12. Respiration

12.3 Anaerobic respiration

Paper 1 and 2

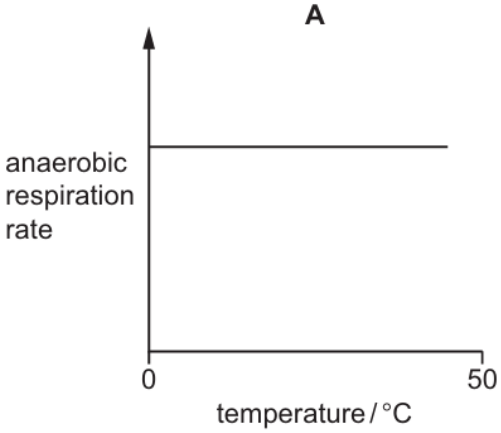
Question Paper

Paper 1

Questions are applicable for both core and extended candidates

1 Which graph shows how temperature affects the rate of anaerobic respiration in yeast?

A



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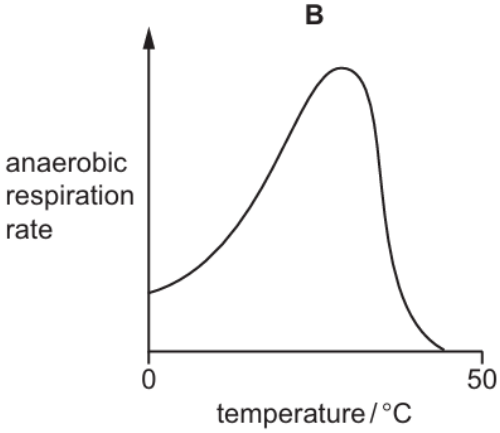

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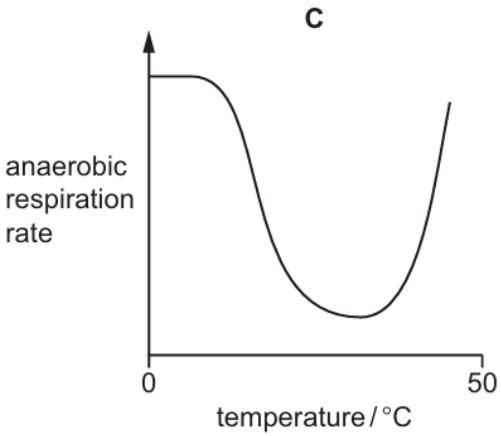

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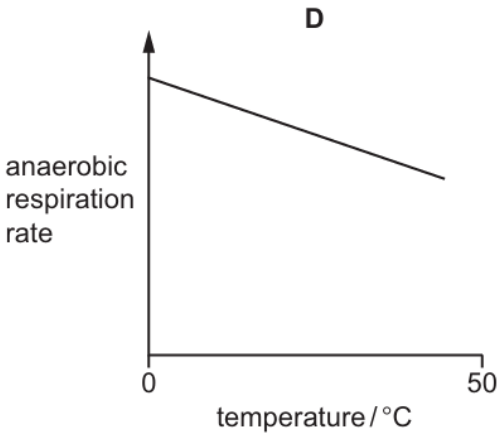


2 Which statement describes anaerobic respiration?

A Anaerobic respiration in humans produces lactic acid and carbon dioxide.

B Anaerobic respiration in yeast produces water and carbon dioxide.

C Anaerobic respiration releases energy from glucose without using oxygen.

D Anaerobic respiration releases more energy per glucose molecule than aerobic respiration.

3 Three statements about anaerobic respiration are listed.

1 In humans, the product is lactic acid.

2 In yeast, the product is lactic acid.

3 It releases more energy per glucose molecule than aerobic respiration.

Which statements are correct?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 only **D** 2 and 3 only

4 Yeast cells can convert glucose into alcohol and carbon dioxide.

Which statement about this process is correct?

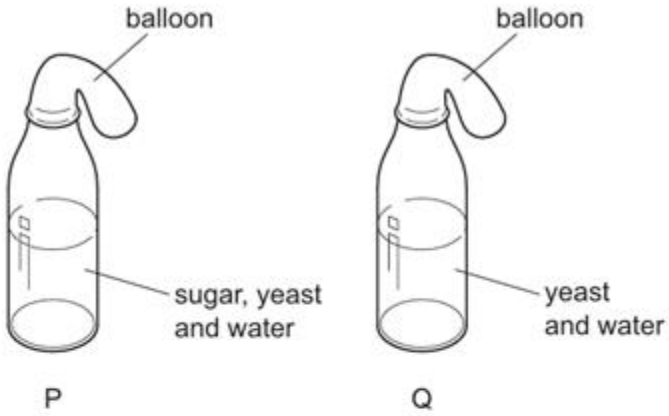
A The alcohol produced can be used to make bread rise.

B The carbon dioxide produced can be burnt as a biofuel.

C The yeast cells are using oxygen for this process.

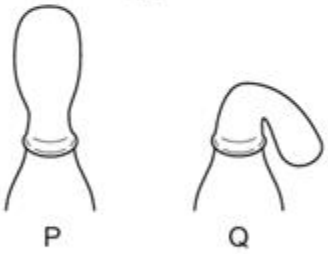
D The yeast cells are carrying out anaerobic respiration.

5 In an experiment to investigate anaerobic respiration, two bottles are set up in a warm room, as shown.



What would happen to each balloon after one day?

A



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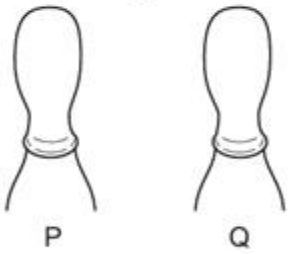

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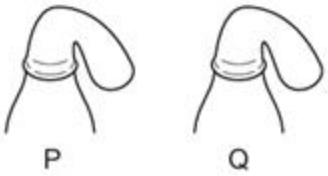

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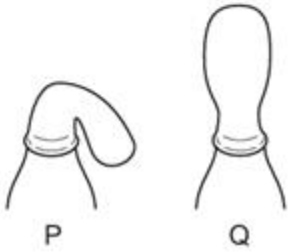


6 Which molecule is produced by anaerobic respiration in yeast?

A carbon dioxide

B lactic acid

C oxygen

D water

7 What is the word equation for anaerobic respiration in yeast?

A glucose → alcohol + carbon dioxide

B glucose → alcohol

C glucose → lactic acid + carbon dioxide

D glucose → lactic acid

8 Which row shows the products of anaerobic respiration in humans and yeast?

	products in humans	products in yeast
A	lactic acid only	alcohol only
B	lactic acid only	alcohol and carbon dioxide
C	lactic acid and carbon dioxide	alcohol only
D	lactic acid and carbon dioxide	alcohol and carbon dioxide

9 What is the word equation for anaerobic respiration in yeast?

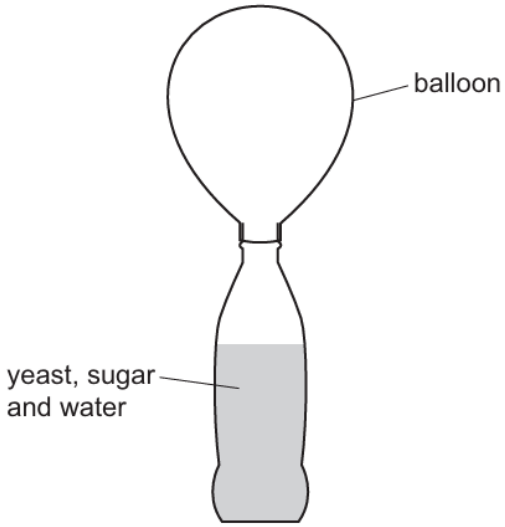
A glucose → alcohol

B glucose → alcohol + carbon dioxide

C glucose → lactic acid

D glucose → lactic acid + carbon dioxide

10 Some students placed yeast, sugar and water into a bottle. They then placed an empty balloon over the opening of the bottle. The bottle was left in a warm place for one hour. During this time the balloon increased in size.



Why does the balloon increase in size?

A The yeast makes alcohol.

B The yeast makes carbon dioxide.

C The yeast makes oxygen.

D The yeast makes lactic acid.

11 Yeast is an organism used in the production of biofuels.

Which statement describes why yeast is used for biofuel production?

A Yeast respires aerobically to produce carbon dioxide.

B Yeast respires aerobically to produce carbon dioxide and ethanol.

C Yeast respires anaerobically to produce carbon dioxide.

D Yeast respires anaerobically to produce carbon dioxide and ethanol.

12 What is produced by anaerobic respiration in humans?

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

key
✓ = yes
✗ = no

13 What are the products of anaerobic respiration in yeast?

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

key
✓ = yes
✗ = no

14 What is produced during anaerobic respiration in muscles?

A carbon dioxide

B ethanol

C lactic acid

D water

15 Yeast is placed inside a container full of a glucose solution with no air.

Which word equation summarises the process that takes place inside the container?

A glucose → ethanol + carbon dioxide

B glucose → lactic acid

C glucose + oxygen → carbon dioxide + water

D glucose + oxygen → ethanol

16 What is produced by anaerobic respiration in mammals?

A alcohol + carbon dioxide

B alcohol + oxygen

C lactic acid + carbon dioxide

D lactic acid

17 Which row describes anaerobic respiration?

	energy released	oxygen required	waste products
A	a little	no	lactic acid
B	a little	yes	carbon dioxide and water
C	a lot	no	lactic acid
D	a lot	yes	carbon dioxide and water

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

18 Vigorous exercise can cause an oxygen debt.

Which process removes the oxygen debt? **(extended only)**

A aerobic respiration of lactic acid in the liver

B a decrease in breathing rate

C a decrease in heart rate

D an increase in blood supply to the skin

19 A student investigates the rate of anaerobic respiration in yeast.

The total volume of carbon dioxide produced is measured every 10 minutes for 40 minutes. The table shows the results.

time / minutes	total volume of carbon dioxide produced / cm^3
0	6
10	30
20	37
30	40
40	41

Between which times is the rate of anaerobic respiration fastest?

A 0–10 minutes

B 10–20 minutes

C 20–30 minutes

D 30–40 minutes

20 Three statements about anaerobic respiration are listed.

1 In humans, the product is lactic acid.

2 In yeast, the product is lactic acid.

3 It releases more energy per glucose molecule than aerobic respiration.

Which statements are correct?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 only **D** 2 and 3 only

21 What is the balanced chemical equation for a type of respiration that occurs in yeast? **(extended only)**

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

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

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

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

22 Yeast cells can convert glucose into alcohol and carbon dioxide.

Which statement about this process is correct?

A The alcohol produced can be used to make bread rise.

B The carbon dioxide produced can be burnt as a biofuel.

C The yeast cells are using oxygen for this process.

D The yeast cells are carrying out anaerobic respiration.

23 What is the correct balanced equation for one type of respiration? **(extended only)**

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

B $2C_2H_5OH \rightarrow C_6H_{12}O_6 + 2H_2O$

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

D $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2H_2O$

24 In the chemical equation for anaerobic respiration in yeast, the numbers have been replaced by the letters W, X, Y and Z.

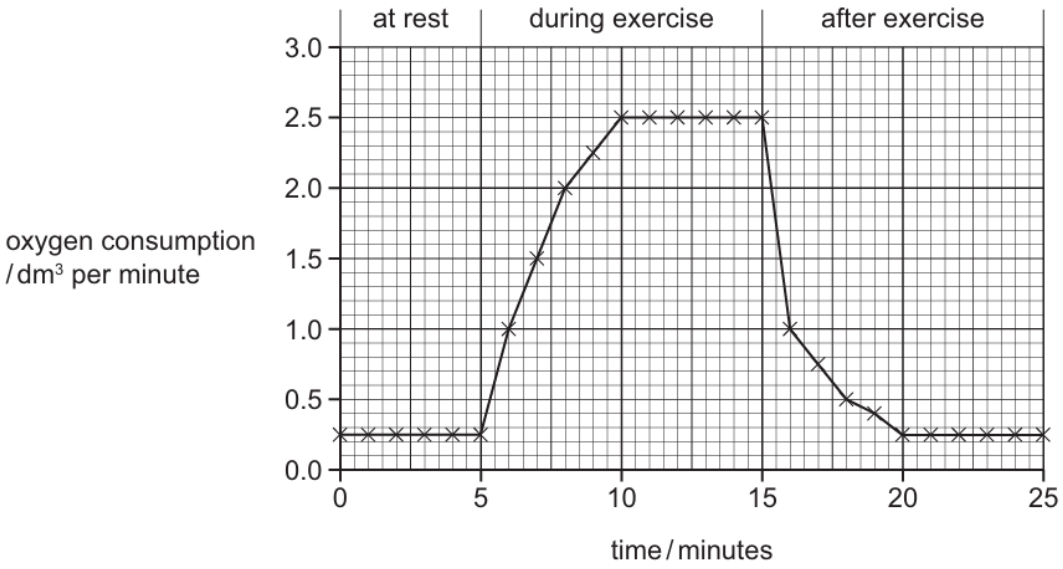
$$C_WH_XO_W \rightarrow YC_YH_ZOH + YCO_Y$$

Which number is Z? **(extended only)**

A 2 **B** 5 **C** 6 **D** 12

25 A student measured their oxygen consumption before, during and after exercise.

The results are shown in the graph.



At which time is the oxygen debt being removed? **(extended only)**

A 5–10 minutes

B 5–15 minutes

C 15–20 minutes

D 20–25 minutes

26 In which organ is lactic acid respired aerobically to remove an oxygen debt? **(extended only)**

A brain

B heart

C liver

D lungs

27 Which statement about lactic acid is correct? **(extended only)**

A Lactic acid is a product of anaerobic respiration in yeast.

B Lactic acid build-up in tissues can lead to an oxygen debt.

C Lactic acid is produced from sucrose during anaerobic respiration.

D Lactic acid is transported from the liver to the muscles after exercise.

28 After vigorous exercise, an athlete continues to breathe deeply during the recovery period.

During this recovery period the oxygen debt is removed.

Which reaction is used to remove the oxygen debt? **(extended only)**

A aerobic respiration of lactic acid in the liver

B aerobic respiration of lactic acid in the muscles

C anaerobic respiration of lactic acid in the liver

D anaerobic respiration of lactic acid in the muscles

29 What is produced during anaerobic respiration in muscles?

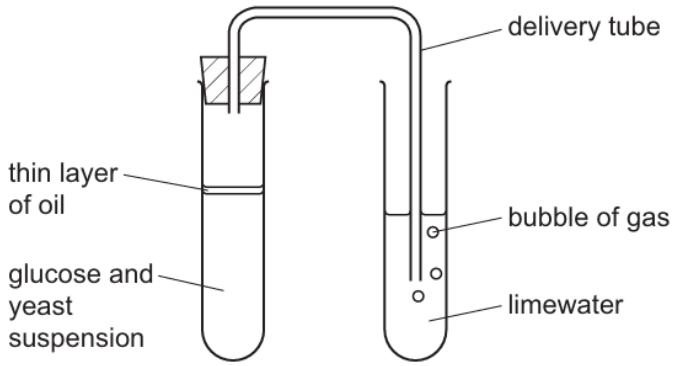
A carbon dioxide

B ethanol

C lactic acid

D water

30 The diagram shows an experiment to investigate the respiration of yeast. Oil prevents oxygen entering the glucose and yeast suspension.



If **no** oxygen is present in the glucose and yeast suspension, what will occur?

A Ethanol will be produced and the limewater will stay clear.

B Ethanol will be produced and the limewater will go cloudy.

C Lactic acid will be produced and the limewater will stay clear.

D Lactic acid will be produced and the limewater will go cloudy.

31 The formula C_2H_5OH represents a chemical produced during anaerobic respiration.

What is this chemical? **(extended only)**

A alcohol

B glucose

C glycogen

D lactic acid

32 Which statement about both aerobic and anaerobic respiration is correct? **(extended only)**

A They break down $C_6H_{12}O_6$.

B They produce an oxygen debt.

C They use CO_2.

D They use O_2.

33 What is produced by anaerobic respiration in mammals?

A alcohol + carbon dioxide

B alcohol + oxygen

C lactic acid + carbon dioxide

D lactic acid