

Q1. Choose words from this list to complete the sentences below.

carbon dioxide insects microbes nitrogen oxygen
cool dry moist warm

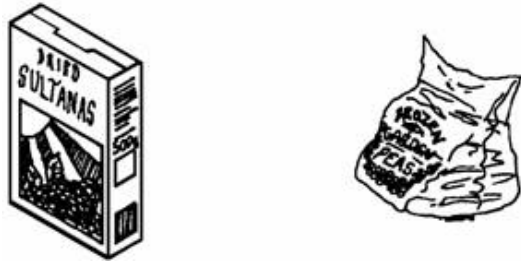
Food decays because it is broken down by

Food decays faster in conditions which are and

It will also decay faster if the air around it contains plenty of gas.

(Total 4 marks)

Q2. Food decays more slowly if it is kept dry or cool.



Explain why.

.....

.....

.....

.....

(Total 3 marks)

Q3.



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

(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)

Q4. 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)

Q5. (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.

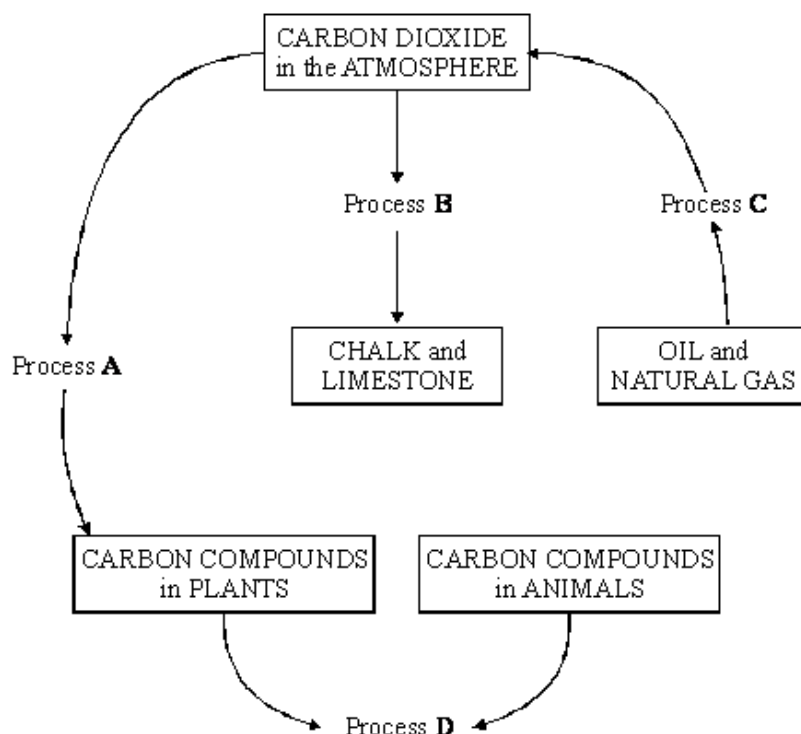
1.

2.

(2)

(Total 3 marks)

Q6. The diagram shows part of the carbon cycle.

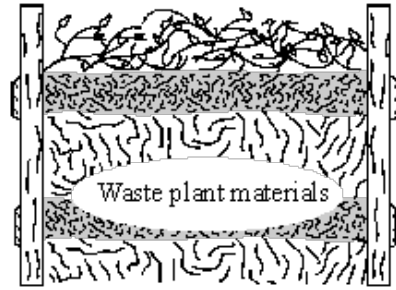


What are the processes shown as **A**, **B**, **C** and **D**?

- (i) Process **A** is
- (ii) Process **B** is
- (iii) Process **C** is
- (iv) Process **D** is

(Total 4 marks)

Q7. 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	

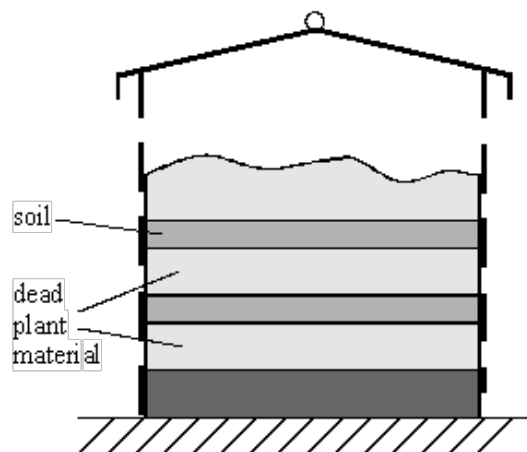
The waste plant materials because they are broken down by microorganisms.

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)

Q8. The drawing shows a section through a well-designed compost heap.



(a) Suggest why soil is put in with the dead plant material.

.....
.....
.....

(2)

(b) Explain why the compost heap is designed with holes in the sides.

.....
.....
.....

(2)

(Total 4 marks)

Q9. Figure 1 shows a food chain containing three organisms.

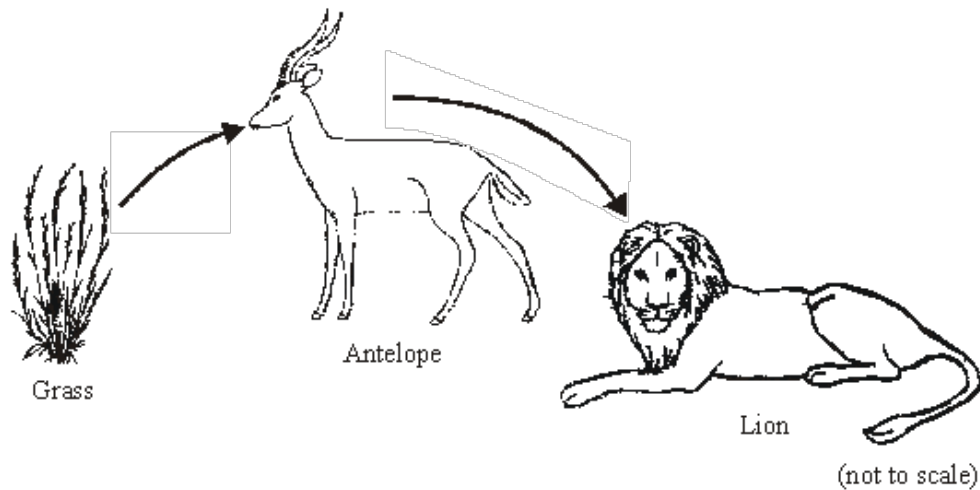


Figure 1

(a) (i) In this food chain, name:

the predator;

the prey.

(2)

(ii) What is the source of energy for the grass?

Draw a ring around **one** answer.

carbon dioxide

light

nitrates

water

(1)

- (iii) **Figure 2** shows a pyramid of biomass for the organisms in **Figure 1**.

Write the names of the organisms on the correct lines in **Figure 2**.

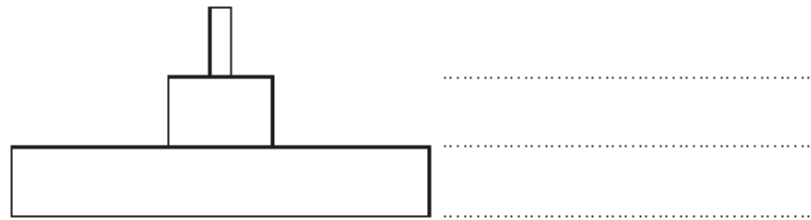


Figure 2

(1)

- (b) Waste materials, like faeces from the animals, will decay,

- (i) What sort of organisms cause decay?

.....

(1)

- (ii) **Three** of the following conditions help decay to occur rapidly.

Which conditions do this?

Draw a ring around each of the **three** answers.

aerobic anaerobic cold dry moist warm

(3)

- (iii) The list below gives four substances. Two of these substances are produced by decay and can be used by the grass.

Which **two** substances are these?

Tick (✓) **two** boxes.

Carbon dioxide ☐

Mineral salts ☐

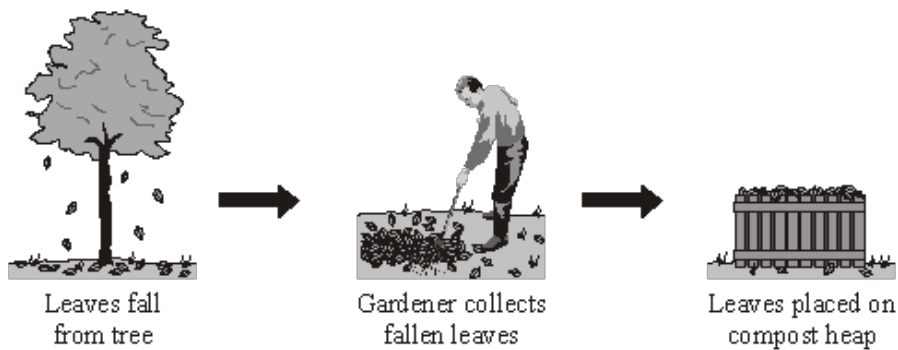
Oxygen ☐

Protein ☐

(2)

(Total 10 marks)

Q10. Gardeners often collect fallen leaves in autumn and place them on compost heaps.



- (a) Over the next year the leaves decay.

Which living things cause leaves to decay?

.....

(1)

- (b) The leaves decay more quickly in summer than in winter.

Give **one** reason why.

.....

.....

(1)

- (c) The compost heap has holes in its sides to allow gases to enter.

Which gas is needed for decay?

Put a tick (✓) in the box next to your choice.

Carbon dioxide

☐

Nitrogen

☐

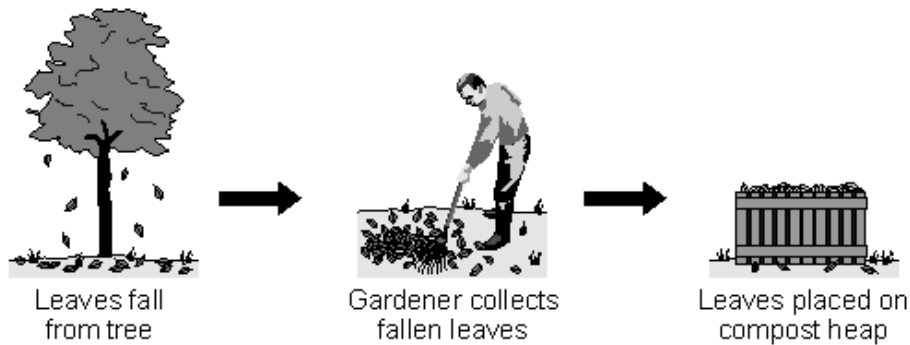
Oxygen

☐

(1)

(Total 3 marks)

Q11. Gardeners often collect fallen leaves in autumn and place them on compost heaps.



- (a) Over the next year the leaves decay.

Which living things cause leaves to decay?

.....
.....

(1)

- (b) The leaves decay more quickly in summer than in winter.

Give **one** reason why.

.....
.....

(1)

- (c) The compost heap has holes in its sides to allow gases to enter.

Which gas is needed for decay?

.....
.....

(1)

(Total 3 marks)

Q12. This question is about what happens during decay.

Draw a ring around the correct word to complete each sentence.

- (a) After living things die, they are decayed by

animals.
microorganisms.
plants.

(1)

(b) Decay happens faster when there is plenty of oxygen and conditions are

cold.
dry.
moist.

(1)

(c) During decay carbon dioxide is produced by

osmosis.
respiration.
photosynthesis.

(1)

(d) Decay releases mineral salts into the soil.

These mineral salts are absorbed by plant

leaves.
roots.
stems.

(1)

(Total 4 marks)

Q13. The amount of carbon dioxide in the atmosphere is increasing.

The table shows the estimated mass of carbon dioxide exchanged with the atmosphere in one year.

	Mass of carbon dioxide exchanged with the atmosphere in millions of tonnes	
	Passed out into the atmosphere	Taken in from the atmosphere
Plants	30	64
Animals	10	0
Microorganisms	24	0
Combustion	6	0

- (a) (i) Calculate the total mass of carbon dioxide passed out into the atmosphere in one year.

Show clearly how you work out your answer.

.....

Answer million tonnes

(2)

- (ii) Calculate the increase in the mass of carbon dioxide in the atmosphere in one year.

You should use your answer to part (a)(i) in your calculation.

Show clearly how you work out your answer.

.....

Answer million tonnes

(2)

- (b) Draw a ring around the correct answer to complete the sentence.

Plants use carbon dioxide in the process of

decomposition.
photosynthesis.
respiration.

(1)
 (Total 5 marks)

- Q14.** When animals die, they usually fall to the ground and decay.
In 1977 the body of a baby mammoth was discovered.
The baby mammoth died 40 000 years ago and its body froze in ice.

The picture shows the mammoth.



By Thomas Quine [CC BY-SA 2.0], via Wikimedia Commons

- (a) Explain why the body of the baby mammoth did **not** decay.

.....

.....

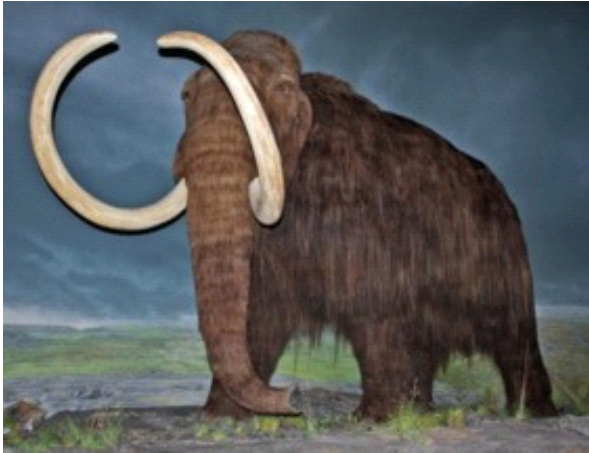
.....

.....

(2)

- (b) Mammoths are closely related to modern elephants.
The pictures show these two animals.

What scientists think a
mammoth looked like



By WolfmanSF (Own work) [CC-BY-SA-3.0], via Wikimedia Commons

Modern elephant



By Caitlin from Hertfordshire, UK [CC-BY-2.0],
via Wikimedia Commons

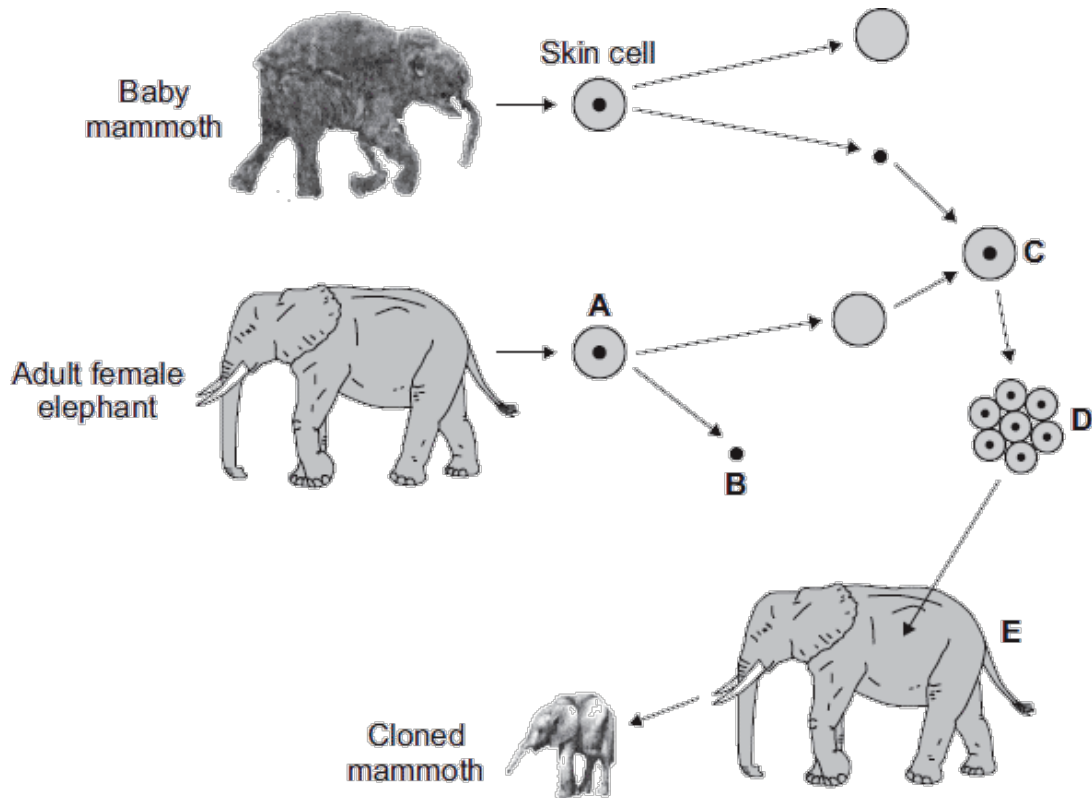
Mammoths are *extinct*. What does *extinct* mean?

.....

.....

(1)

- (c) Scientists believe they may be able to use adult cell cloning to recreate a living mammoth.
- The scientists will use a skin cell from the baby mammoth.
- The diagrams show how the skin cell will be used.



In each question, draw a ring around the correct answer.

- (i) What type of cell is cell **A**?

skin cell

egg cell

sperm cell

(1)

- (ii) Part **B** is removed from cell **A**.

What part of the cell is part **B**?

nucleus

cytoplasm

cell membrane

(1)

- (iii) After cell **C** is formed, it divides into embryo cells.

What is done to cell **C** to make it divide?

Cell **C** is

treated with enzymes.
mixed with sperm cells.
given an electric shock.

(1)

- (iv) The embryo cells form a ball of cells. The ball of cells will be put into female elephant, **E**.

Which part of elephant **E** is the ball of cells put into?

womb

stomach

ovary

(1)

- (d) The scientists expect any offspring of the adult cell cloning to look like a mammoth and **not** like an elephant.

Why?

.....

.....

(1)

(Total 8 marks)

Q15. In a woodland, bluebells grow well every year.

Bluebells growing well in woodland



Mick Garratt [CC-BY-SA-2.0], via Wikimedia Commons

Each year the dead flowers and leaves of the bluebells and leaves from the trees fall onto the ground.

The bluebells do not run out of mineral ions.

Explain why the bluebells do **not** run out of mineral ions.

The words in the box may help you.

roots	dead leaves	mineral ions
	microorganisms	decay

.....

.....

.....

.....

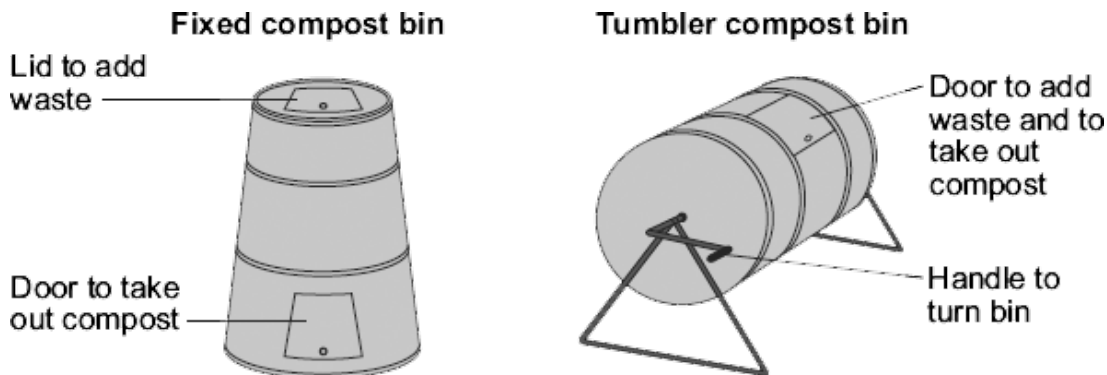
.....

.....

(3)
(Total 3 marks)

- Q16.** Garden waste can be recycled.
One way of recycling garden waste is to use a compost bin.

The diagram shows two types of compost bin.
Each bin can contain the same amount of waste.



Information about the compost bins is given below.

Fixed compost bin

- Compost can be taken out after two years.
- The bin costs about £40.
- The bin takes up an area of 1 m².

Tumbler compost bin

- The bin is turned twice a day using the handle.
- Six weeks later compost can be taken out.
- The bin costs about £80.
- The bin takes up an area of 2 m².

(a) A gardener is buying a compost bin.

- (i) Give **one** advantage to the gardener of buying a tumbler compost bin and not a fixed compost bin.

.....
.....

(1)

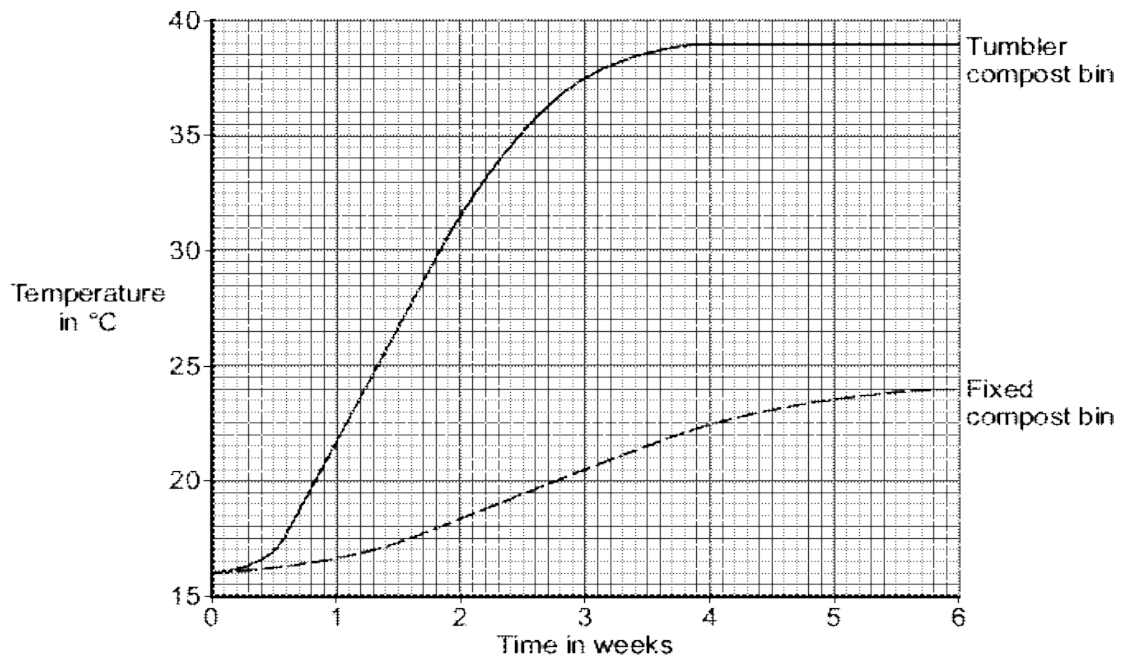
- (ii) Give **two** advantages to the gardener of buying a fixed compost bin and not a tumbler compost bin.

1

2

(2)

- (b) The same amounts of waste were added to the two types of bin.
The graph shows the temperature in the bins in the first six weeks after the waste was added.



- (i) Give **two** differences between the results for the tumbler compost bin and the fixed compost bin.

1

.....

2

.....

(2)

- (ii) Complete the sentences.

The waste is converted into compost by organisms
called

The conversion of waste into compost works best in warm, moist
and conditions.

(2)

(iii) There was a big difference in the final temperatures in the two bins.

Suggest an explanation for this temperature difference.

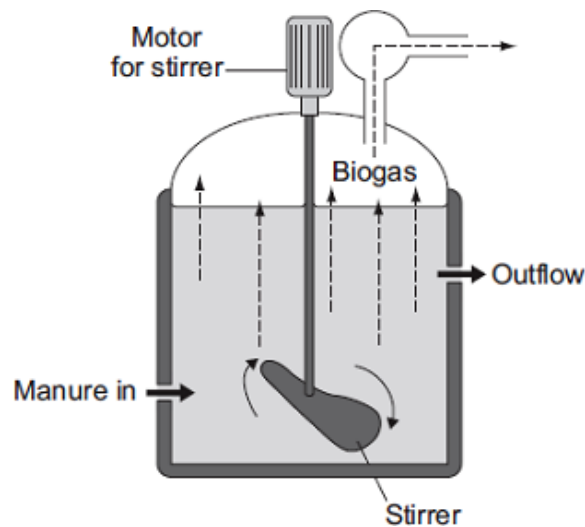
.....

.....

.....

(2)
(Total 9 marks)

Q17. The diagram shows one type of biogas generator.



- (a) With this type of biogas generator, the concentration of solids that are fed into the reactor must be kept very low.

Suggest **one** reason for this.

Tick (✓) **one** box.

A higher concentration contains too little oxygen.

☐

A higher concentration would be difficult to stir.

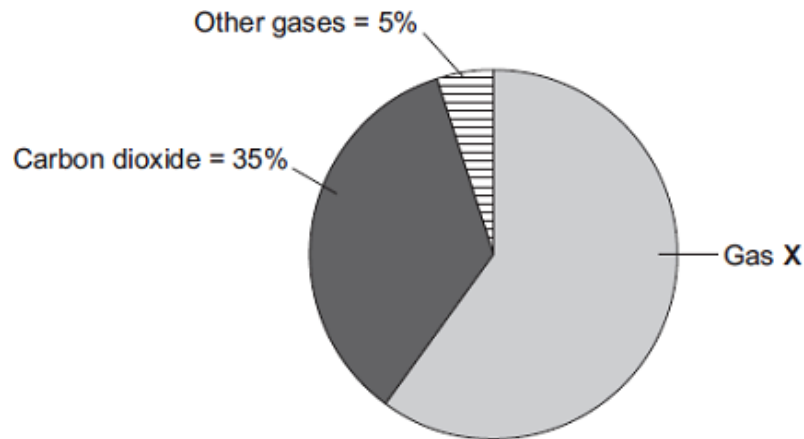
☐

A higher concentration contains too much carbon dioxide.

☐

(1)

- (b) The pie chart shows the percentages of the different gases found in the biogas.



Gas **X** is the main fuel gas found in the biogas.

- (i) What is the name of gas **X**?

Draw a ring around **one** answer.

methane

nitrogen

oxygen

(1)

- (ii) What is the percentage of gas **X** in the biogas?

Show clearly how you work out your answer.

.....

Percentage of gas **X** =

(2)

- (c) If the biogas generator is not airtight, the biogas contains a much higher percentage of carbon dioxide.

Draw a ring around **one** answer in each part of this question.

- (i) The air that leaks in will increase the rate of

aerobic respiration.

anaerobic respiration.

fermentation.

(1)

(ii) The process in part (c)(i) occurs because the air contains

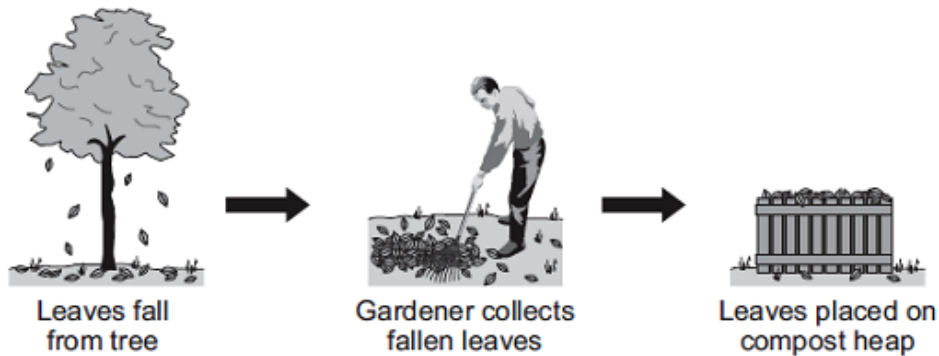
ammonia.

nitrogen.

oxygen.

(1)
(Total 6 marks)

Q18. Gardeners often collect fallen leaves in autumn and place them on compost heaps.



(a) Over the next year the leaves decay.

Which living things cause decay?

.....

(1)

(b) The leaves decay more quickly in summer than in winter.

Give **one** reason why.

.....

.....

(1)

(c) The compost heap has holes in its sides to let gases enter.

Which gas is needed for decay?

Tick (✓) **one** box.

Carbon dioxide

☐

Nitrogen

☐

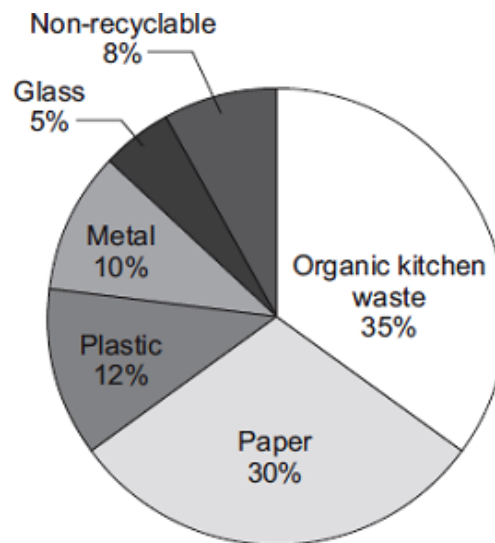
Oxygen

☐

(1)
(Total 3 marks)

Q19. This question is about recycling.

The pie chart shows the different types of waste from an average household in England.



- (a) In 2010, councils in England collected 23 million tonnes of waste from households. Most of the waste was put into landfill sites. Councils pay to use landfill sites.

Organic kitchen waste can be put onto compost heaps.

Calculate the mass of organic kitchen waste from households that could have been put onto compost heaps in 2010.

.....
.....

Answer = million tonnes

(2)

- (b) Some householders put organic kitchen waste onto their compost heaps.

- (i) Suggest **one** advantage of this to the council.

.....
.....

(1)

- (ii) Suggest **one** advantage of this to the householder.

.....
.....

(1)

(Total 4 marks)

