

Name:

Date:

B7- Test 3
ECOLOGY
Intermediate

GCSE

BIOLOGY

AQA - Triple Science

Mark

Grade

Materials

For this paper you must have:

- Ruler
- Pencil and Rubber
- Scientific calculator, which you are expected to use when appropriate

Instructions

- Answer all questions
- Answer questions in the space provided
- All working must be shown

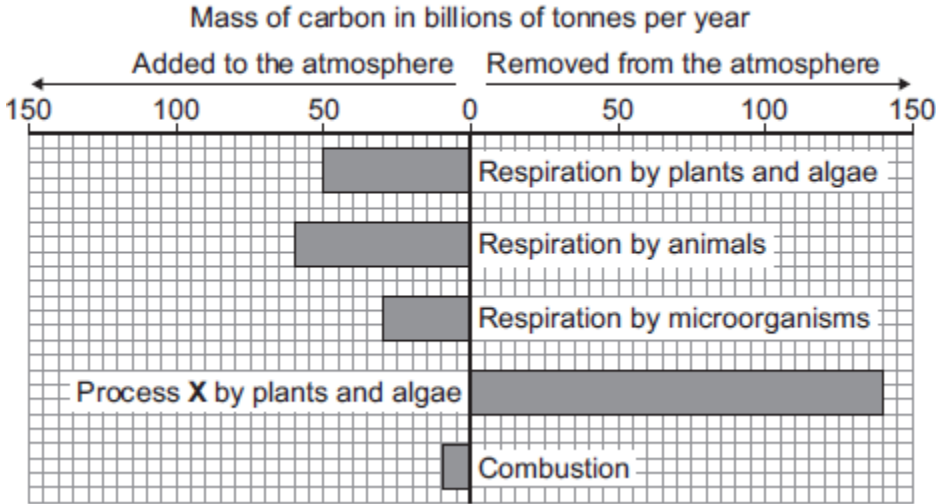
Information

- The marks for the questions are shown in brackets

1.

This question is about carbon.

The graph shows the mass of carbon added to and removed from the atmosphere each year.



(a) Name process X.

(1)

(b) (i) Calculate the mass of carbon added to the atmosphere by respiration per year.

Answer = _____ billion tonnes

(1)

(ii) Some scientists are concerned that the mass of carbon in the atmosphere is changing.

How does the data in the graph support this idea?

(1)

(Total 3 marks)

2.

The world population is increasing and the need for food is increasing.

Mycoprotein is a high-protein food made in fermenters using the organism *Fusarium*.

The process takes only a few weeks to produce a large amount of food.

(a) (i) What type of organism is *Fusarium*?

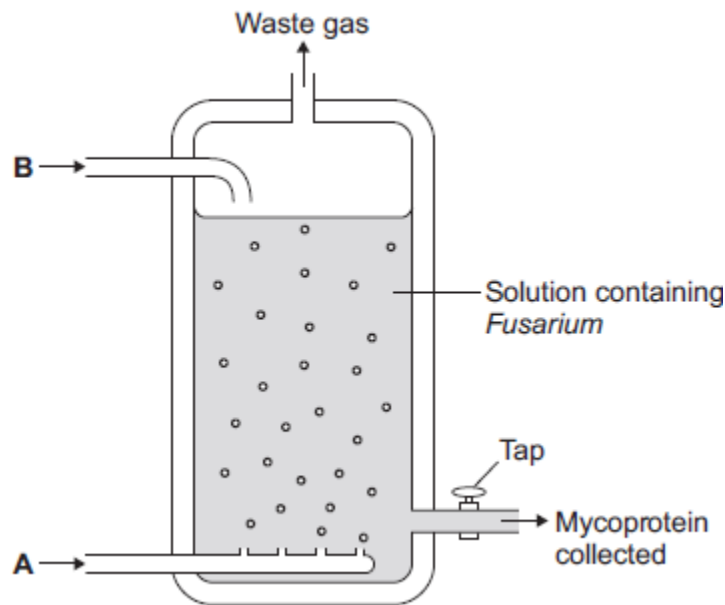
Draw a ring around the correct answer.

bacterium

fungus

virus

The diagram below shows a fermenter used in mycoprotein production.



(1)

(ii) *Fusarium* makes mycoprotein. *Fusarium* respire aerobically.

Suggest which gas is added to the fermenter at point **A**.

(1)

(iii) Another substance is added to the fermenter at point **B**. This substance is used in aerobic respiration.

Name this substance.

(1)

(b) People need to eat protein to grow and to be healthy.

Some people think that it would be an advantage to get more food from mycoprotein and less from farming animals.

Suggest **two** possible advantages of getting more food from mycoprotein.

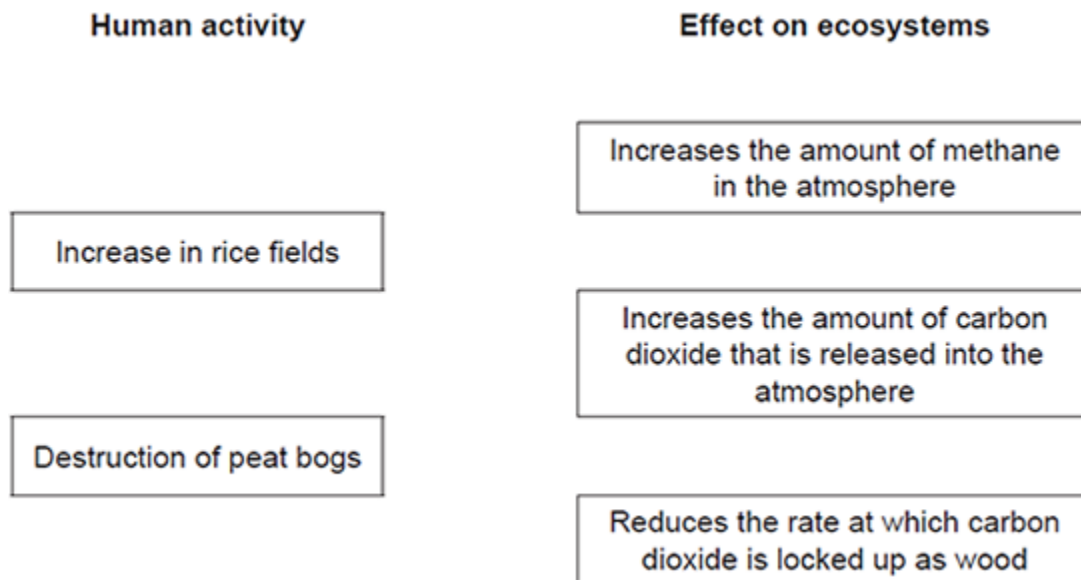
1. _____

2. _____

(2)
(Total 5 marks)

3. Human activity affects ecosystems.

(a) Draw **one** line from each human activity to the effect on ecosystems.



(2)

(b) (i) Deforestation also affects the atmosphere.

Give **two** reasons why deforestation takes place.

1. _____

2. _____

(2)

(ii) Changes in the gases in our atmosphere can cause global warming.

Give **two** possible effects of a rise in the Earth's temperature.

1. _____

2. _____

(2)

(Total 6 marks)

4.

A gardener wants to add compost to the soil to increase his yield of strawberries.

The gardener wants to make his own compost.

(a) An airtight compost heap causes anaerobic decay.

Explain why the gardener might be against producing compost using this method.

(2)

(b) The gardener finds this research on the Internet:

'A carbon to nitrogen ratio of 25:1 will produce fertile compost.'

Look at the table below.

Type of material to compost	Mass of carbon in sample in g	Mass of nitrogen in sample in g	Carbon:nitrogen ratio
Chicken manure	8.75	1.25	7:1
Horse manure	10.00	0.50	20:1
Peat moss	9.80	0.20	X

Determine the ratio **X** in the table above.

Ratio _____

(1)

- (c) Which type of material in the table above would be **best** for the gardener to use to make his compost?

Justify your answer.

(1)

- (d) Some of the leaves from the gardener's strawberry plant die.

The dead leaves fall off the strawberry plant onto the ground.

The carbon in the dead leaves is recycled through the carbon cycle.

Explain how the carbon is recycled into the growth of new leaves.

(6)

(e) The diagram below shows two strawberries.

- Both strawberries were picked from the same strawberry plant.
- Both strawberries were picked 3 days ago.
- The strawberries were stored in different conditions.

Strawberry A



Strawberry B



A © sarahdoow/iStock/Thinkstock, B © Mariusz Vlack/iStock/Thinkstock

Give **three** possible reasons that may have caused strawberry **A** to decay.

1. _____

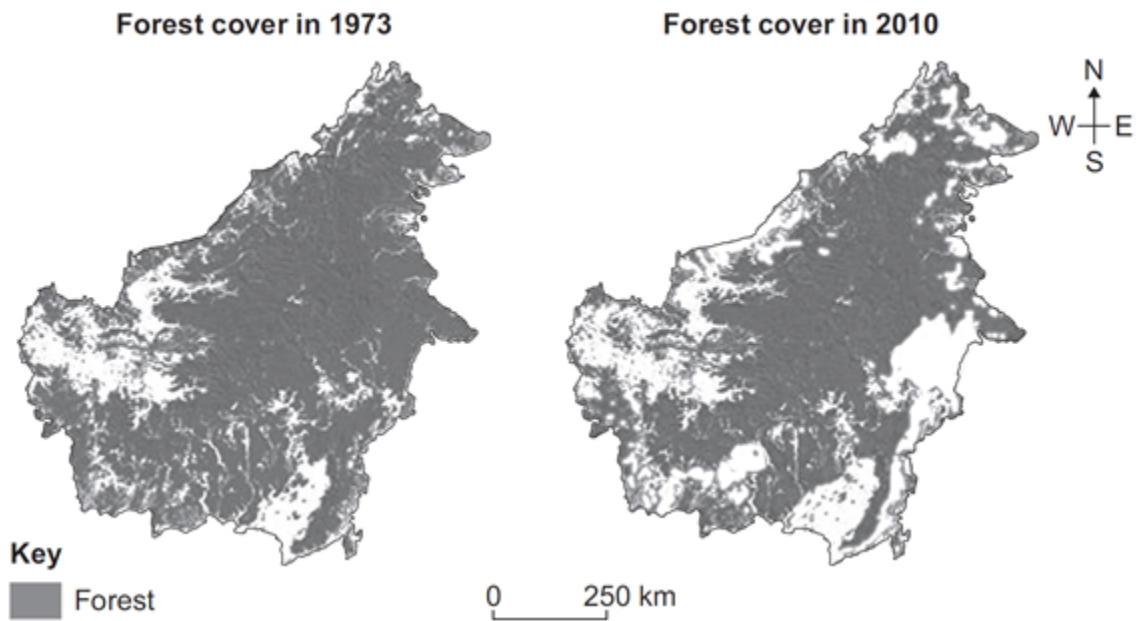
2. _____

3. _____

(3)
(Total 13 marks)

5.

The figure below shows the amount of forest cover on an island in Asia, in 1973 and in 2010.



- (a) (i) Deforestation has decreased the amount of forest cover on the island.

Describe the change in the pattern of forest cover on the island.

(2)

- (ii) Give **two** possible reasons why the amount of forest has decreased between 1973 and 2010.

1. _____

2. _____

(2)

(b) Scientists are concerned about the effects of a decrease in forest cover on ecosystems.

Give **two** possible negative effects of the decrease in forest cover on ecosystems.

1. _____

2. _____

(2)

(Total 6 marks)

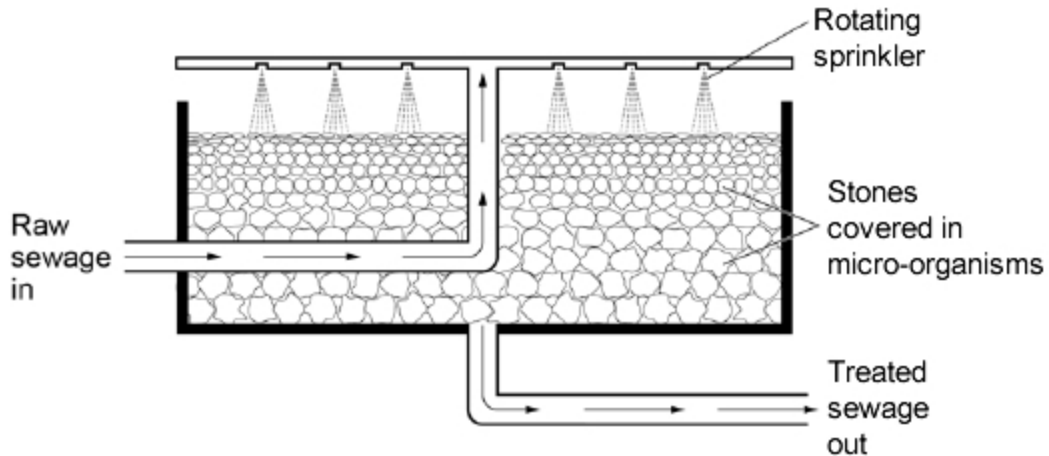
6.

Pollution of rivers with untreated sewage can kill plants and animals.

Figure 1 shows a sprinkler bed at a sewage works.

The sewage trickles slowly downwards over the surfaces of the stones.

Figure 1



Some of the microorganisms on the stones feed on organic matter in the sewage.

The treated sewage is safe enough to pass into a river.

(a) Most of the microorganisms in the sprinkler bed respire aerobically.

Describe **two** features of the sprinkler bed that encourage **aerobic** respiration.

Use information from **Figure 1**.

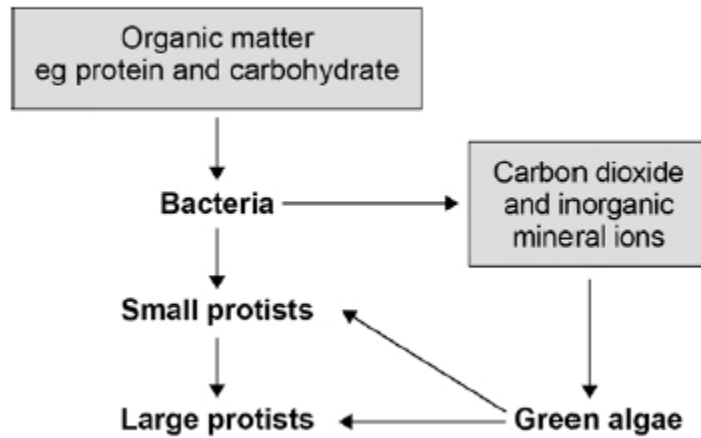
1. _____

2. _____

(2)

Figure 2 shows the feeding relationships between the microorganisms in the sprinkler bed.

Figure 2



(b) Which organisms in **Figure 2** are producers?

Tick **one** box.

- Bacteria
- Green algae
- Large protists
- Small protists

(1)

(c) Name **one** organism in **Figure 2** which is both a primary and a secondary consumer.

(1)

(d) The bacteria are decomposers.

Figure 2 shows that the bacteria change organic matter into carbon dioxide and inorganic mineral ions.

Describe how the bacteria do this.

(4)
(Total 8 marks)

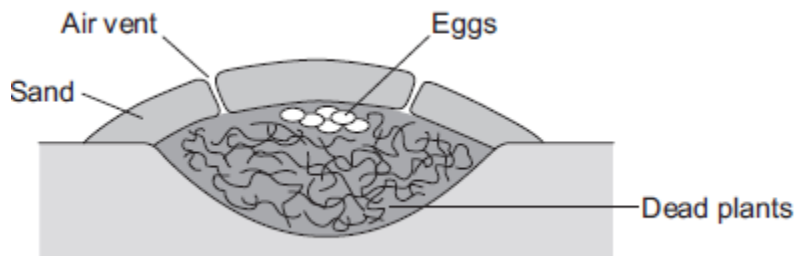
7.

Most birds sit on their eggs to keep them warm until they hatch.

Megapode birds:

- dig a large hole in sand
- fill the hole with dead plants
- lay their eggs on top of the dead plants
- cover the surface with a thick layer of sand.

The image below shows a megapode bird's nest.



- (a) The dead plants in the nest decay. The decaying process helps to keep the eggs warm for many weeks.

Suggest how.

(3)

- (b) (i) Megapode birds open and close the air vents of the nest at different times of the day.

Suggest reasons why it is necessary to open and close the air vents.

(3)

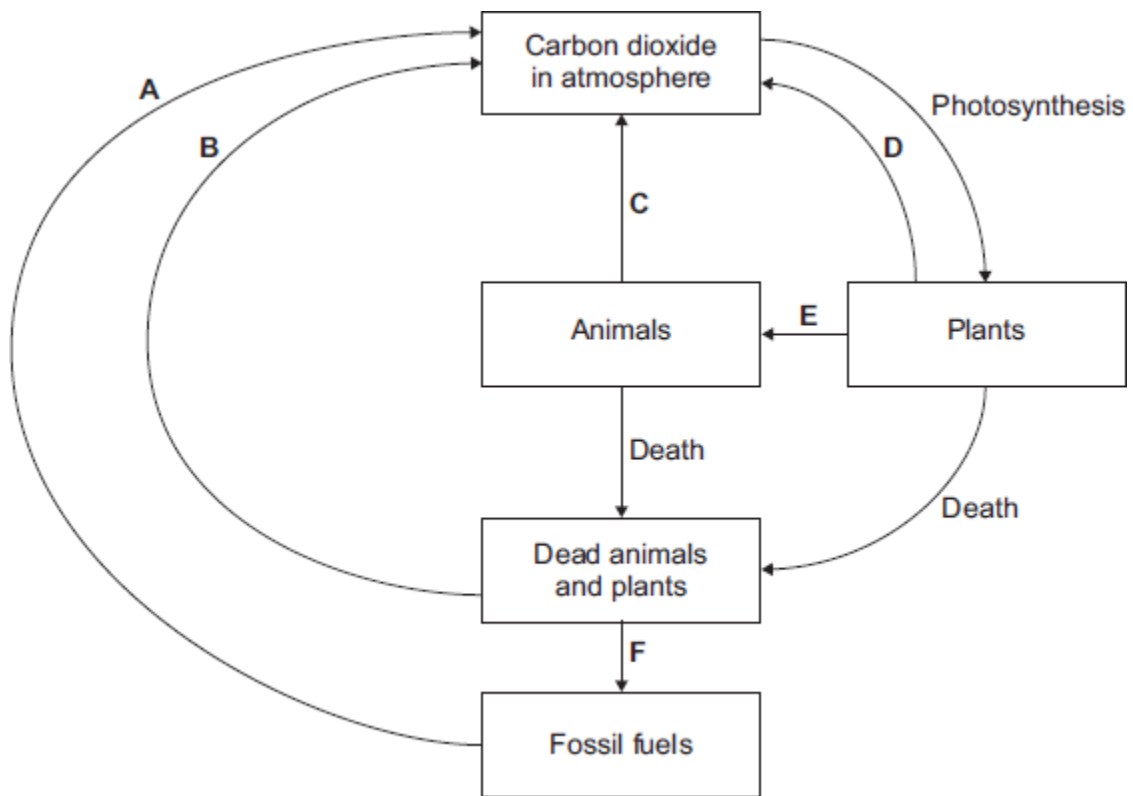
- (ii) The sex of a megapode bird that hatches from an egg depends on the temperature at which the egg was kept.

Use this information to suggest why it is important for megapode birds to control the temperature of their nests.

(1)

(Total 7 marks)

8. (a) The diagram shows the carbon cycle.



(i) The concentration of carbon dioxide in the atmosphere has increased over the last 100 years.

Give **two** human activities that might have caused this increase.

1. _____

2. _____

(2)

(ii) Give the letters of **two** arrows in the diagram which show respiration.

and

(2)

(iii) Give the letter of **one** arrow which shows decay.

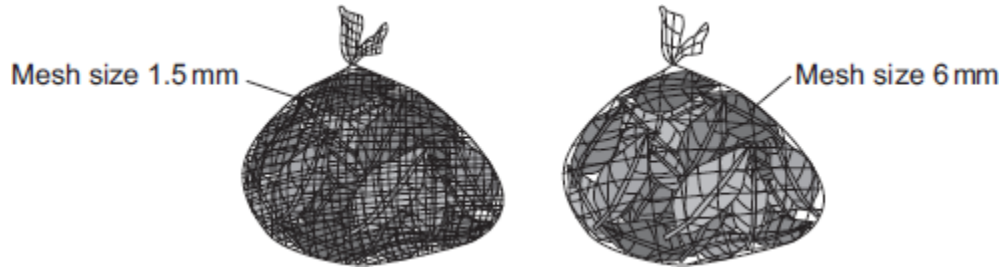
(1)

(b) Scientists investigated the breakdown of dead leaves.

The scientists:

- placed dried leaves in mesh bags. Half of the bags had a mesh size of 1.5 mm; the others had a mesh size of 6 mm.

Mesh bags containing leaves

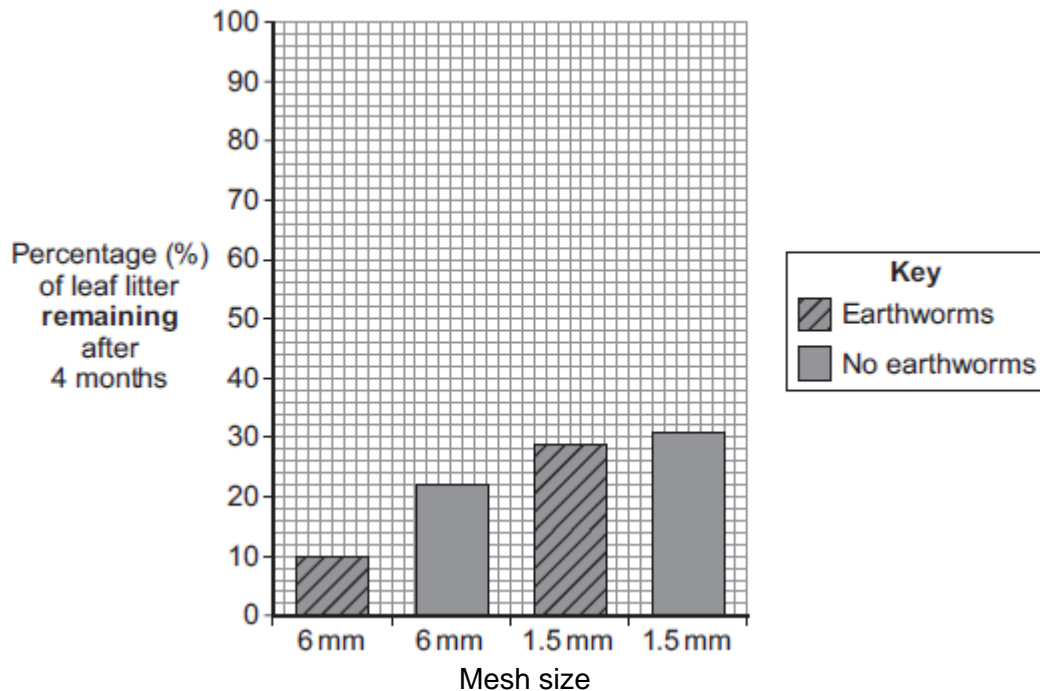


The scientists then:

- weighed the dried leaves in each bag at the start of the investigation
- placed the bags of leaves on soil: some of the bags were placed in areas where there **were earthworms** in the soil; the other bags were placed in areas where there were **no earthworms**
- left the bags for four months
- collected the bags, dried the leaves and weighed them again.

Most earthworms are between 3 mm and 6 mm in diameter.

The bar graph shows the scientists' results.



(i) The percentage of leaf litter at the start of the investigation was 100% in each bag.

What percentage of the leaf litter was broken down in the 6 mm mesh bags . . .

with earthworms _____ %

without earthworms? _____ %

(2)

(ii) What effect do earthworms have on the amount of leaves broken down in the 6 mm mesh bags?

Use your answer to part **(b) (i)** to show how you arrive at your answer.

(1)

(iii) When there were earthworms in the soil, the results for the 6 mm mesh bags were different from the results for the 1.5 mm mesh bags.

Explain why.

(2)

(iv) Other organisms, smaller than earthworms, cause most of the breakdown of the leaves.

Explain how the results show this.

(2)

(Total 12 marks)

9.

In many areas of the world the mass of household waste produced each year is increasing.

(a) Give **two** reasons why the mass of household waste is increasing each year.

1. _____

2. _____

(2)

(b) The table below shows how the mass of household waste in the UK has changed from 2004 to 2012.

Year	Total mass of household waste in thousands of tonnes (including total household recycling)	Total mass of household recycling in thousands of tonnes	Percentage of household waste recycled
2004	25 658	5785	22.5
2006	25 775	7976	30.9
2008	24 334	9398	38.6
2010	23 454	9733	
2012	22 643	9782	43.2

(i) Calculate the percentage of household waste recycled in 2010.

_____ %

(2)

(ii) The UK government has been encouraging a 'zero waste economy'.

In a 'zero waste economy', we reduce, reuse and recycle as much waste as possible.

A newspaper concluded that: **'The government's 'zero waste economy' has been successful.'**

Use information from the table to describe the reasons for and against the newspaper's conclusion.

(4)

(c) (i) Some waste releases carbon dioxide and methane into the atmosphere.
An increase in carbon dioxide and methane contributes to global warming.

Global warming can cause sea levels to rise.

Describe **two** other possible effects of global warming on our environment.

1. _____

2. _____

(2)

(ii) Storing the carbon dioxide helps to prevent more global warming.
Carbon dioxide can be stored (sequestered) in trees when they photosynthesise.

Give **one** different way in which carbon dioxide is sequestered in our environment.

(1)

(Total 11 marks)