OCR
Oxford Cambridge and RSA

Tuesday 14 May 2024 – Morning

AS Level Physical Education

H155/01 Physiological factors affecting performance

Time allowed: 1 hour 15 minutes

You can use:
- a calculator

H155O1

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

INSTRUCTIONS
- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.

INFORMATION
- The total mark for this paper is **70**.
- The marks for each question are shown in brackets **[ ]**.
- Quality of extended response will be assessed in questions marked with an asterisk (*).
- This document has **16** pages.

ADVICE
- Read each question carefully before you start your answer.

Section A

1

(a) The images show an athlete throwing a discus with their right hand.

Complete the table to analyse the movement at the right shoulder and right hip during the discus throw.

Joint	Movement	Agonist muscle	Antagonist muscle	Type of contraction
Shoulder				Concentric
Hip	Medial rotation			

[6]

(b) Give **two** structural and **two** functional characteristics of fast oxidative glycolytic muscle fibres.

Structural characteristics:

1 .....

2 .....

Functional characteristics:

1 .....

2 .....

[4]

(c) Explain how the conduction system of the heart controls the systolic phase of the cardiac cycle.

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..... **[5]**

(d) Analyse the effect of recovery on gas exchange at the muscles after exercise.

In your answer refer to the changes in the pressure gradients and the changes in the dissociation of oxyhaemoglobin.

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2

(a) Individuals may choose to use ergogenic aids to enhance their performance.

Explain the use of pharmacological aids to benefit the performance of a weightlifter.

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(b)

(i) "The ability to produce a maximal amount of force in one or a series of rapid muscular contractions."

Put a tick (✓) in the box next to the type of strength defined above.

A Explosive strength ☐

B Maximum strength ☐

C Static strength ☐

D Strength endurance ☐

[1]

(ii) Which **one** of the following is a long-term adaptation from maximum strength training?

Put a tick (✓) in the box next to the correct answer.

A Increased aerobic enzyme production. ☐

B Reduced bone density. ☐

C The stretch reflex occurs more readily in the antagonist. ☐

D Tolerance of lactic acid increases. ☐

[1]

(iii) Describe a training session to improve the most appropriate type of strength for a high jumper.

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(c)

(i) Explain **one** benefit of good hip flexibility for a performer in a sport of your choice.

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(ii) Describe the use of a goniometer to measure flexibility.

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..... **[3]**

(d) Periodisation is the organisation of training into specific blocks or phases.

Complete the table to show your knowledge of the periodisation of training.

Periodisation term	Description
Preparatory phase	
	Fitness is maintained; focus is on tactics and strategies.
Tapering	
	Active rest and recuperation.

[4]

3

(a) Apply Newton's **three** laws of motion to the example of a footballer taking a penalty kick.

First Law: .....

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Second Law: .....

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Third Law: .....

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[6]

(b) Describe what each of the following terms means.

Weight: .....

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Reaction: .....

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Friction: .....

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Air resistance: .....

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[4]

(c) An elite sprinter has a mass of 80 kg. During the first 3 seconds of the race they have an average acceleration of 2.25 m/s^2.

(i) Calculate the net force acting on the sprinter in Newtons.

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..... **[2]**

(ii) The sprinter's average velocity is 6.75 m/s for the first 3 seconds of the race.

Calculate the sprinter's average momentum for this time and include appropriate units.

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(d) Discuss the benefits of the use of limb kinematics and wind tunnels to optimise performance in sport.

Limb kinematics .....

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Wind tunnels .....

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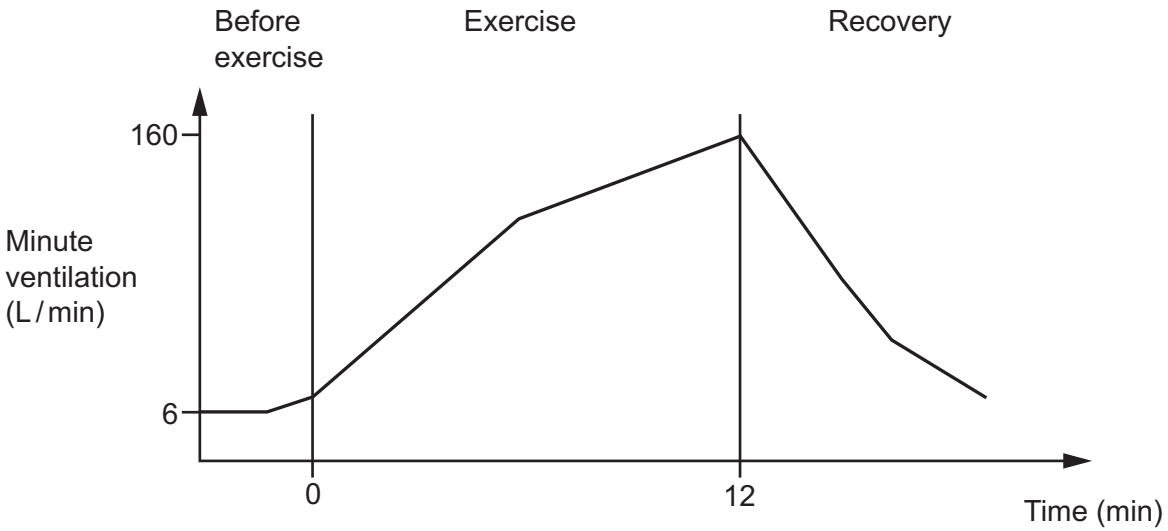
Section B

4* The graph shows the minute ventilation of a performer with high aerobic capacity completing and recovering from a multistage fitness test.



Use your knowledge of the regulation of breathing to explain the changes in the performer's minute ventilation shown in the graph.

Evaluate both continuous training and high intensity interval training (HIIT) as methods used to improve aerobic capacity for games players. **[10]**

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END OF QUESTION PAPER

EXTRA ANSWER SPACE

If you need extra space use these lined pages. You must write the question numbers clearly in the margin.