1 A pyramid of numbers can be used to show the number of organisms at each trophic level in an ecosystem.

(a) Explain what is meant by the term **trophic level**.

(1)

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(b) A scientist collected data from a local ecosystem.

Number of nettle plants = 300

Number of robins that feed on the caterpillars = 20

Number of caterpillars that feed on the nettles = 200

Number of hawks that feed on robins = 2

Draw and label a pyramid of numbers for this data.

(3)

(c) The scientist collected this data during the summer months.

Suggest why the number of the caterpillars might be different during the winter.

(2)

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(d) The total mass of the organisms at each level in the pyramid decreases as you move up the pyramid.

Explain why.

(4)

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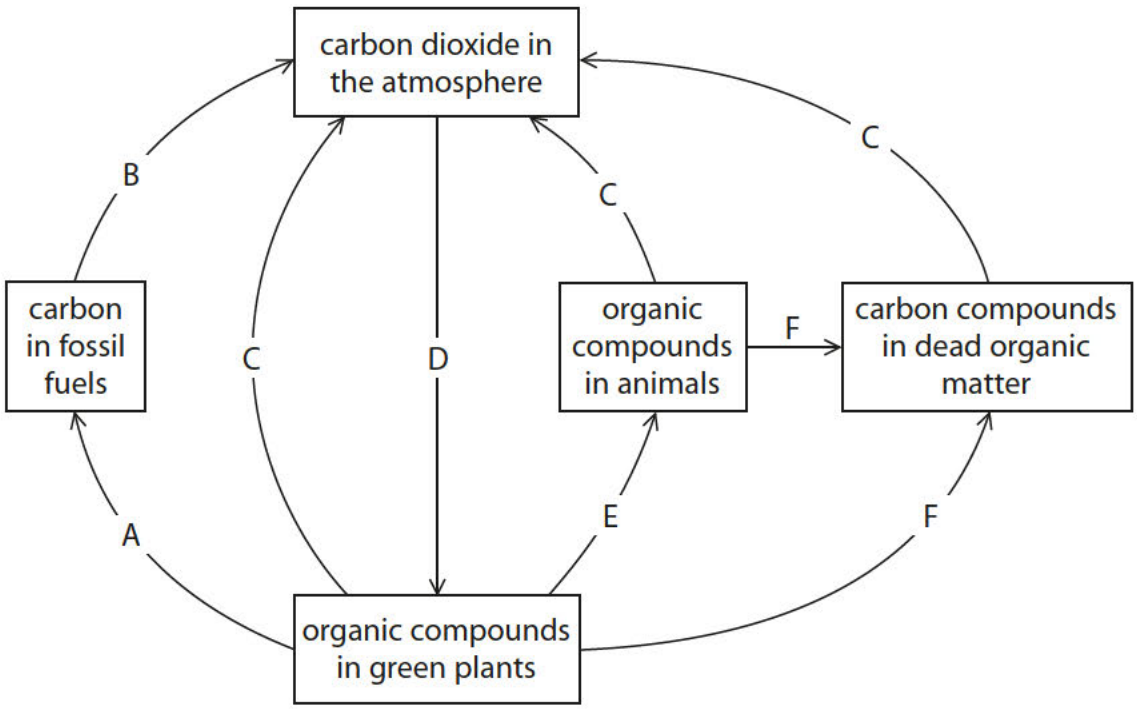
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(Total for Question = 10 marks)

2 The diagram shows the carbon cycle. The letters A to F represent different processes in the carbon cycle.



(a) Complete the table by naming the process represented by each letter. The first one has been done for you.

(5)

Letter	Name of process
A	fossilisation
B	
C	
D	
E	
F	

(b) (i) Some of the carbon in plants is found in the form of carbohydrates.

Name two carbohydrates found in plants.

(2)

1 .....

2 .....

(ii) The molecule that genes are made from contains carbon.

Name this molecule.

(1)

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(c) Describe how increasing levels of carbon dioxide in the air may cause global warming and explain the possible consequences of global warming.

(5)

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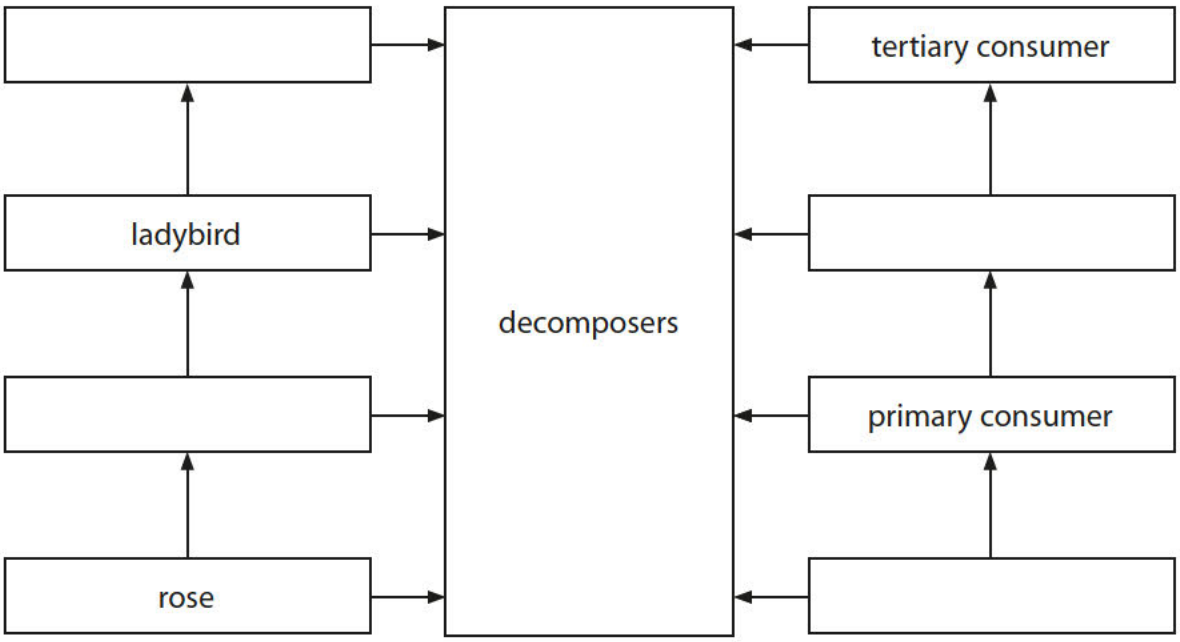
(Total for Question = 13 marks)

3 Here is a food chain.



(a) (i) Use the information in this food chain to complete the diagram.

(3)



(ii) Name **one** type of organism that is a decomposer.

(1)

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(b) Decomposition is a stage in the carbon cycle. The other stages are respiration, photosynthesis and combustion.

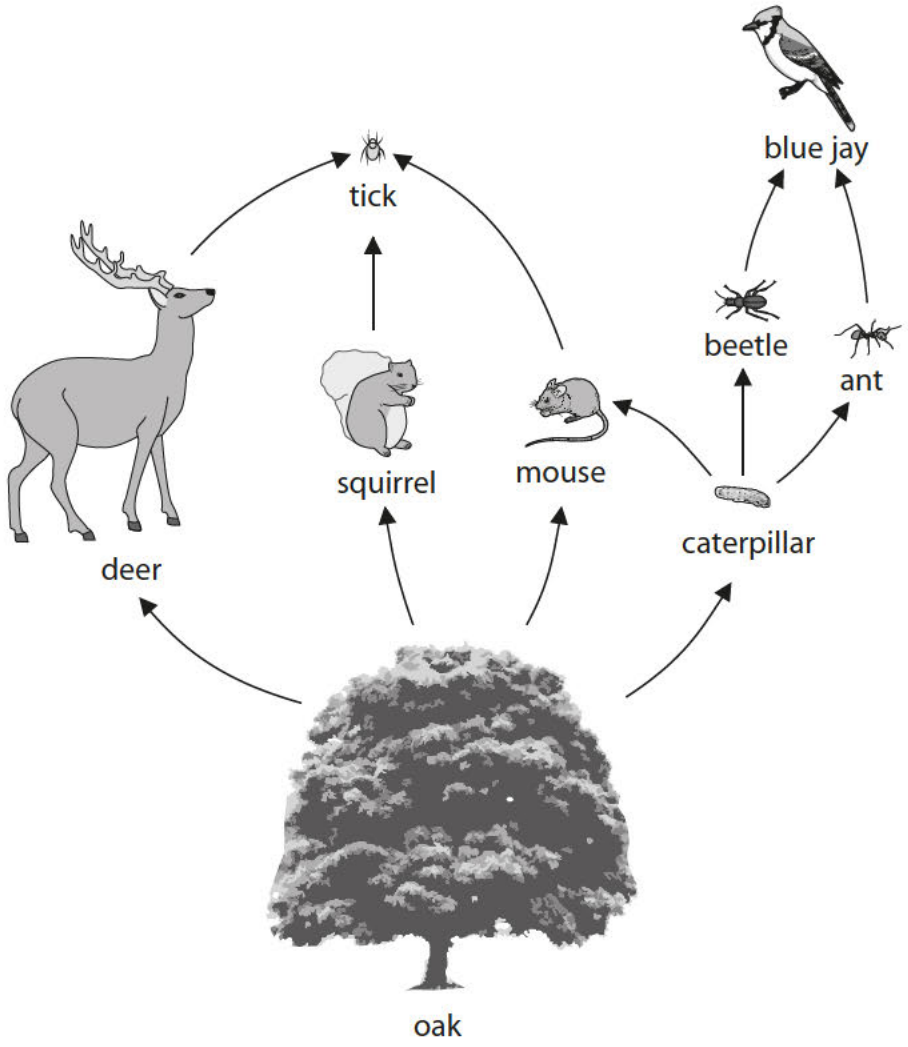
How many of these four stages add carbon dioxide to the air?

(1)

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(Total for Question = 5 marks)

4 The diagram shows part of a food web in an oak forest.



(a) Use the information in the food web to complete the statements in the table. The first one has been done for you.

(4)

Statement	Number
the number of animals is	8
the number of producers is	
the number of herbivores is	
the number of secondary consumers is	
the number of food chains is	

(b) (i) What effect would a decrease in the population size of caterpillars have on the population size of blue jays?

(1)

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(ii) What is meant by the term **population**?

(1)

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(c) The tick feeds on deer by sucking their blood.

Name two different molecules that are found in the blood of deer that the tick could feed on.

(2)

1 .....

2 .....

(Total for Question = 8 marks)

5 The photograph shows a bird called a parakeet.



(a) (i) Parakeets eat seeds.

Parakeets can be eaten by birds of prey called raptors.

Use this information to draw a food chain.

(2)

(ii) Many seeds contain starch.

Suggest what happens to starch in the gut of a parakeet.

(3)

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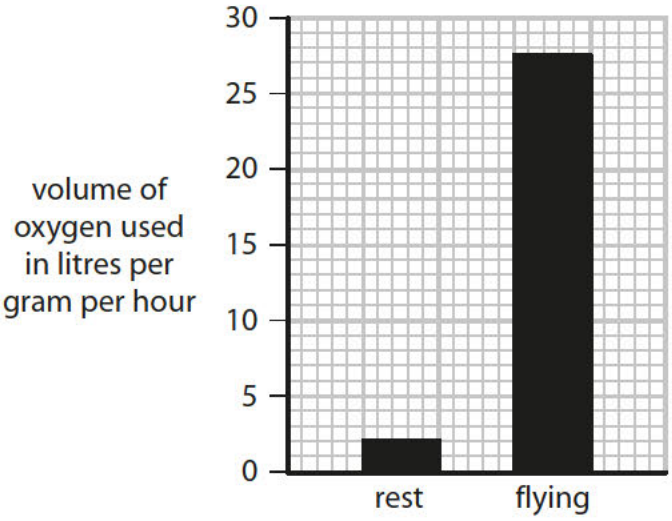
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(b) (i) The graph shows the volume of oxygen used by a resting parakeet compared to a flying parakeet.



Calculate the extra volume of oxygen used in litres per gram per hour when flying compared to the volume used at rest.

Show your working.

(2)

Answer ..... litres per gram per hour

(ii) Like humans, parakeets need to keep their body temperature constant.

Suggest how the volume of oxygen used by a parakeet at rest would change if it was moved to a colder environment.

(3)

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(Total for Question = 10 marks)