

Past-paper walk-through

Anaerobic respiration ■ 12.3

eXercise

Questions in this set

- 0610/21 N25 Q19 ■ 1 mark
- 0610/22 N25 Q17 ■ 1 mark
- 0610/42 N25 Q6 ■ 12 marks
- 0610/22 J25 Q22 ■ 1 mark
- 0610/23 J25 Q20 ■ 1 mark
- 0610/22 M25 Q19 ■ 1 mark

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 19

0610/21 N25 ■ Q19 ■ 1 mark

19 What is produced by anaerobic respiration in human muscles?

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

key

✓ = substance is produced

✗ = substance is **not** produced

Solution 19

Answer: **C**

Why

- In human muscle, anaerobic respiration converts glucose into lactic acid only.
- No carbon dioxide and no water are produced – that is the yeast pathway and the aerobic pathway respectively.
- So lactic acid is the only product listed that is formed.

Question 17

0610/22 N25 ■ Q17 ■ 1 mark

17 A person exercised vigorously for one minute and then rested for one hour.

Which statements about lactic acid are correct?

- 1 During exercise, lactic acid is produced in the muscles and diffuses into the blood.
- 2 The blood transports lactic acid to the liver.
- 3 Lactic acid is broken down by anaerobic respiration.

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

Solution 17

Answer: **B**

Why

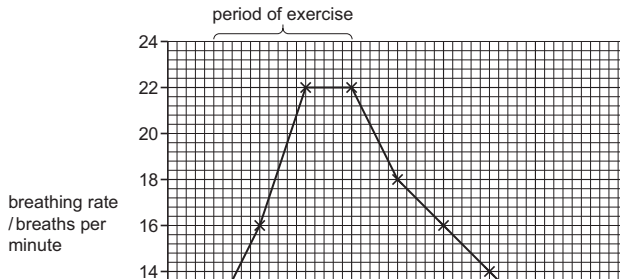
- Lactic acid is produced in the muscles during vigorous exercise, when oxygen runs short.
- It is then carried in the blood to the liver.
- There it is broken down using the oxygen taken in during the recovery period.

Question 6

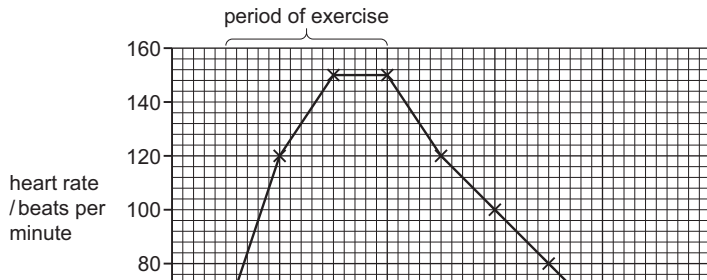
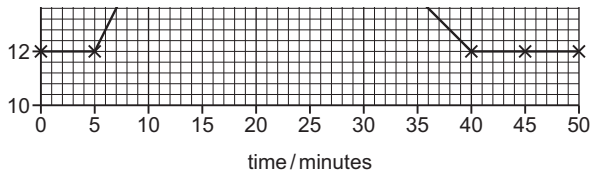
0610/42 N25 ■ Q6 ■ 12 marks

- 6 (a) An athlete monitored their heart rate and breathing rate before, during and after vigorous exercise.

Fig. 6.1 shows the results.



Question 6



Question 6

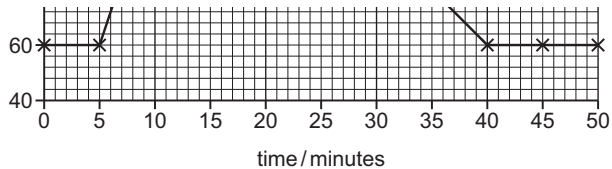


Fig. 6.1

Complete the sentences to describe **and** explain the results shown in Fig. 6.1.

Question 6

return to its resting rate.

Question 6

40 minutes.

The heart rate and breathing rate do not immediately return to their resting rates because anaerobic respiration has occurred.

Question 6

[7]

- (b)** The carbon dioxide produced during exercise is excreted. Urea is another substance that is excreted.
- (i)** State the name of the organ that produces urea.

Question 6

- (ii) State the name of the organ that excretes urea.

Question 6

(c) State the balanced chemical equation for anaerobic respiration in yeast.

Question 6

(d) State **one** food product that is made using anaerobic respiration in yeast.

Question 6

[Total: 12]

Solution 6

(a) Mark scheme

- 20 ;
- 90 ;
- muscles / blood ;
- debt ;
- liver ;
- oxygen ;
- aerobic ;
- 7

Solution 6

(b)(i)

Mark scheme

- liver ;
- 1

(b)(ii)

Mark scheme

- kidney ;
- 1

Solution 6

(c)

Mark scheme

- $\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow$;
- $2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$;
- 2
- products in either order

Solution 6

(d)

Mark scheme

- bread / AVP ;
- 1

Question 22

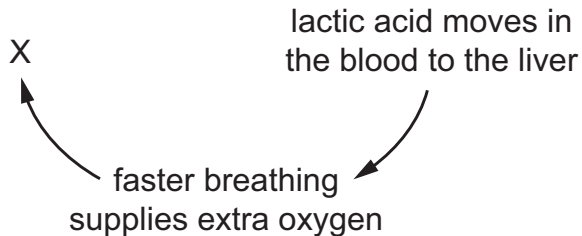
0610/22 J25 ■ Q22 ■ 1 mark

22 After a race, athletes experience oxygen debt.

The diagram shows how the oxygen debt is removed.

lactic acid forms
in the muscles





What happens at X?

- A** aerobic respiration of glucose
- B** aerobic respiration of lactic acid

- C** anaerobic respiration of glucose
- D** anaerobic respiration of lactic acid

Solution 22

Answer: **B**

Why

- Vigorous exercise makes the muscles respire anaerobically, producing lactic acid.
- The lactic acid is carried in the blood to the liver.
- Faster, deeper breathing supplies the extra oxygen needed to break it down there.

Question 20

0610/23 J25 ■ Q20 ■ 1 mark

20 Which sequence of statements explains the build-up and removal of an oxygen debt?

- 1 Anaerobic respiration occurs in muscles during vigorous exercise.
- 2 Faster and deeper breathing continues after exercise.
- 3 Glucose is converted to lactic acid.
- 4 Lactic acid builds up in muscles causing an oxygen debt.
- 5 Oxygen enables the continued aerobic respiration of lactic acid.

A 1 → 3 → 4 → 2 → 5

B 1 → 3 → 2 → 4 → 5

Question 20

C $3 \rightarrow 4 \rightarrow 5 \rightarrow 1 \rightarrow 2$

D $3 \rightarrow 4 \rightarrow 1 \rightarrow 5 \rightarrow 2$

Solution 20

Answer: **A**

Why

- Vigorous exercise outstrips the oxygen supply, so muscles respire anaerobically and make lactic acid.
- That creates the oxygen debt – the oxygen still needed to deal with the lactic acid.
- Faster, deeper breathing afterwards supplies that oxygen, so the lactic acid can be broken down.

Question 19

0610/22 M25 ■ Q19 ■ 1 mark

19 Yeast can respire aerobically and anaerobically.

For each molecule of glucose used in yeast, how many more molecules of carbon dioxide gas are produced by aerobic respiration compared with anaerobic respiration?

- A** 1 more
- B** 2 more
- C** 4 more
- D** 6 more

Solution 19

Answer: **C**

Why

- Aerobic respiration of one glucose gives six molecules of carbon dioxide.
- Anaerobic respiration in yeast gives only two, plus ethanol.
- So aerobic respiration produces $6 - 2 = 4$ more.