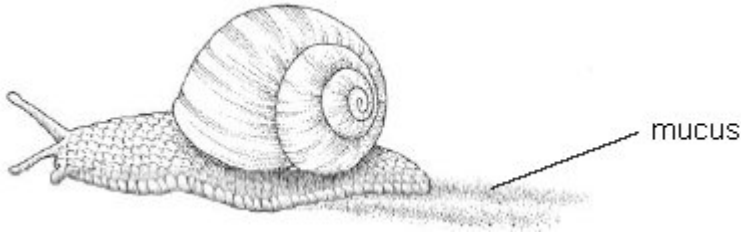
1 mark

(ii) Give one way the snail and slug are the **same**.

.....

1 mark

(b) Snails produce mucus to help them move along the ground.



How does mucus help snails to move?
Tick the correct box.

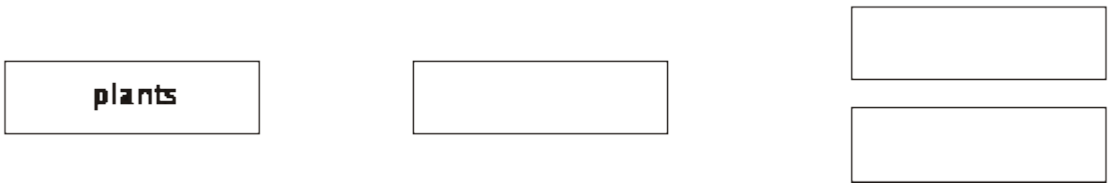
Mucus is cold.	☐	Mucus reduces friction.	☐
Mucus increases weight.	☐	Mucus leaves a trail.	☐

1 mark

(c) Snails are herbivores. Thrushes and blackbirds eat snails.

Complete the food web below to show the relationship between plants, snails, thrushes and blackbirds.

Draw arrows on the diagram.



2 marks

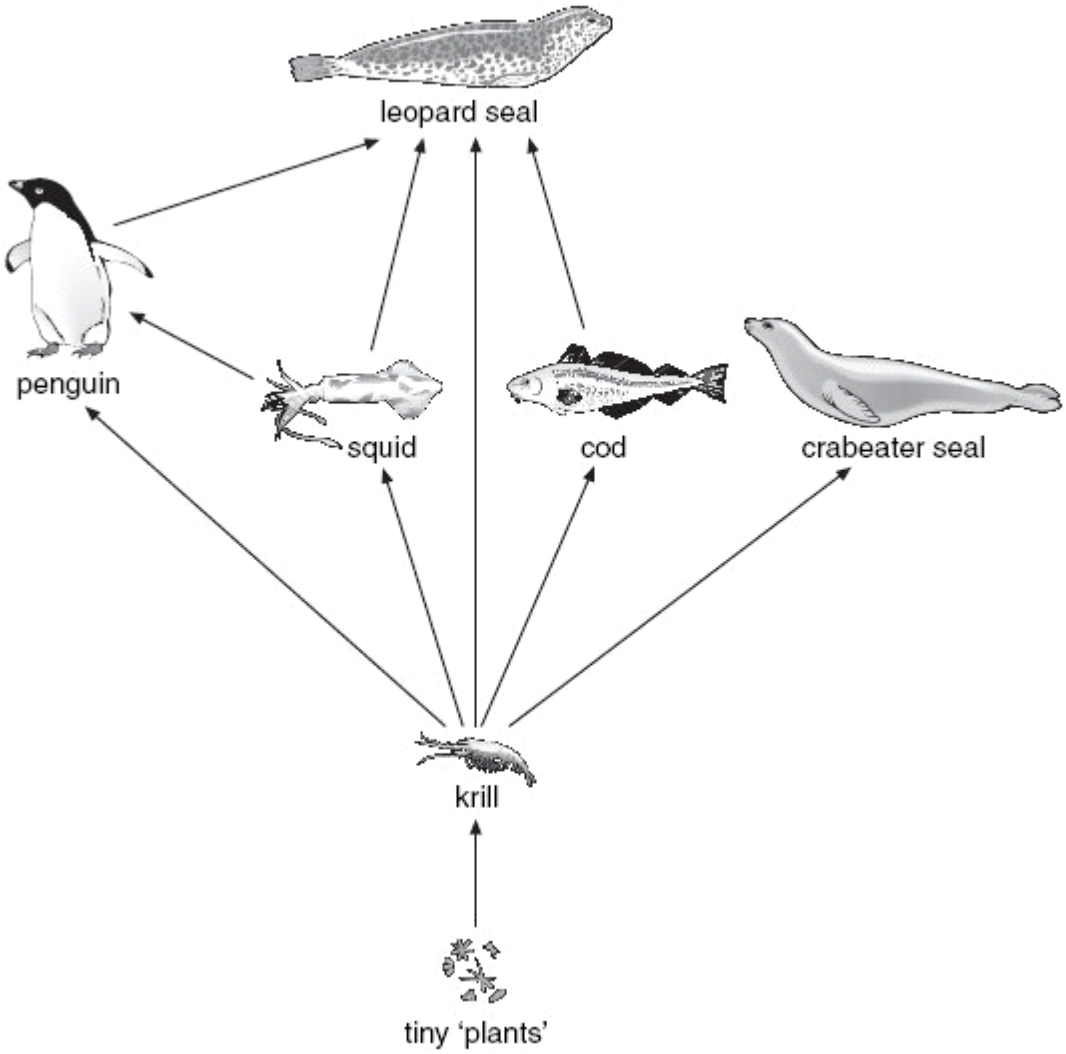
(d) Snails that live in woodland areas are usually brown or red.

Suggest how the colour of snails in woodland areas protects them from birds.

.....

1 mark
maximum 6 marks

4. The drawing below shows part of a food web in the sea around Antarctica.



not to scale

(a) **From the food web**, give the names of **two** animals that **only** eat krill.

1. .....

1 mark

2. .....

1 mark

(b) (i) Which word describes the plants in a food web?
Tick the correct box.

producers	☐	predators	☐
herbivores	☐	carnivores	☐

1 mark

(ii) Krill are small animals that eat tiny plants.

Which word describes krill in the food web?
Tick the correct box.

producers	☐	predators	☐
herbivores	☐	carnivores	☐

1 mark

(c) (i) Crabeater seals eat krill.
Fishermen catch large amounts of krill from the sea.

How would a decrease in the number of krill affect the number of crabeater seals?

.....

.....

1 mark

(ii) Look at the food web.
Leopard seals also eat krill.

A decrease in the number of krill will affect the crabeater seals sooner than it affects leopard seals.
Give the reason for this.

.....

.....

1 mark
maximum 6 marks

5. (a) Scientists studied the animals and plants in a large wood, over a period of time. One food chain in the wood is shown below.

oak trees → winter moth caterpillars → great tits → sparrowhawks

In the space below, draw a pyramid of numbers for this food chain.

2 marks

(b) Insecticide was sprayed onto fields near the wood. Some of the insecticide was blown into the wood by the wind.

(i) In the food chain above, the sparrowhawks contained the highest concentration of insecticide.
Explain why.

.....

.....

.....

.....

2 marks

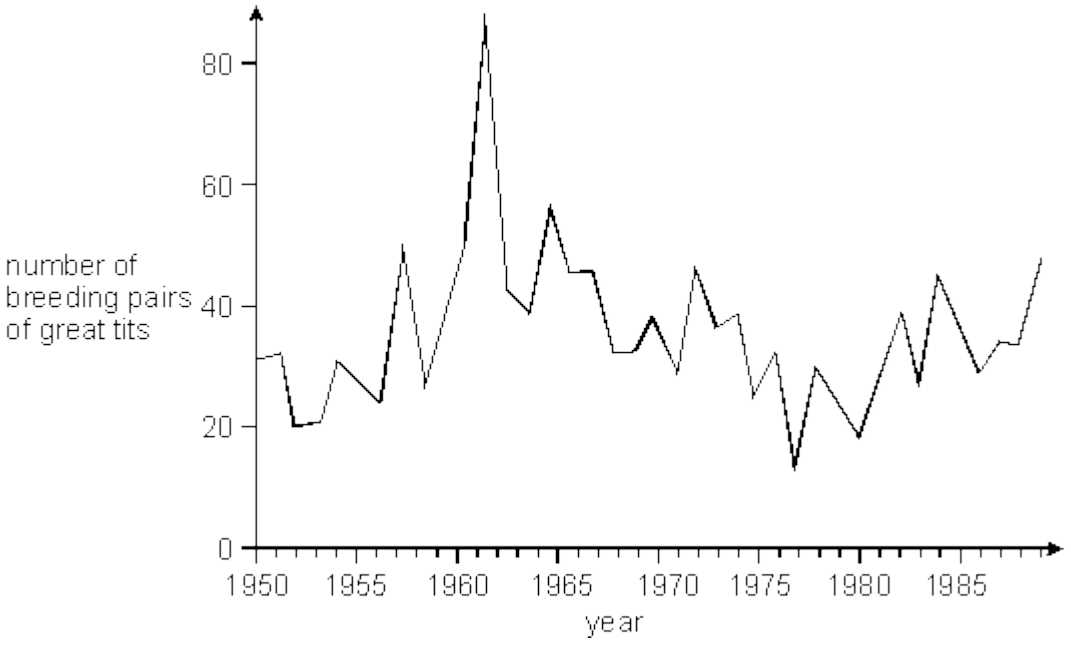
(ii) The use of insecticides could cause the population of sparrowhawks to decrease.
Give **one** other reason why the population of sparrowhawks might decrease.

.....

.....

1 mark

(c) The graph shows how the number of pairs of great tits changed in the wood over a period of time.



Adapted from *Wytham Woods* by Dr C M Perrins, published in *The Biologist*, Volume 36, 1989

(i) Use the graph to suggest the year when there were probably fewest sparrowhawks in the wood.

.....

What is the evidence from the graph for your answer?

.....

.....

1 mark

(ii) Explain the reasoning for the answer you have given in part (c) (i).

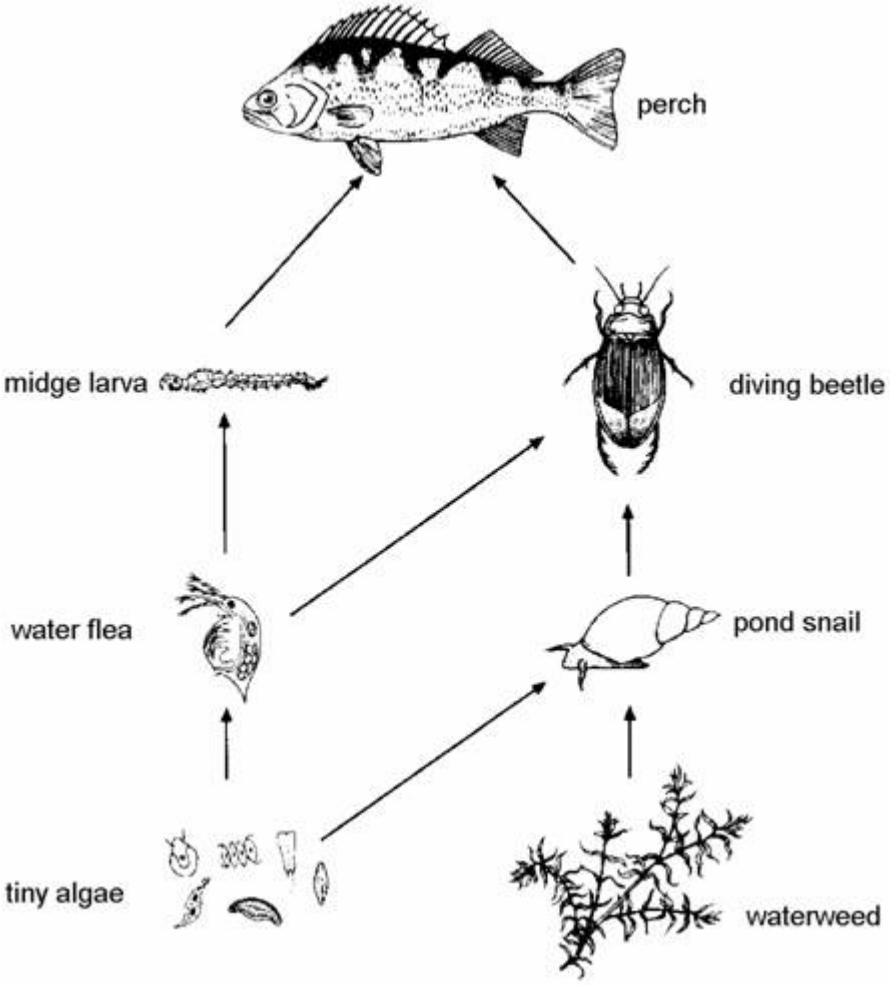
.....

.....

1 mark

Maximum 7 marks

6. The diagram below shows part of a food web in a pond.



not to scale

(a) (i) The numbers of tiny algae and waterweed in the pond increase.
What effect will this have on the numbers of pond snails and water fleas?

.....

1 mark

(ii) Some more perch are put into the pond. What will happen to the numbers of midge larvae and diving beetles?

.....

1 mark

(b) From the food web:

(i) give the name of **one** predator; .....

1 mark

(ii) give the name of its prey; .....

1 mark

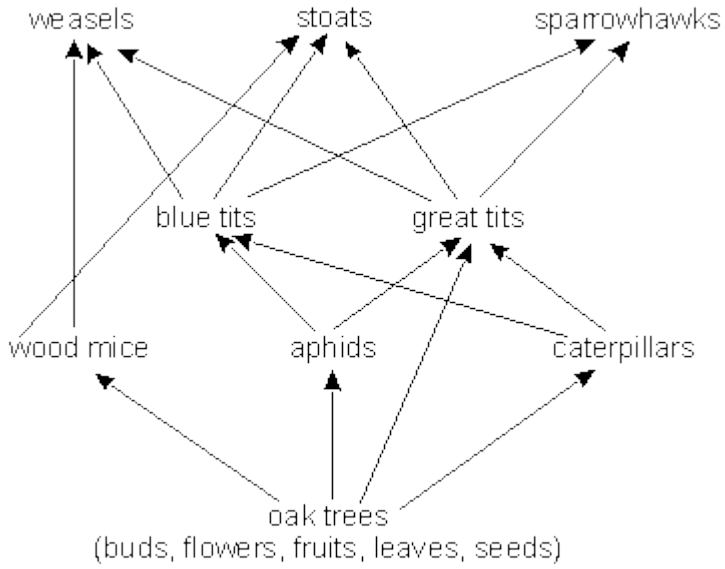
(iii) write **one** complete food chain which ends with perch.

..... → ..... → ..... → **perch**

1 mark

Maximum 5 marks

7. The diagram shows part of a food web in a wood.



Use **only** the information in the diagram to answer questions (a) and (b).

(a) Name **one** herbivore and **one** omnivore.

herbivore .....

omnivore .....

2 marks

(b) The number of blue tits in the wood decreases.
This affects the number of great tits in the wood.

(i) Give **one** reason why the number of great tits might **increase**.

.....

.....

1 mark

(ii) Give **one** reason why the number of great tits might **decrease**.

.....

.....

1 mark

(iii) Why might a decrease in the number of blue tits affect the sparrowhawks more than the stoats?

.....

.....

1 mark

(c) The arrows in the diagram show the direction of energy flow through the food web. A weasel eats a wood mouse. Most of the chemical energy stored in the wood mouse does not end up as chemical energy in the weasel.
Explain why.

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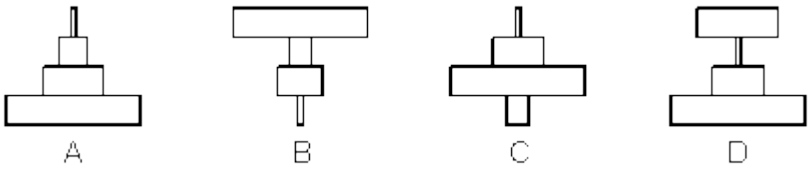
2 marks

(d) The following diagrams show four different **pyramids of numbers**.



A food chain in the food web is

oak trees → **aphids** → **blue tits** → **sparrowhawks**

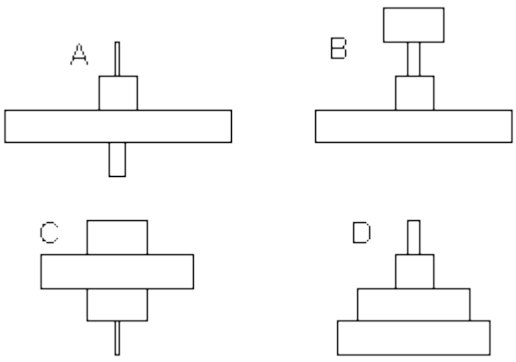
Which of the drawings, A, B, C or D, best represents the pyramid of numbers for this food chain?

.....

1 mark
Maximum 8 marks

8. Pyramids of numbers represent the numbers of organisms at each stage in a food chain.

Study the four pyramids of numbers A, B, C and D shown below.



(a) For each of the food chains choose the pyramid of numbers which best represents the food chain.

(i) grass → insects → spiders → birds .....

1 mark

(ii) oak trees → aphids → blue tits → sparrow hawks .....

1 mark

(iii) grass → rabbits → foxes → fleas .....

1 mark

(b) (i) Which is the main process transferring energy to the surroundings at each stage in a food chain?

Tick the correct box.

growth ☐

nutrition ☐

reproduction ☐

respiration ☐

1 mark

(ii) Which process transfers energy from organisms at one stage in a food chain to organisms at the next?

Tick the correct box.

reproduction ☐

feeding ☐

movement ☐

photosynthesis ☐

1 mark

Maximum 5 marks