1.6 Short-Term Effects of Exercise on the Body Systems: 10-minute Pack

AQA 8582 · Calculators not allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A netball player takes part in a fast-paced 60-minute match, involving repeated sprinting, jumping and sudden changes of direction.

Evaluate how the short-term effects of exercise on the cardiovascular, respiratory and muscular systems work together to help the player meet the physical demands of the match.

(Total for Question 1 is 6 marks)

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2 Table 1 lists short-term effects of exercise, with the body system it mainly affects missing.

Table 1

Part	Short-term effect of exercise
(a)	An increase in heart rate and stroke volume
(b)	An increase in breathing rate and tidal volume
(c)	A build-up of lactic acid

(a) Name the body system mainly affected by the change described in row (a) of Table 1. **(1)**

(b) Name the body system mainly affected by the change described in row (b) of Table 1. **(1)**

(c) Name the body system mainly affected by the change described in row (c) of Table 1. **(1)**

(Total for Question 2 is 3 marks)

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3 A gymnast feels sore leg muscles two days after an intense competition, a condition often called delayed onset muscle soreness (DOMS).

(a) State approximately when DOMS is typically felt after unaccustomed or intense exercise. **(1)**

(b) State the current understanding of what causes DOMS. **(1)**

(Total for Question 3 is 2 marks)

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Mark scheme · 1.6 Short-Term Effects of Exercise on the Body Systems: 10-minute Pack

Question 1

Level 3 A detailed and coherent evaluation that explains at least three short-term effects across different body systems (e.g. increased heart rate/stroke volume, increased breathing rate/depth, vascular shunt, increased muscle temperature, lactic acid build-up) and clearly links each to how it helps meet the demands of the match, using accurate terminology throughout. **5-6**

Level 2 At least two short-term effects are explained with reasonable accuracy, with some link made to the demands of the match, but the evaluation may be underdeveloped. **3-4**

Level 1 One or two relevant points about short-term effects of exercise are made, with little explanation or clear link to the match. **1-2**

Level 0 No relevant content. **0**

Indicative content:

- Heart rate and stroke volume both increase, raising cardiac output so more oxygenated blood is delivered to the working muscles each minute.
- Breathing rate and tidal volume both increase, moving more air (and so more oxygen) into the lungs each minute to keep pace with the muscles' oxygen demand.
- Blood flow is redistributed (vascular shunt): vasodilation increases blood flow to the working muscles, while vasoconstriction reduces blood flow to organs less essential during exercise, such as the digestive system.
- Muscle temperature rises, speeding up the chemical reactions that release energy and increasing the elasticity of the muscles, helping with the sudden accelerations and direction changes needed in netball.
- During the most intense bursts (sprints, jumps), lactic acid builds up in the muscles from the lactic acid system, contributing to fatigue that the player must manage between less intense passages of play.
- A balanced evaluation might conclude that these short-term effects work together as an interconnected system: the cardiovascular and respiratory changes work to delay the point at which the muscular system must rely heavily on anaerobic energy and lactic acid build-up, but during the match's most intense moments some build-up is unavoidable and must be managed through brief lower-intensity recovery periods.

Question 2

(a) cardiovascular system **B1**

(a) Answer: Cardiovascular system

(b) respiratory system **B1**

(b) Answer: Respiratory system

(c) muscular system **B1**

(c) Answer: Muscular system

Question 3

(a) around 24 to 72 hours (one to three days) after exercise, oe **B1**

(a) Answer: Around 24 to 72 hours (one to three days) after exercise.

(b) microscopic damage to the muscle fibres/tissue during unaccustomed or intense exercise, leading to inflammation and soreness (NOT simply lactic acid remaining in the muscle), oe **B1**

(b) Answer: Microscopic damage to the muscle fibres during unaccustomed or intense exercise, leading to inflammation and soreness (not, as is commonly and incorrectly believed, lactic acid remaining in the muscle).

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