Respiration (H)

1. In a sample of DNA, 23% of the bases are cytosine.

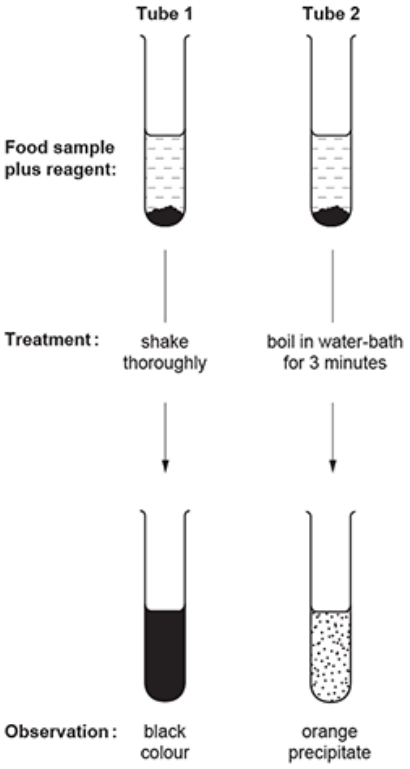
What percentage of the bases are adenine?

A 23%
B 27%
C 46%
D 54%

Your answer ☐

[1]

2. The diagram shows positive results in two different food tests.



What do the results show in each tube?

	Tube 1	Tube 2
A	sugar	lipid
B	starch	sugar
C	protein	sugar
D	starch	protein

Your answer

[1]

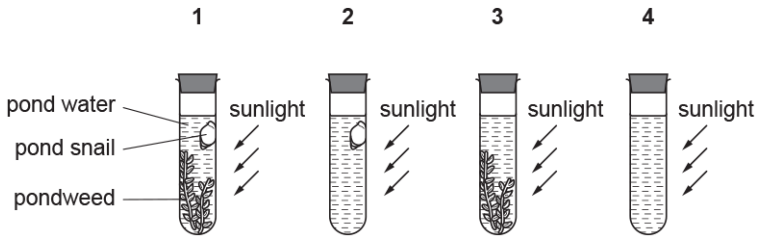
3. Aerobic respiration occurs all the time in plant cells but photosynthesis only occurs in daylight.

Why is more energy released by a plant cell during the night?

A Photosynthesis is endothermic taking in energy and aerobic respiration is exothermic.
B Photosynthesis is exothermic taking in energy and aerobic respiration is endothermic.
C Aerobic respiration is exothermic taking in energy and photosynthesis is endothermic.
D Aerobic respiration is endothermic taking in energy and photosynthesis is exothermic.

Your answer ☐ **[1]**

4. Pond snails and pondweed are living in water in sealed test tubes.



Carbon dioxide dissolves in water and forms an acid.

In which test tube would the water become most acidic?

A 1
B 2
C 3
D 4

Your answer ☐ **[1]**

5. Hypercholesterolemia (HC) is the result of a mutation in the genome. It is caused by a dominant allele on chromosome 19. The mutation involved causes a change in the DNA nucleotides.

People with HC are more likely to develop heart disease. **Fig. 21.1** shows the heart of a person who has heart disease.

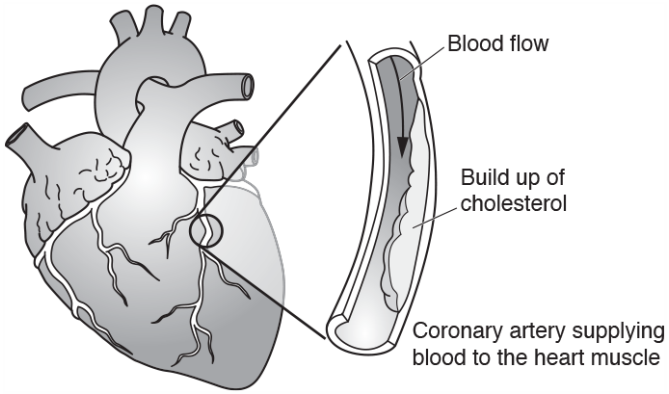


Fig. 21.1

The LDL receptor protein is found on the cell membrane of liver cells. The receptor picks up cholesterol from the blood and transports it into the liver cell. Inside the liver cell the cholesterol is broken down or used.

Explain why people who have the mutation in the allele for the LDL receptor are much more likely to develop heart disease.

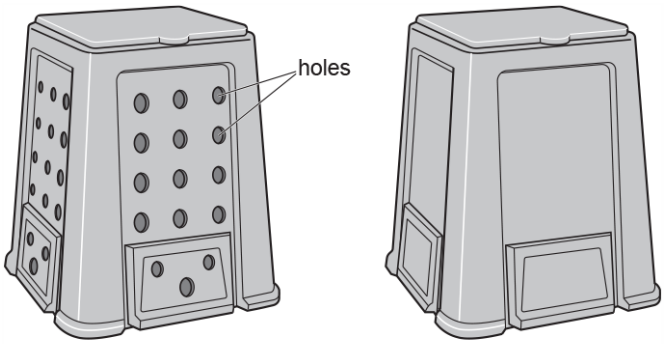
[6]

6 (a). Gardeners often turn dead plant material from their garden into compost. They then add this compost to the soil where they are growing plants.

Compost can be made in a composting bin. In the bin **aerobic bacteria** turn dead plant material into compost.

Some people use a different way of making compost, called bokashi. In this process the compost is made **anaerobically.**

The drawings show a normal composting bin and a bokashi bin.



Explain the difference in the design of the two composting bins.

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[2]

(b). Scientists investigate the two methods of making compost.

This is their method:

- Take one large pile of dead plant material
- Divide the material into two samples of equal mass
- Place one sample into the normal composter and place one sample into the bokashi composter
- Measure the temperature in each composter every 10 days
- After 40 days, measure the mass of the compost.

Write down **one** way that the scientists make sure that they can draw valid conclusions.

---

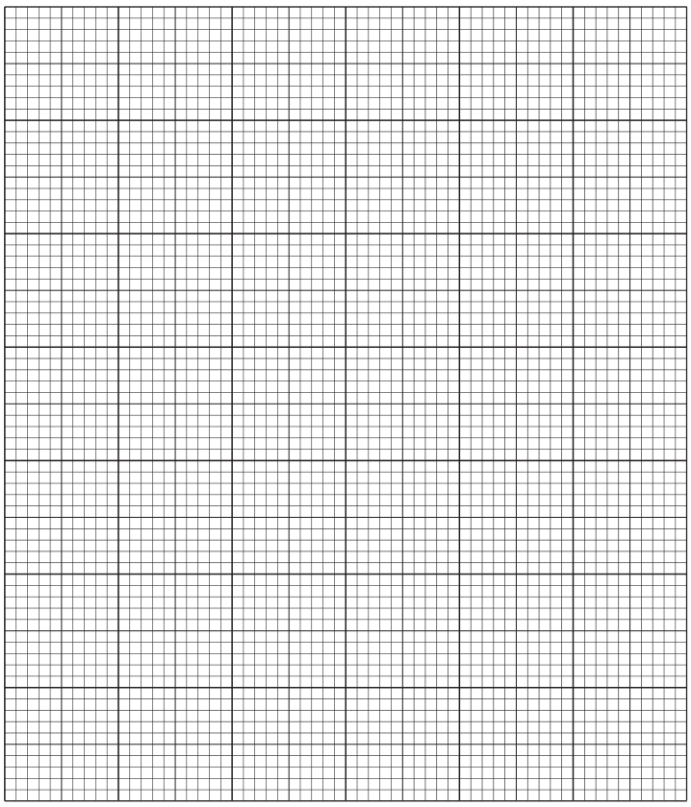
[1]

(c). Table 18.1 shows the scientists' temperature readings.

	Temperature of the compost (°C)	
Time (days)	normal compost	bokashi compost
0	26	26
10	70	27
20	53	29
30	42	31
40	28	28

Table 18.1

i. Plot the scientists' results on the grid for normal and bokashi compost, and draw **two** curves of best fit.



[5]

ii. Explain why the temperature of the compost in the **normal** bin changed as shown in the graph.

---

[2]

iii. Explain the difference in the temperature changes between the aerobic normal compost and the anaerobic bokashi compost.

_____

_____

_____

_____ **[2]**

(d). Table 18.2 shows the scientists' results for the mass of the compost.

	Normal compost	**Bokashi compost**
Mass at start (kg)	1500	1500
Mass after 40 days (kg)	750	1100

Table 18.2

A gas is given off in the formation of the compost. This causes most of the decrease in mass.

i. The percentage decrease in the mass of the normal compost is 50%.

Calculate the percentage decrease in the mass of the bokashi compost.

Give your answer to **2** significant figures.

Percentage decrease = ... % **[3]**

ii. The scientists concluded that the bokashi method of composting might be better for the environment.

Use your answer from part **(i)** to justify the scientists' conclusion.

_____

_____

_____

_____

_____ **[2]**

7. Protein synthesis takes place inside cells.

ADH is a protein hormone made up of amino acids.

i. Complete the sentences to explain the link between amino acids and proteins.

Large molecules, like proteins, made of smaller molecules are called .....

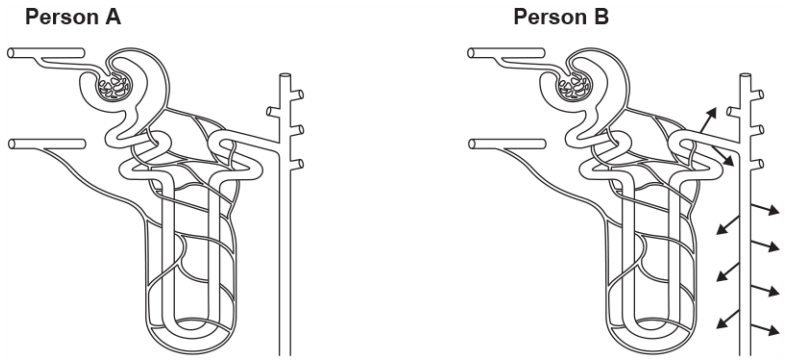
The smaller molecules, or amino acids, are called ..... .

[2]

ii. Alcohol inhibits ADH production.

Person **A** and **B** both drank one small 100 ml drink.
Only one of the drinks was high in alcohol.

Look at the diagram of a kidney tubule in person **A** and **B** after the drink.



→ Movement of water

Explain how you can tell from the diagram that person **A**'s drink contained alcohol.

---**[2]**

iii. After the alcohol has been removed from person **A**'s body, control mechanisms will correct the excess loss of water caused by the alcohol.
Describe these control mechanisms.

---**[2]**

8. A process in cells is involved in producing a chemical that causes ripening of fruit.
Look at **Fig. 20.2**.

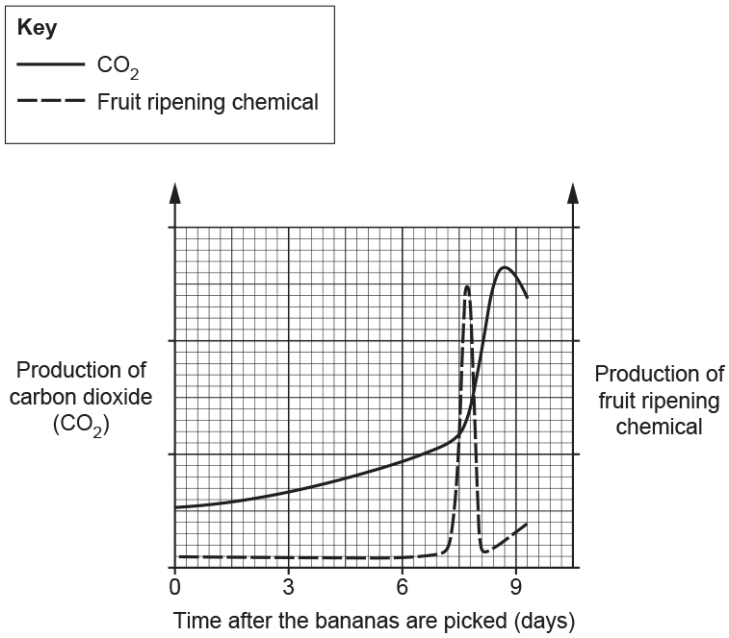


Fig. 20.2

Use evidence from **Fig. 20.2** to suggest what this process might be.

_____

_____

_____

_____ **[2]**

9 (a). Complete the word equation for **anaerobic** respiration in yeast.

glucose → _____ + _____ **[1]**

(b). Write down **two** ways in which anaerobic respiration in yeast cells is different from anaerobic respiration in human muscle cells.

1
_____

_____

2
_____

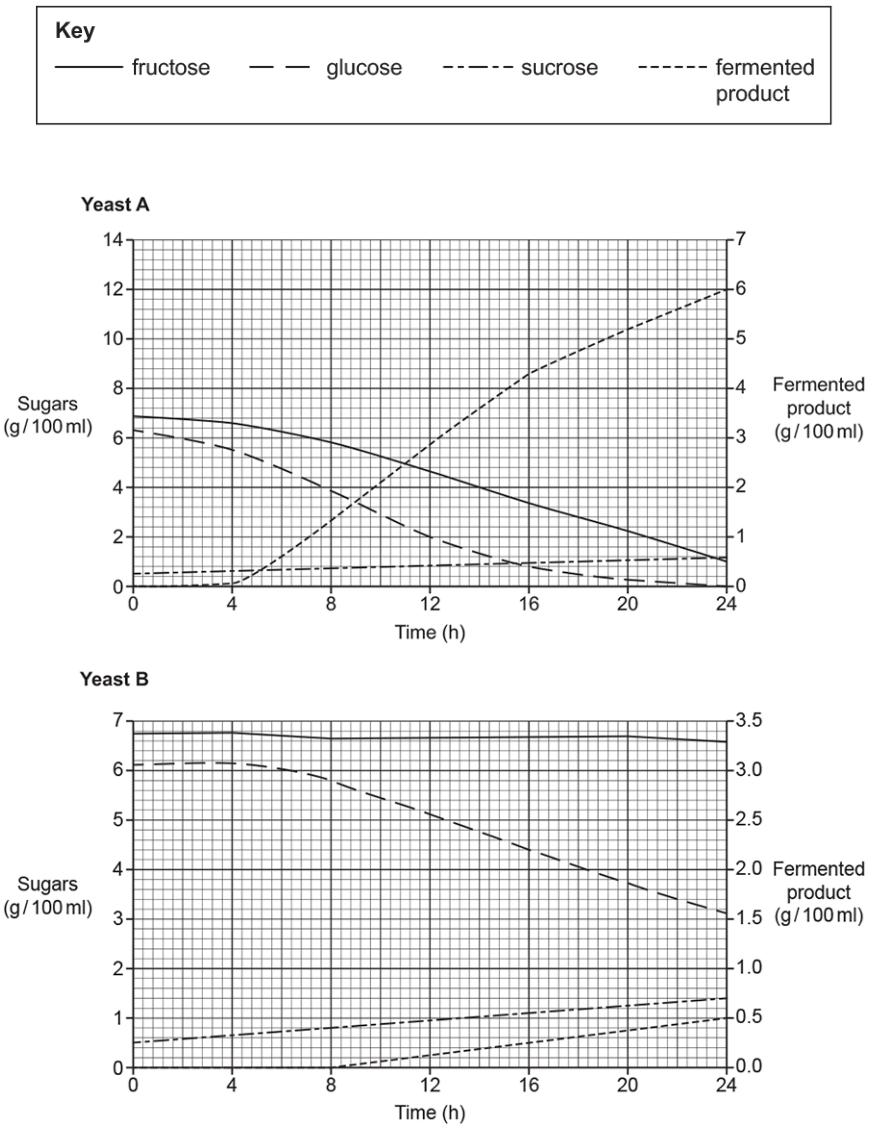
_____ **[2]**

(c). Date fruits contain three different sugars, fructose, glucose and sucrose.

Different strains of yeast can ferment different sugars to produce a fermented product.

Scientists investigate how two different strains of yeast, **A** and **B**, ferment sugars inside date fruits.

Look at their results.



i. Which sugar is **not** fermented by either strain of yeast?

Tick (✓) **one** box.

Fructose ☐

Glucose ☐

Sucrose ☐

[1]

ii. After 24 hours, how many times higher is the fermented product yield of yeast **A** compared to yeast **B**?

Number of times higher = ... **[2]**

iii. Which sugar would increase fermentation the **most** if added to either yeast **A** or yeast **B**?

Tick (✓) **one** box.

Fructose	☐
Glucose	☐
Sucrose	☐

[1]

iv. Fermented dates are used to supply both fructose and fermented product.

Explain why it would be best to use yeast **B** to ferment dates to supply both fructose and fermented product.

---

[2]

10 (a). Date fruits contain three different sugars, fructose, glucose and sucrose.

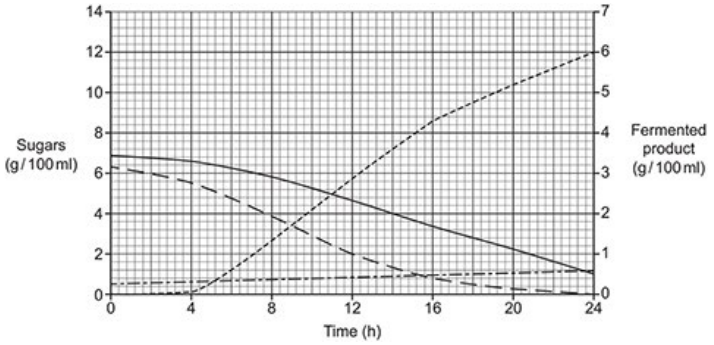
Different strains of yeast can ferment different sugars to produce a fermented product.

Scientists investigate how two different strains of yeast, **A** and **B**, ferment sugars inside date fruits.

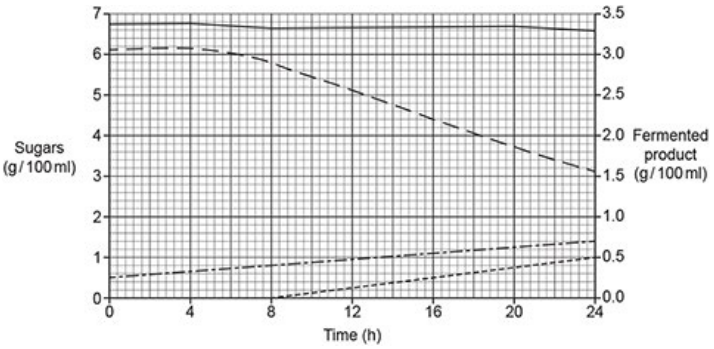
Look at their results.

Key
———— fructose —— —— glucose – - — - – sucrose ----- fermented product

Yeast A



Yeast B



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Tick (✓) **one** box.

Fructose ☐

Glucose ☐

Sucrose ☐

[1]

ii. After 24 hours, how many times higher is the fermented product yield of yeast **A** compared to yeast **B**?

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Tick (✓) **one** box.

Fructose ☐

Glucose ☐

Sucrose ☐

[1]

iv. Fermented dates are used to supply both fructose and fermented product.

Explain why it would be best to use yeast **B** to ferment dates to supply both fructose and fermented product.

---

[2]

(b). Yeast cells can respire anaerobically.

Complete the word equation for **anaerobic** respiration in yeast.

glucose → ..... + ... **[1]**

(c). Write down **two** ways in which anaerobic respiration in yeast cells is different from anaerobic respiration in human muscle cells.

1

2

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[2]

END OF QUESTION PAPER