5090 Biology Paper 1 - Respiration

Topical questions | 27 questions

1. Question | 5090 May-June 2023 P1 V1 Q15

15 How many molecules of carbon dioxide will be produced from the breakdown of two molecules of glucose in aerobic respiration?

A 2 **B** 4 **C** 6 **D** 12

2. Question | 5090 May-June 2023 P1 V1 Q16

16 Which equation shows the type of respiration that can cause an ‘oxygen debt’ in muscles during vigorous exercise?

A glucose + oxygen → carbon dioxide + water

B glucose → lactic acid

C glucose → ethanol + carbon dioxide

D glucose → lactic acid + carbon dioxide + water

3. Question | 5090 May-June 2023 P1 V2 Q14

14 Which process does **not** result in an overall loss of energy from the organism?

A photosynthesis in a green plant

B respiration in an animal

C temperature control in humans

D the germination of seeds

5090 Biology Paper 1 - Respiration

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4. Question | 5090 May-June 2023 P1 V2 Q15

15 When yeast cells respire anaerobically, which substance is used and which substances are produced?

	substance used	substances produced
A	alcohol	carbon dioxide and water
B	alcohol	lactic acid and water
C	sugar	alcohol and carbon dioxide
D	sugar	carbon dioxide and water

5. Question | 5090 May-June 2023 P1 V2 Q16

16 Which word equation represents aerobic respiration?

A carbon dioxide + water → glucose + oxygen

B carbon dioxide + oxygen → glucose

C glucose + oxygen → carbon dioxide + water

D glucose + oxygen → water

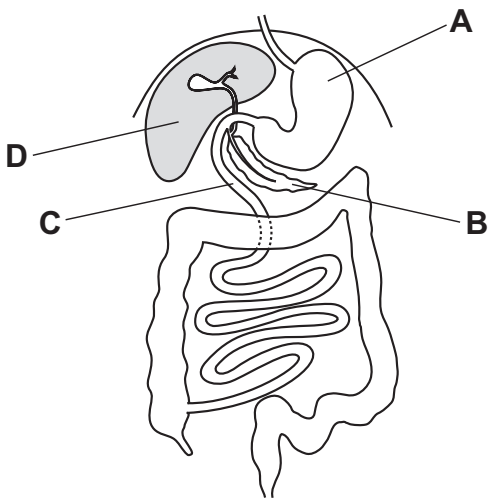
6. Question | 5090 Oct-Nov 2023 P1 V1 Q15

15 What are the products of anaerobic respiration in muscle?

	alcohol	carbon dioxide	glucose	lactic acid	water
A	✓	✓	✓	✗	✗
B	✗	✓	✗	✓	✓
C	✓	✗	✓	✗	✓
D	✗	✗	✗	✓	✗

7. Question | 5090 Oct-Nov 2023 P1 V1 Q16

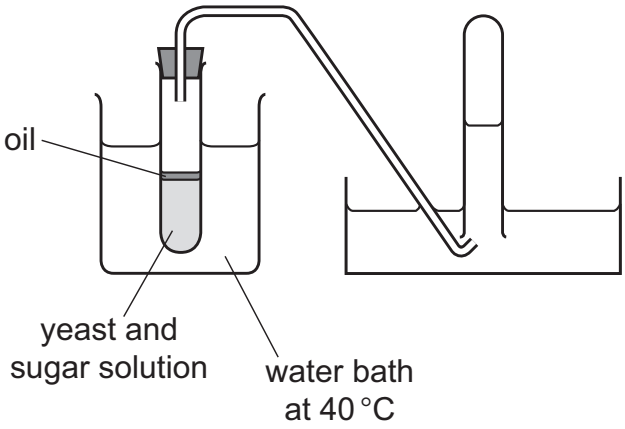
16 Which label shows where lactic acid is broken down?



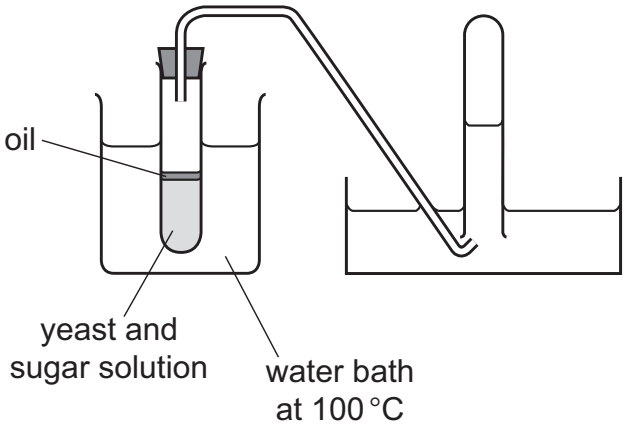
8. Question | 5090 Oct-Nov 2023 P1 V2 Q15

15 Which apparatus can be used to investigate the production of carbon dioxide by anaerobic respiration of yeast?

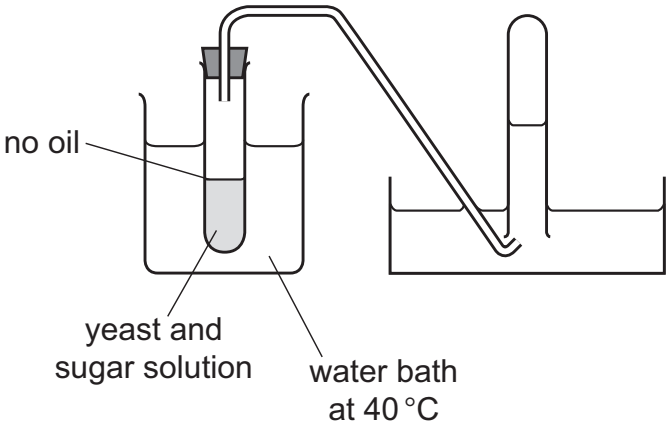
A



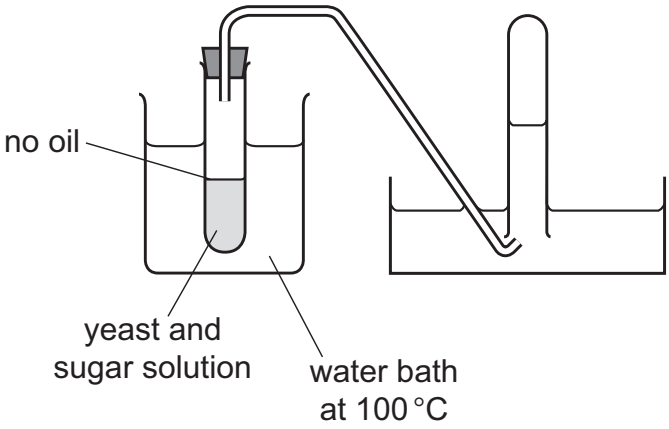
B



C



D



9. Question | 5090 Oct-Nov 2023 P1 V2 Q16

16 The diagram represents the equation for aerobic respiration.

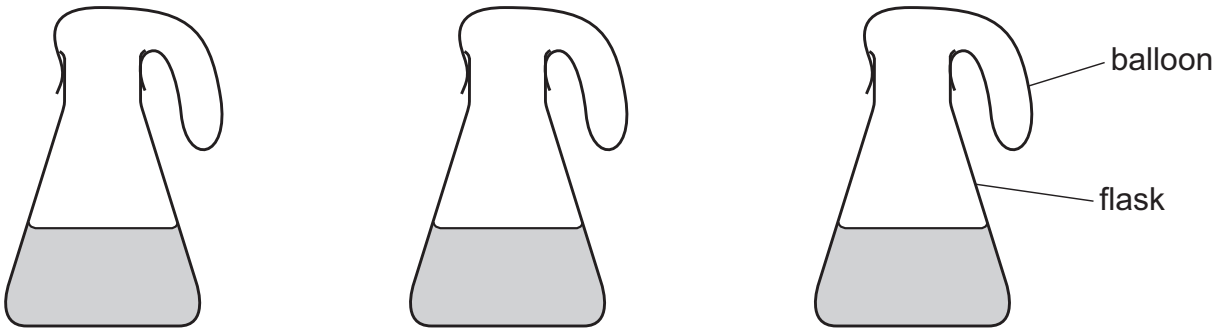
.....1..... + ...2..... → .....3..... + ...4…...

Which words correctly complete gaps 1–4?

	1	2	3	4
A	carbon dioxide	water	glucose	oxygen
B	glucose	carbon dioxide	oxygen	water
C	glucose	oxygen	carbon dioxide	water
D	oxygen	water	carbon dioxide	glucose

10. Question | 5090 Oct-Nov 2023 P1 V2 Q36

36 Three flasks were set up as shown at 35 °C. Each flask had a balloon attached to the top.



1	2	3
contains water, yeast and sugar	contains water and sugar	contains water and yeast

The amount of inflation of each balloon was recorded after one hour.

What is the correct order for the balloons from most to least inflated?

A $1 \rightarrow 3 \rightarrow 2$ **B** $1 \rightarrow 2 \rightarrow 3$ **C** $3 \rightarrow 1 \rightarrow 2$ **D** $3 \rightarrow 2 \rightarrow 1$

11. Question | 5090 Specimen 2023 P1 Q15

15 What are the products of aerobic respiration in animals and plants?

A carbon dioxide and glucose

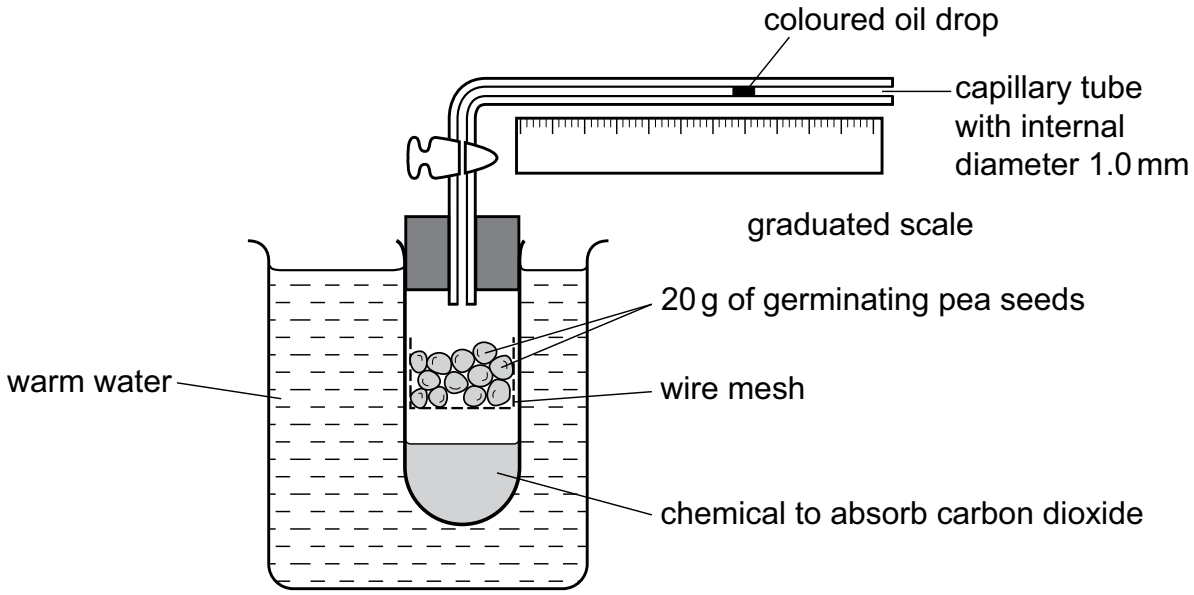
B carbon dioxide and water

C glucose and oxygen

D lactic acid

12. Question | 5090 Specimen 2023 P1 Q16

16 The diagram shows apparatus used to investigate the rate of respiration of germinating pea seeds.



In an experiment, the coloured oil drop moved 24 mm to the left in 30 minutes.

Calculate the rate of respiration of the pea seeds in:

mm^3 of oxygen, per gram of pea seeds, per minute.

Assume $\pi = 3.0$

A $0.03\,mm^3/g/min$

B $0.06\,mm^3/g/min$

C $0.12\,mm^3/g/min$

D $0.60\,mm^3/g/min$

13. Question | 5090 May-June 2024 P1 V1 Q15

15 Which equation represents anaerobic respiration in humans?

A glucose + carbon dioxide → lactic acid

B glucose → alcohol + carbon dioxide

C glucose → lactic acid

D glucose → lactic acid + carbon dioxide

14. Question | 5090 May-June 2024 P1 V2 Q15

15 What is produced during anaerobic respiration in muscles?

A alcohol, carbon dioxide and water

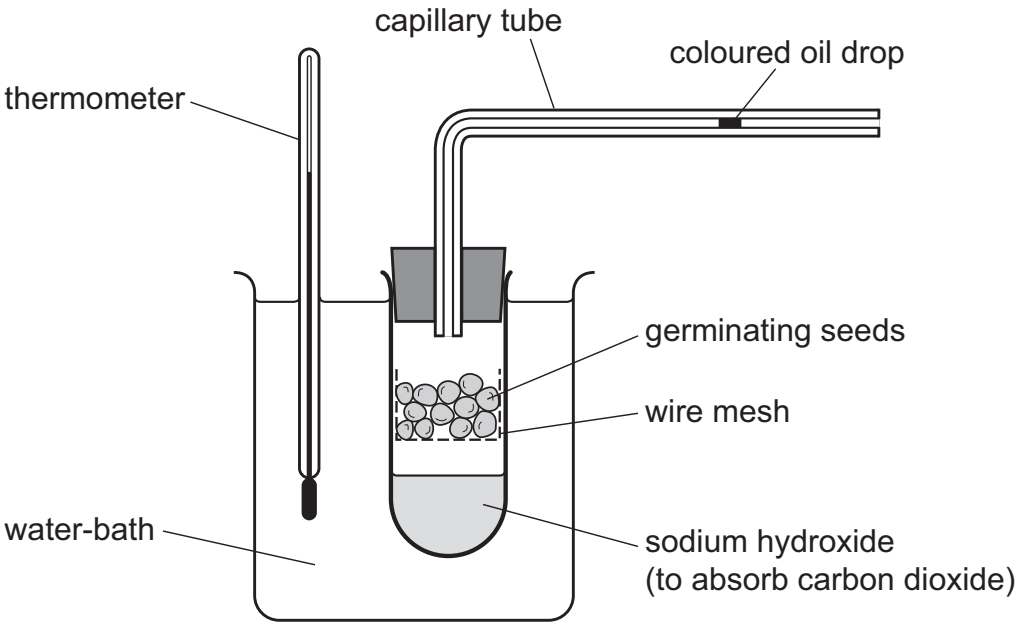
B carbon dioxide and lactic acid

C carbon dioxide only

D lactic acid only

15. Question | 5090 Oct-Nov 2024 P1 V2 Q15

15 The diagram shows how some apparatus is set up to investigate respiration in germinating seeds.



The coloured oil drop moves along the capillary tube.

What causes the movement of the coloured oil drop?

A carbon dioxide released

B heat released

C oxygen used

D water used

16. Question | 5090 May-June 2025 P1 V1 Q15

15 Which balanced chemical equation shows aerobic respiration?

A $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

B $C_6H_{12}O_6 \rightarrow 2C_3H_6O_3$

C $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

D $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

17. Question | 5090 May-June 2025 P1 V2 Q16

16 What is a feature of anaerobic respiration in humans?

A It requires oxygen.

B It produces carbon dioxide.

C It produces lactic acid.

D It releases more energy than aerobic respiration.

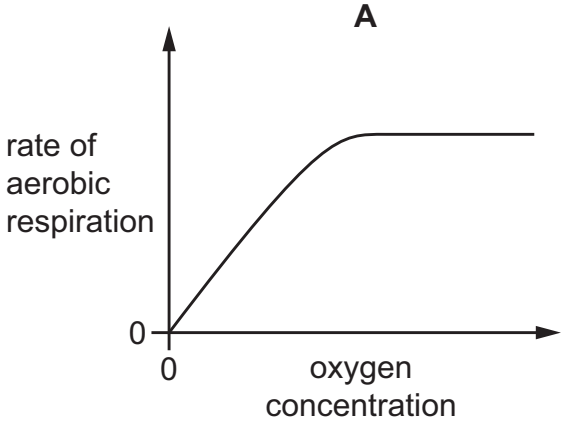
18. Question | 5090 May-June 2025 P1 V2 Q17

17 Yeast can respire aerobically or anaerobically.

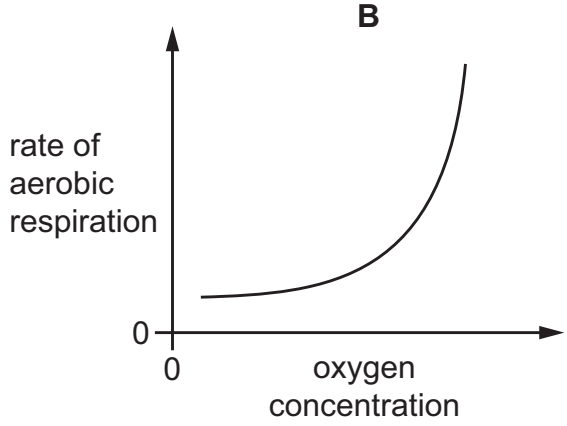
A student investigates the rate of aerobic respiration in yeast. The temperature is maintained at 35 °C and the oxygen concentration is varied.

Which graph would the student draw from their results?

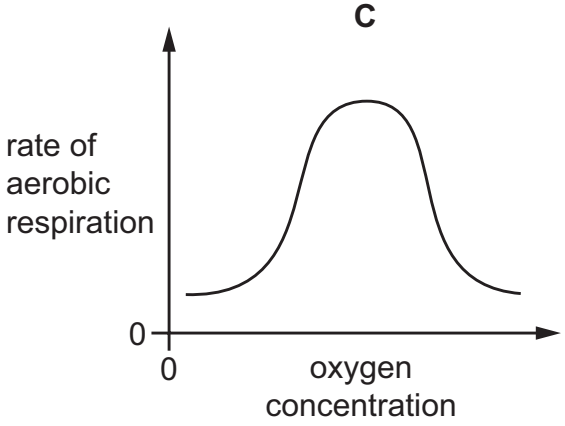
A



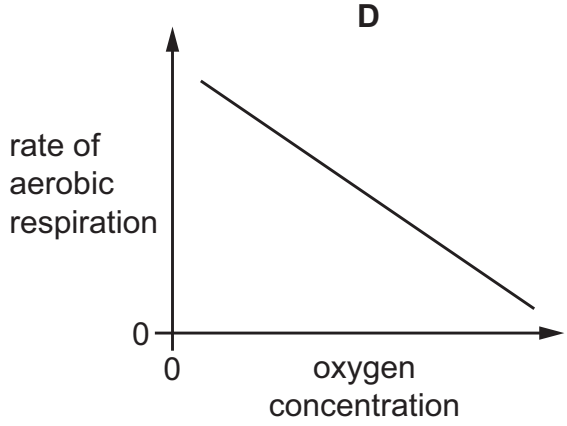
B



C



D



19. Question | 5090 Oct-Nov 2025 P1 V1 Q14

14 Which processes use energy obtained from respiration?

1 contraction of intercostal muscles during breathing

2 nitrate ions entering a root hair cell against the concentration gradient

3 oxygen moving from the lungs into blood capillaries

4 production of antibodies by lymphocytes

5 water entering a bacterial cell by osmosis

A 1, 2 and 3 **B** 1, 2 and 4 **C** 2, 3 and 4 **D** 3, 4 and 5

20. Question | 5090 Oct-Nov 2025 P1 V1 Q15

15 During vigorous exercise, lactic acid builds up in the muscles. Blood leaving these muscles will have a high concentration of lactic acid.

Which process removes **most** of the lactic acid from the blood?

A It is broken down in the liver.

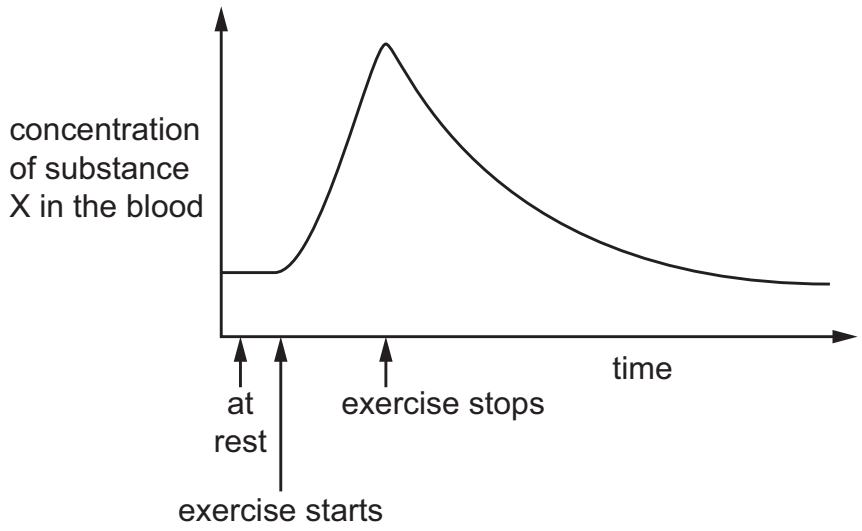
B It is excreted during sweating.

C It is expired during faster breathing.

D It is oxidised to release energy in muscles.

21. Question | 5090 Oct-Nov 2025 P1 V2 Q14

14 The graph shows the concentration of substance X in a person's blood before, during and after exercise.



What is substance X?

A alcohol

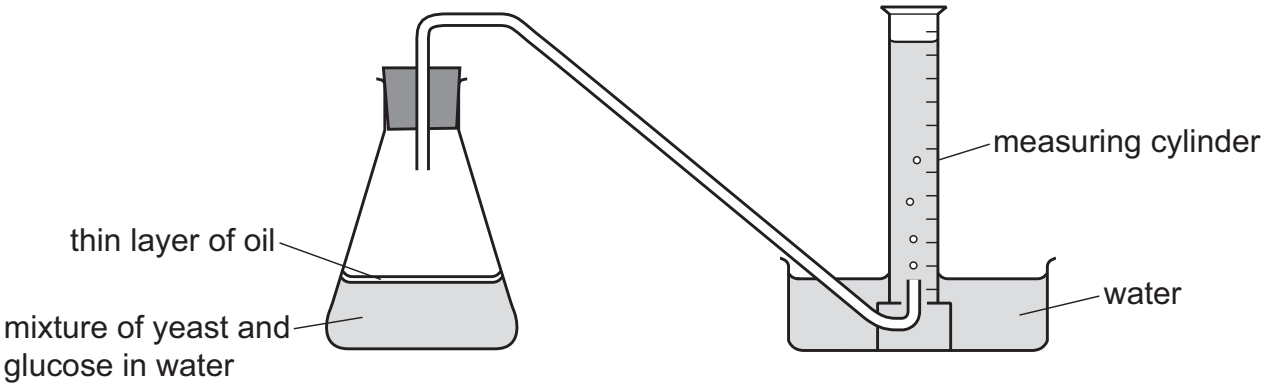
B glycogen

C lactic acid

D urea

22. Question | 5090 Oct-Nov 2025 P1 V2 Q15

15 The apparatus shown is used to investigate the volume of gas produced by yeast during anaerobic respiration.



Why is the yeast mixture covered with the thin layer of oil in this investigation?

A to provide energy for the yeast

B to prevent oxygen in the air from reaching the yeast

C to prevent heat loss from the mixture

D to prevent the yeast mixture from drying out

23. Question | 5090 Oct-Nov 2025 P1 V2 Q16

16 The equation shows aerobic respiration.

$$X + 6O_2 \rightarrow Y + 6CO_2 + \text{energy}$$

What do X and Y represent?

	X	Y
A	$6H_2O$	$C_6H_{12}O_6$
B	$C_6H_{12}O_6$	$6H_2O$
C	$C_{12}H_{22}O_{11}$	$11H_2O$
D	$C_6H_{12}O_6$	H_2O

5090 Biology Paper 1 - Respiration

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24. Question | 5090 Oct-Nov 2025 P1 V2 Q35

35 Bread is made from a mixture of flour, sugar, water and yeast.

The mixture is left in a warm place to allow it to rise before being baked.

Which process makes the bread rise?

A The yeast feeds on the flour and grows.

B The yeast reproduces to make the loaf bigger.

C The yeast uses sugar to respire and produces carbon dioxide.

D The yeast produces alcohol which it excretes.

25. Question | 5090 May-June 2026 P1 V1 Q17

17 Which equation shows the type of respiration that can cause an ‘oxygen debt’ in muscles during vigorous exercise?

A glucose + oxygen → carbon dioxide + water

B glucose → lactic acid + carbon dioxide + water

C glucose → ethanol + carbon dioxide

D glucose → lactic acid

26. Question | 5090 May-June 2026 P1 V2 Q14

14 A respirometer is used in experiments to measure the volume of oxygen used up.

The volumes of oxygen consumed are shown in the table.

respirometer	contents of respirometer	volume of oxygen used up in 30 minutes / cm^3
X	germinating pea seeds	2.4
Y	dead pea seeds	0.1
Z	glass beads	0.0

Why does respirometer X record the highest volume of oxygen used up?

A There are some microbes on the dead pea seeds.

B The pea seeds are carrying out photosynthesis.

C The pea seeds are respiring anaerobically.

D The pea seeds are respiring aerobically.

27. Question | 5090 May-June 2026 P1 V2 Q15

15 A student writes a chemical equation for aerobic respiration.

$$2C_3H_6O_3 + 6O_2 \rightarrow 6CO_2 + 6H_2O$$

What is wrong with the equation?

A The equation is **not** balanced.

B The formula for glucose is **not** correct.

C There are too many oxygen molecules.

D Water is a reactant **not** a product.