1.6 Short-Term Effects of Exercise on the Body Systems: Test Pack

AQA 8582 · Calculators not allowed · about 15 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 What happens to heart rate during a single session of exercise, compared with the resting value immediately beforehand?

- ☐ A) It decreases
- ☐ B) It increases
- ☐ C) It stays exactly the same
- ☐ D) It stops responding to exercise

(Total for Question 1 is 1 mark)

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2 A footballer waiting in the tunnel before kickoff notices their heart rate rising, even though they have not yet started moving.

(a) Name this rise in heart rate that occurs before exercise begins. **(1)**

(b) Explain the mechanism that causes this rise. **(2)**

(Total for Question 2 is 3 marks)

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3 Suggest one way in which the short-term respiratory response to a 100 m sprint is likely to differ from the short-term respiratory response during a marathon, in terms of how quickly breathing rate rises.

(Total for Question 3 is 2 marks)

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4 Table 4 shows the breathing of a swimmer at rest and during a hard interval set. Minute ventilation is the volume of air breathed in during one minute.

Table 4

Measurement	At rest	Hard interval set
Breathing rate (breaths per minute)	12	30
Tidal volume (ml)	500	2,000

(a) Calculate the swimmer's minute ventilation during the hard interval set. Give your answer in ml per minute. **(2)**

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(b) Calculate how many times greater the swimmer's minute ventilation is during the hard interval set than at rest. **(2)**

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(Total for Question 4 is 4 marks)

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5 A sprinter's heart rate begins to rise while they are still standing in the blocks, before the starting gun has fired. Explain why the sprinter's heart rate rises before exercise begins.

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(Total for Question 5 is 2 marks)

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6 A swimmer's breathing rate and depth both increase noticeably during a hard interval set. Explain how this short-term change increases the amount of oxygen taken into the body each minute.

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(Total for Question 6 is 2 marks)

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Mark scheme · 1.6 Short-Term Effects of Exercise on the Body Systems: Test Pack

Question 1

B (it increases) **B1**

Answer: B (it increases)

Question 2

(a) anticipatory rise (in heart rate) **B1**

(a) Answer: Anticipatory rise

(b) the nervous system responds to the footballer's nerves/excitement about the upcoming match, oe **B1**

(b) by releasing adrenaline, a hormone which increases heart rate even though the footballer's muscles are not yet working any harder, oe **B1**

(b) Answer: The nervous system responds to the footballer's nerves and excitement about the upcoming match by releasing the hormone adrenaline, which increases heart rate even though their muscles are not yet working any harder.

Question 3

in a 100 m sprint, breathing rate has very little time to rise significantly at all before the race is already over, oe **B1**

whereas in a marathon, breathing rate rises early on and is then sustained at an elevated level throughout the much longer race, allowing the aerobic system time to respond, oe **B1**

Answer: In a 100 m sprint, there is very little time for breathing rate to rise significantly before the race is already over; in a marathon, breathing rate rises early on and is then sustained at an elevated level throughout the much longer race, giving the aerobic system time to respond.

Question 4

(a) breathing rate x tidal volume, e.g. 30 x 2000 **M1**

(a) 60000 (ml per minute) cao; accept 60 litres per minute **A1**

(a) Answer: 60000 ml per minute

(b) minute ventilation at rest found, i.e. 12 x 500 = 6000 (ml per minute), or the two ratios multiplied, i.e. (30 / 12) x (2000 / 500), oe **M1**

(b) 10 (times greater) cao **A1**

(b) Answer: 10 times greater

Question 5

this is called the anticipatory rise in heart rate, oe **B1**

it happens because the nervous system releases adrenaline in response to nerves/excitement about the upcoming race, which increases heart rate before exercise has even begun, oe **B1**

Answer: This is called the anticipatory rise in heart rate; it happens because the nervous system releases adrenaline in response to nerves and excitement about the upcoming race, raising heart rate before exercise has even begun.

Question 6

a greater depth of breathing (tidal volume) means more air, and so more oxygen, enters the lungs with each breath, oe **B1**

a faster breathing rate means this happens more often each minute, so overall more oxygen reaches the lungs (and diffuses into the blood) per minute, oe **B1**

Answer: A greater depth of breathing means more air (and oxygen) enters the lungs with each breath, and a faster breathing rate means this happens more often each minute, so overall more oxygen reaches the lungs and diffuses into the blood every minute.

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