



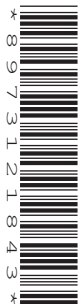
Oxford Cambridge and RSA

Thursday 26 May 2022 – Afternoon

A Level Physical Education

H555/01 Physiological factors affecting performance

Time allowed: 2 hours



You can use:

- a calculator



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

Centre number

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Candidate number

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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 **90**.
- 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 **20** pages.

ADVICE

- Read each question carefully before you start your answer.

SECTION A

Answer **all** the questions.

1 Explain how the conduction system of the heart controls diastole.

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..... [2]

2 Identify the processes that occur during the fast component of excess post exercise oxygen consumption (EPOC).

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..... [2]

3 Performers compare energy expenditure to energy intake to manage body weight.

Describe **two** factors that performers use to work out their (daily) energy expenditure.

1

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2

..... [2]

4 If a sports performer is suspected of suffering a concussion, the IRB’s “Recognise and Remove” 6 R’s protocol should be followed.

Complete the table to name and describe the missing stages of the 6 R’s.

1	Recognise	Coaches should be aware of the symptoms of concussion.
2	Remove	Player with suspected concussion must be removed from the field of play.
3		
4	Rest	Player must rest until free of symptoms.
5		
6	Return	Player must have written authorisation and complete the ‘graduated return to play’ protocol before returning to play.

[2]

5 Describe how the use of a wind tunnel could help an elite track cyclist to enhance their performance.

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..... [2]

SECTION B

Answer **all** the questions.

- 6 (a) **Fig. 6.1** shows the performance of the upward phase of a leg curl when moving from position A to position B.

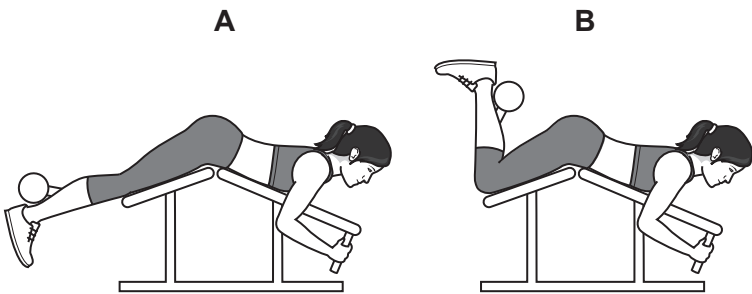


Fig. 6.1

- (i) Complete the table below to analyse the movement at the knee joint in **Fig. 6.1** when performing the leg curl.

	Movement	Agonist muscle	Plane of movement
Knee joint			

[3]

- (ii) Describe the role of **two** respiratory muscles during expiration at rest.

1

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2

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[2]

(c) During exercise the working muscles have an increased need for oxygen.

Assess how changes in the pressure gradient and the dissociation of oxyhaemoglobin affect oxygen diffusion at the working muscles during exercise.

Changes in the pressure gradient

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Changes in dissociation of oxyhaemoglobin

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[6]

(d) The highest football stadium in the world is home to the Bolivian national team and stands 3,601 m above sea level.

(i) How long before a match should a team arrive at this altitude in order to acclimatise?

..... [1]

(ii) Describe the physiological processes of acclimatisation to altitude.

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..... [2]

7 (a) (i) Name a sport where performers might use anabolic steroids to enhance their performance.

..... [1]

(ii) Give **one** potential benefit and **one** risk of using anabolic steroids to enhance performance.

Benefit

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Risk

.....

[2]

(b) An elite marathon runner is using a multi-gym to develop their strength endurance.

(i) Use your knowledge of strength training guidelines to complete the table with appropriate values.

Strength endurance training guidelines		
Resistance	Repetitions	Sets

[3]

(ii) Explain how the physiological adaptations from strength training may benefit the marathon runner.

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..... [4]

(d) (i) Explain why a simple fracture is an example of an acute, hard tissue injury.

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..... [1]

(ii) Describe the use of surgery to treat acute, hard tissue injuries.

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..... [4]

8 (a) Sport performers will manipulate factors that affect the size of the friction force acting on them.

(i) Why do performers want to increase friction?

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..... [1]

(ii) Using examples from sport, explain how performers increase friction.

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..... [3]

(b) A basketball player jumps upwards from one foot to reach a rebound.

Draw a free body diagram to show the vertical forces acting at take off and explain the resulting motion of the basketball player.

Free body diagram

Explanation

[5]

(c) A rugby player of mass 96 kg takes 2.5 seconds to accelerate from a standing start to 8 m/s.

Calculate the weight of the player, their acceleration between 0 s and 2.5 s and their momentum at maximum velocity.

(Assume $g = 10 \text{ m/s}^2$)

Weight of rugby player:

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Acceleration between 0 s and 2.5 s:

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Momentum at maximum velocity:

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[5]

(d) Complete the **four** missing parts of the table below in relation to the quantities of angular motion and describe the factors affecting the size of the moment of inertia of a rotating body.

Angular motion quantity	Definition	Unit of measurement
Angular momentum		$\text{kg m}^2\text{rad/s}$
	The rate of change in angular displacement	rad/s
Moment of Inertia		

Description

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..... [6]

15
SECTION C

9* **Fig. 9.1** is a velocity/time graph showing the motion of a hockey ball that is hit at the goal and rebounds off the post.

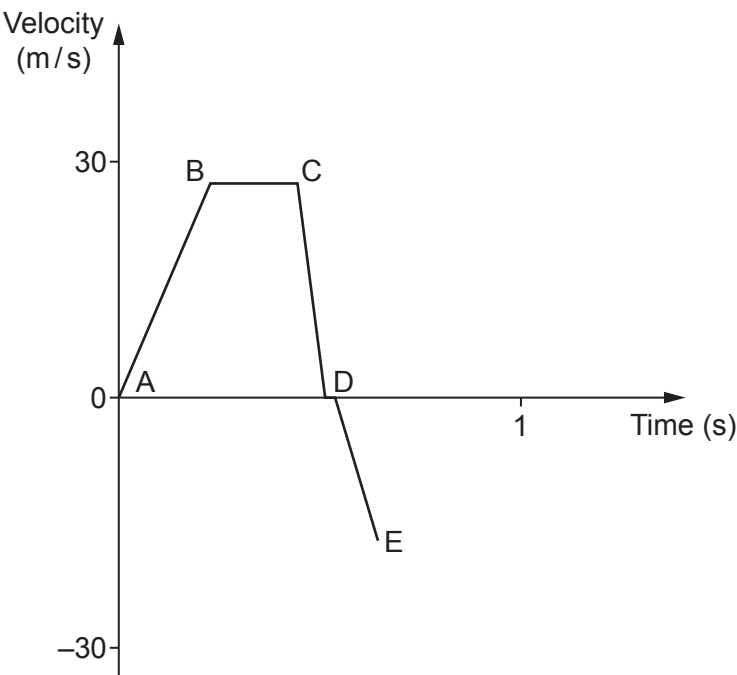


Fig. 9.1

Use the graph in **Fig. 9.1** to explain the motion of the ball.

Hockey is a team game that involves intermittent exercise of differing intensities and durations.

Analyse the interplay of the energy systems during intermittent exercise and the factors that affect this interplay. Use examples from a team game of your choice to support your analysis. **[20]**

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[illegible]

END OF QUESTION PAPER

[illegible]

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