OCR
Oxford Cambridge and RSA

Friday 17 May 2019 – Morning

AS Level Physical Education

H155/01 Physiological factors affecting performance

Time allowed: 1 hour 15 minutes

You may use:
- a scientific or graphical 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. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- 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 (*).
- This document consists of **12** pages.

Section A

Answer **all** the questions.

1 **(a)** A football player will use their knee joint and the quadriceps group of muscles to perform a powerful clearance kick.

Identify **one** of the quadriceps muscles and the type of synovial joint at the knee.

Outline the functional role and type of contraction in the quadriceps muscle during the preparation and execution of the kick.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[6]**

(b) **Table 1** shows the distribution of blood in the body at rest and during exercise.

Table 1

Tissue / organ	At rest (ml / min)	Blood flow (%)	During exercise (ml / min)	Blood flow (%)
Skeletal muscle	1000	**B**	16 000	80
Heart	250	5	750	3.75
Brain	750	15	750	3.75
Skin	**A**	10	1250	6.25
Kidneys	1000	20	750	3.75
Other	1500	30	500	2.50
Total	5000	100	20 000	100

(i) Calculate the missing values for **A** and **B**.

A = ...

B = ...

[2]

(ii) Explain how the changes in the distribution of blood to the skeletal muscles and other organs is achieved during exercise.

Skeletal muscles .....

.....

.....

Other organs .....

.....

.....

[4]

(c) Analyse the changes in the mechanics of breathing as exercise increases which would enhance the performance of an endurance swimmer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[4]**

(d) Compare the process of gas exchange at the muscles during exercise to resting conditions.

.....

.....

.....

.....

.....

.....

.....

..... **[4]**

2 **(a)** Outline the timing and composition of pre-event meals an endurance athlete may use in the hours leading up to their event.

.....

.....

.....

.....

.....

.....

.....

.....

.....

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

(b) Aerobic capacity is an important fitness component for team game players.

Evaluate the benefit of different physiological adaptations made by the muscular and metabolic systems after a period of aerobic training.

.....

.....

.....

.....

.....

.....

.....

..... **[4]**

(c) Describe, using a practical example for each, the following types of strength.

Static strength .....

.....

.....

.....

Dynamic strength .....

.....

.....

.....

Maximum strength .....

.....

.....

.....

[6]

(d) **(i)** Identify **one** recognised method of evaluating flexibility. Describe **two** advantages and **one** disadvantage of this method.

Method: .....

Advantages: .....

.....

.....

.....

Disadvantage: .....

.....

[4]

(ii) Explain why a javelin thrower would benefit from good shoulder flexibility.

.....

.....

..... **[1]**

3 **(a)** Hockey players hit the ball at high speeds to prevent interceptions.

(i) Apply Newton's second law of motion to show how a hockey player may maximise the ball's acceleration.

.....

.....

.....

.....

.....

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

(ii) Calculate the force applied to a hockey ball with a mass of 0.16 kg to cause it to accelerate at a rate of 30 ms^{-2}. Show your workings.

.....

.....

.....

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

(b) Identify all the component parts of a lever system. Use a practical example from sport to show the component order of a first class lever.

.....

.....

.....

.....

.....

.....

.....

..... **[4]**

(c) Explain, using practical examples, how force plates are used to enhance sporting performance.

.....

.....

.....

.....

.....

.....

.....

.....

.....

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

(d) A high jumper uses the Fosbury Flop technique.

Define centre of mass. Describe the changes in its position at take off and during flight that maximise performance.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[6]**

Section B

4* Explain the physiological adaptations as a result of a flexibility training programme, applying them to a sporting activity of your choice.

Evaluate, using practical examples, the structural and functional characteristics of fast oxidative glycolytic muscle fibres. **[10]**

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).