



Oxford Cambridge and RSA

Wednesday 24 May 2023 – 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

--	--	--	--	--

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 **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.

2
SECTION A

1 Outline the main function of the following components of a healthy diet:

Fibre

.....

The essential mineral iron

.....

[2]

2 Explain how joint type and length of surrounding connective tissue affect flexibility.

Joint type

.....

.....

.....

Length of connective tissue

.....

.....

.....

[2]

3 Which **two** treatments will reduce pain from exercise-induced muscle damage?

Put a tick (✓) in the box next to **two** correct answers.

- A** Cold therapy
- B** Immobilisation, using a splint
- C** Massage
- D** Surgery

[2]

4 The ATP-PC energy system can be used to resynthesise ATP.

Identify the ATP yield of the ATP-PC system.

Give a practical example from sport in which the ATP-PC system is predominantly used.

ATP yield

Example

[2]

5 Describe how the speed of release and the height of release (if angle and speed of release are constant) affect the horizontal distance travelled by a projectile.

Speed of release

.....

.....

Height of release (if angle and speed of release are constant)

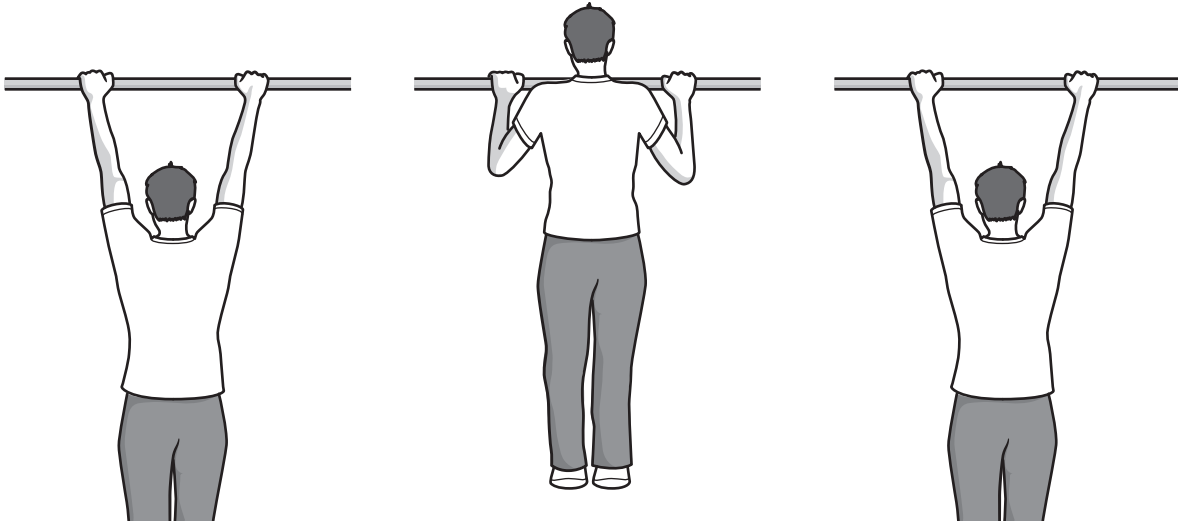
.....

.....

[2]

4
SECTION B

6 The images show the performance of a pull up.



(a) Complete the table to analyse the action of the latissimus dorsi in the upward and downward phases of the pull up.

Phase of pull up	Joint movement	Role of latissimus dorsi	Type of contraction
Upward phase	Agonist
Downward phase

[5]

(b) Explain the roles of the sternocleidomastoid and the internal intercostal muscles in the mechanics of breathing.

Sternocleidomastoid muscle

.....

.....

.....

.....

.....

.....

.....

.....

.....

Internal intercostal muscle

.....

.....

.....

.....

.....

.....

.....

.....

.....

[6]

(c) Describe the following stages of the aerobic energy system:

Krebs cycle (also known as the citric acid cycle)

.....

.....

.....

.....

.....

.....

.....

.....

.....

Electron transport chain

.....

.....

.....

.....

.....

.....

.....

.....

.....

[6]

7 (a) Continuous training is one way of developing aerobic capacity.

(i) Describe **one** typical continuous training session.

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

(ii) Identify **three** muscular adaptations from aerobic training.

1
.....
2
.....
3
..... [3]

(b) State **one** type of strength that is important for a cross-country skier. State a different type of strength that is important for a ski jumper. Justify your answers.

Cross-country skier

Type of strength

Justification

.....
.....

Ski jumper

Type of strength

Justification

.....
.....

[4]

(c) Identify **two** lifestyle diseases of the respiratory system and analyse the impact of training on these lifestyle diseases.

1

2

Impact of training

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

[5]

(d) Name and describe **two** chronic sports injuries.
Use a sporting example to describe a possible cause of each chronic sports injury.

Chronic injury 1

Description

.....

Possible cause

.....

Chronic injury 2

Description

.....

Possible cause

.....

[6]

- 8 (a) Michael Phelps broke the 400-metre individual medley swimming world record in 2008. The table shows the order of each swimming stroke and his split times for each length of the 50 m pool.

Stroke	Distance (m)	Split time (s)
Butterfly	0–50	25.73
	50–100	29.19
Backstroke	100–150	31.37
	150–200	30.20
Breaststroke	200–250	34.77
	250–300	35.79
Freestyle (Front crawl)	300–350	28.94
	350–400	27.85

- (i) Calculate the displacement of the swimmer after one length of backstroke.
 [1]
- (ii) Calculate the average velocity of the swimmer over the first length of backstroke. Show your working.

 [2]
- (iii) Calculate the difference between the average speed for the freestyle 100 m and the average speed for the breaststroke 100 m. Give your answer to 2 decimal places. Show your working.

 [3]

(b) Explain **four** factors affecting the stability of a sports performer.

- 1
 -
 - 2
 -
 - 3
 -
 - 4
 -
- [4]**

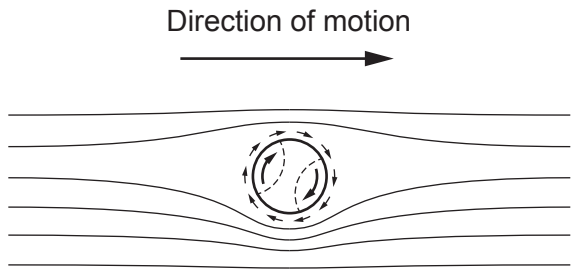
(c) (i) Identify the **two** factors affecting the size of the moment of inertia of a rotating body.

- 1
 - 2
- [2]**

(ii) Use an example of a sports performer with angular motion to describe the relationship between moment of inertia and angular velocity.

-
 -
 -
 -
 -
 -
 -
 -
 -
 -
- [2]**

(d) The air flow diagram shows a side view of a tennis ball with topspin.



(i) Use the airflow diagram to explain how the use of topspin in tennis causes the flight path of the ball to deviate.

..... [5]

(ii) Describe **one** benefit of using topspin in a tennis match.

..... [1]

A series of 25 horizontal dotted lines spanning the width of the page, providing a template for handwriting practice.

A series of horizontal dotted lines spanning the width of the page, providing a guide for handwriting practice.

.....

.....

.....

.....

.....

.....

.....

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).

A large area of lined paper for writing, consisting of 25 horizontal dotted lines. A solid vertical line runs down the left side of the page, creating a margin. The rest of the page is open for writing.

A large area of the page is reserved for writing, featuring a vertical solid line on the left side and horizontal dotted lines extending across the page.



Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of Cambridge University Press & Assessment, which is itself a department of the University of Cambridge.