

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
AS LEVEL**

H155/01

PHYSICAL EDUCATION

**Physiological factors affecting
performance**

TUESDAY 23 MAY 2017: Morning

**TIME ALLOWED: 1 hour 15 minutes
plus your additional time allowance**

MODIFIED ENLARGED

First name		Last name	
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Centre number						Candidate number				
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YOU MAY USE:

A scientific or graphical calculator

READ INSTRUCTIONS OVERLEAF



INSTRUCTIONS

Use black ink. HB pencil may be used for graphs and diagrams only.

Answer ALL the questions.

Complete the boxes on the first page with your name, centre number and candidate number.

Read each question carefully. Make sure you know what you have to do before starting your answer.

Write your answer to each question in the space provided. If additional space is required, use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.

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 the question marked with an asterisk (*).

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SECTION A

Answer ALL the questions.

- 1 (a) FIG. 1.1 shows an acrobatic movement in gymnastics.

FIG. 1.1



- (i) Complete the table below to identify the movement and agonist muscle at the left and right hip during this skill. [4]

	Movement	Agonist
Left hip		
Right hip		

- (ii) FIG. 1.2 shows a discus thrower in action.

FIG. 1.2



Identify the predominant muscle fibre type used by the discus thrower to achieve maximum distance.

_____ [1]

- (iii) **Explain how the function of this fibre type suits the performance of a discus throw.**

_____ [2]

(b) (i) Describe the nervous stimulation of a motor unit.

[2]

(ii) Describe the frontal and sagittal planes of movement and give a sporting example for each.

Frontal

Sagittal

[4]

(c) Explain the cardiac cycle of the heart using the following key terms:

Atrial systole

Ventricular systole

Diastole

[3]

(d) An athlete has a tidal volume of 0.5 litres and a breathing frequency of 12 breaths per minute.

(i) Calculate the athlete's minute ventilation using these values. Show your workings.

[2]

(ii) During a 5000 metre race, the athlete's tidal volume increases. Explain how neural control of breathing causes this to happen.

[2]

- 2 (a) Describe intermittent hypoxic training (IHT). Outline ONE benefit and ONE risk of intermittent hypoxic training.**

[4]

(b) An elite marathon runner will have a very high VO_2 max.

(i) Describe how age and gender can affect VO_2 max.

[2]

(ii) Evaluate the importance of a high VO_2 max for an elite footballer.

[3]

(c) A gymnast is encouraged to follow a healthy, balanced diet by his coach.

(i) Explain how carbohydrates, vitamins and fibre in the gymnast's diet support training and performance.

[3]

(ii) Assess the possible long term effects on the gymnast if he regularly follows a diet that is high in fat and low in proteins.

[2]

- (d) The three phases of training are named below. Outline what is meant by each phase, and, using sporting examples, describe a specific objective for each phase.

Preparatory _____

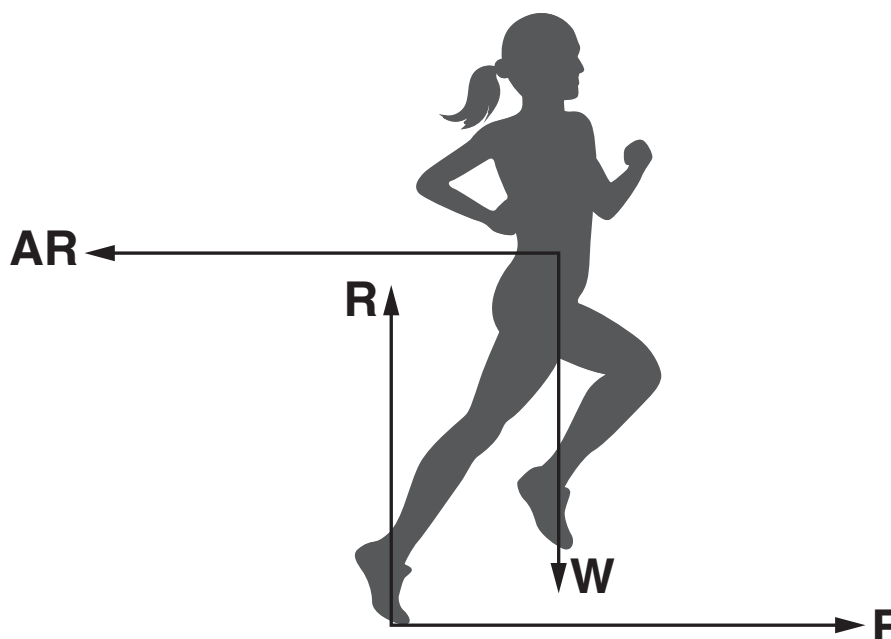
Competitive _____

Transition _____

[6]

- 3 FIG. 3.1 shows a diagram of a middle distance runner in motion.

FIG. 3.1



- (a) (i) Which one of the following is true?

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

A. The sprinter is accelerating.

☐

B. The sprinter is at constant velocity.

☐

C. The sprinter is decelerating.

☐

D. The motion of the sprinter cannot be identified.

☐

[1]

(ii) Give ONE reason for your answer in (i).

_____ [1]

(b) State which of Newton's laws of motion is most applicable to each of the following statements.

(i) The long jumper who produces the greatest muscular force will have the greatest change in momentum.

_____ [1]

(ii) A sprinter at rest in the blocks must apply a large enough force to the blocks to overcome their weight.

_____ [1]

(iii) A speed skater achieves constant velocity as they travel round the track.

_____ [1]

(c) A sprinter generates momentum. They have a mass of 70 kg and run at a velocity of 10 m/s.

(i) Define and calculate the sprinter's momentum, showing your workings.

[3]

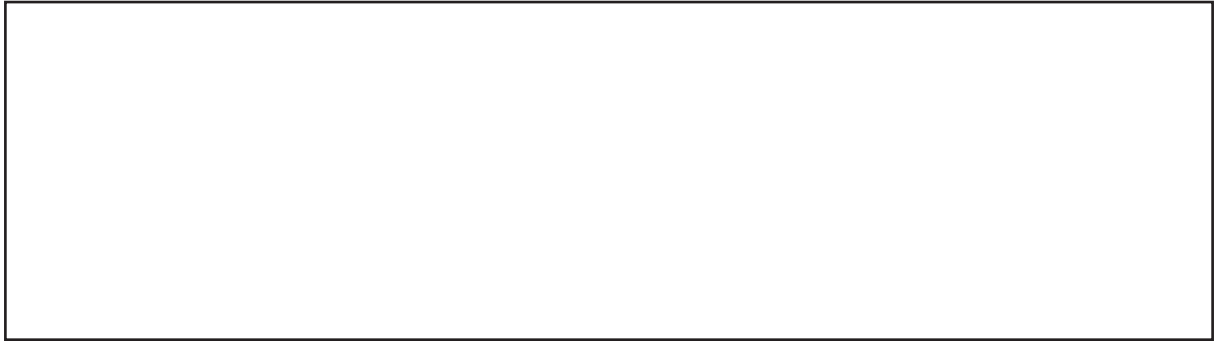
(ii) At what velocity must a 100 kg athlete run to have the same momentum as calculated above?

[1]

(d) Describe how the force of weight acts on a sporting body. Using examples from sport explain THREE factors affecting air resistance.

[5]

- (e) (i) Sketch a second class lever system in the box below, and identify the effort arm and load arm. [3]**



- (ii) Describe a sporting example of a second class lever system in the human body.**

_____ **[1]**

- (iii) Explain why a second class lever has a mechanical advantage.**

_____ **[2]**

SECTION B

- 4* Jogging is a very popular aerobic sporting activity as part of a healthy lifestyle.

Explain the immediate effects of jogging on the vascular system, and evaluate the impact of regular training on lifestyle diseases of the cardiovascular system. [10]

This image shows a full page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for writing or drawing. There are no margins, text, or other markings on the page.

[illegible]

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).

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