OCR
Oxford Cambridge and RSA

Wednesday 6 October 2021 – Morning

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.

SECTION A

Answer **all** the questions.

1 Muscles contract to create movement about a joint.

Which joints do the following muscles act on?

Iliopsoas .....

Latissimus dorsi .....

[2]

2 State **one** enzyme that is active when each of the following energy systems is in use.

ATP-PC (Phosphocreatine) system .....

Aerobic system .....

[2]

3 Describe the terms 'active' and 'passive' in reference to the assessment of sporting injuries using SALTAPS.

Active .....

.....

Passive .....

.....

[2]

4 Outline what is meant by the term 'exercise-induced muscle damage'. Describe a sporting situation that may cause exercise-induced muscle damage.

Exercise-induced muscle damage .....

.....

Sporting situation .....

.....

[2]

5 Give a practical example of each of the following planes of movement.

Sagittal .....

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Transverse .....

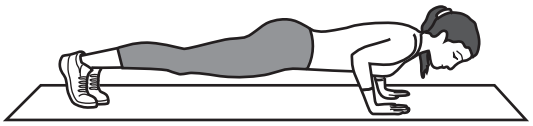
.....

[2]

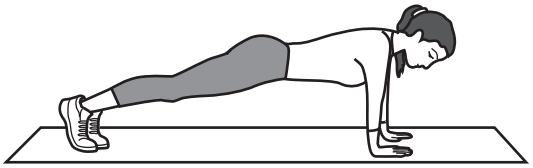
SECTION B

Answer **all** the questions.

6 **Fig. 6.1** shows the performance of the upward phase of a press-up.



A



B

Fig. 6.1

(a) Complete **Table 6.1** to analyse the movement at the elbow during the upward phase of the press-up (as shown in diagram B).

Joint	Movement	Agonist	Type of contraction of agonist	Antagonist
Elbow	.....	.....	.....	.....

[4]

Table 6.1

(b) Describe **four** mechanisms of venous return that maintain blood flow back to the heart.

1 .....

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2 .....

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3 .....

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4 .....

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[4]

(c) **Table 6.2** shows the lung volumes of an untrained and a trained individual at rest and during maximal exercise with some missing values, **A**, **B** and **C**.

Untrained individual	**Rest**	**Maximal exercise**
Breathing frequency	**A**	40 breaths / min
Tidal volume	0.5 litres	2.5 litres
Minute ventilation	7 litres / min	100 litres / min
Trained individual	**Rest**	**Maximal exercise**
Breathing frequency	12 breaths / min	50 breaths / min
Tidal volume	**B**	**C**
Minute ventilation	6 litres / min	150 litres / min

Table 6.2

(i) Using the data in **Table 6.2**, calculate **A**, **B** and **C**.

A .....

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B .....

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C .....

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

(ii) Explain why the minute ventilation of the trained individual is lower at rest than that of the untrained individual.

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

(iii) Tidal volume changes during exercise and recovery. Describe the role of proprioceptors in the control of these changes.

During exercise .....

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During recovery .....

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[3]

(d) Explain the term 'excess post-exercise oxygen consumption' (EPOC).

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

7 **(a)** Describe intermittent hypoxic training. Identify **one** benefit and **one** risk associated with its use.

Description .....

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Benefit .....

.....

Risk .....

.....

[4]

(b) **Table 7.1** shows the fitness test results of two performers.

Performer	Multi-stage fitness test (ml/kg/min)	Abdominal curl test (no. of sit-ups)	Sit and reach test (cm)
A	54.2	92	17
B	49.8	147	4

Table 7.1

(i) Identify which performer had the greater aerobic capacity, and which performer showed greater strength endurance.

Greater aerobic capacity .....

Greater strength endurance .....

[2]

(ii) Explain how age and gender may account for differences in VO_2 max in the two performers.

Age .....

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Gender .....

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[4]

(c) Outline the timing and the main objectives of the preparatory and transition phases of training. You must apply your knowledge to a sport of your choice.

Sport: .....

Preparatory phase

Timing .....

Objective 1 .....

.....

Objective 2 .....

.....

Transition phase

Timing .....

Objective 1 .....

.....

Objective 2 .....

.....

[6]

(d) Explain **two** extrinsic risk factors that may cause injury in sport or physical exercise.

Use practical examples to support your answer.

Risk factor 1 .....

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Risk factor 2 .....

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[4]

8 **(a)** Identify **three** factors that affect the stability of a gymnast.

1 .....

2 .....

3 .....

[3]

(b) A footballer is practising free kicks. After contact, one football travels in a straight line and another swerves during flight.

Explain the effect of the application of force on the resulting motion of each football in flight.

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

(c) Forces act on sports performers when they are in motion.

(i) On the image shown in **Fig. 8.1**, use arrows to show **four** types of force acting on the cyclist while they pedal forwards.

The arrows must show the point of application, the direction of the forces and the magnitude of the forces.

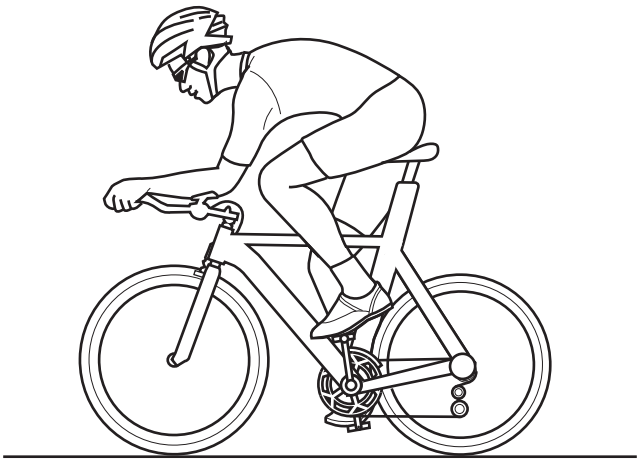

Fig. 8.1

[4]

(ii) An ice skater spins about their longitudinal axis by generating angular momentum.

Use the angular analogue of Newton's 1st law of motion to explain how the skater can increase their rate of spin.

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

(d) **Fig. 8.2** shows a ski jumper in flight.

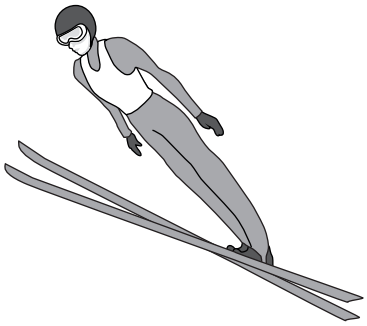

Fig. 8.2

Explain how a ski jumper can apply Bernoulli's principle to maximise the distance travelled through the air.

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

SECTION C

9* Define Newton's laws of motion and apply them to the performance of a vertical jump in sport.

Define the term 'concussion' and describe ways that a concussion may occur in a range of sports.

Explain and evaluate World Rugby's concussion management protocol known as 'Recognise and Remove' (the 6 R's). **[20]**

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).