Oxford Cambridge and RSA

Friday 24 May 2024 – 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.

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SECTION A

1 Name **one** agonist muscle that contracts to cause knee extension. Identify the plane of movement.

Agonist muscle: .....

Plane of movement: .....
[2]

2 Describe **two** factors that affect the maximum strength of a performer.

1: .....

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2: .....

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[2]

3 Define periodisation of training. Explain **one** benefit of using it when planning training.

Definition: .....

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Benefit: .....

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[2]

4
(a) Describe the term net force.

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

(b) Use a practical example from sport to explain the effect of net force.

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

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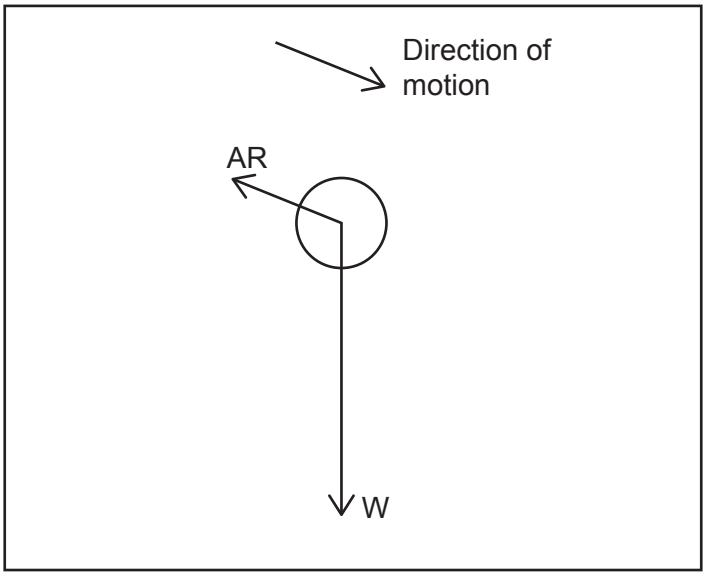
5 The diagram shows the forces acting on a shot put in flight.

On the diagram, draw and label the net force acting on the shot put. Use the parallelogram of forces.



[2]

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SECTION B

6

(a) Nervous stimulation of a motor unit causes skeletal muscle to contract.

Describe the nervous stimulation of a motor unit.

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

(b) Describe the changes in heart rate before, during and in recovery from a submaximal training run.

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

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(c) The table shows the relative percentage contribution of each energy system during three different sporting activities.

Sporting activities	ATP-PC system (%)	Glycolytic system (%)	Aerobic system (%)
Activity A	0	5	95
Activity B	53	40	7
Activity C	8	54	38

Suggest a suitable different sporting example for each activity **A**, **B** and **C** using the data in the table.

Justify your answers.

Sporting example for **activity A** .....

Justification .....

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Sporting example for **activity B** .....

Justification .....

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Sporting example for **activity C** .....

Justification .....

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[6]

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(d) Explain the effects of exercising in the heat on the respiratory system and on performance in sport.

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

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7

(a) The use of physiological ergogenic aids in sport has potential benefits and risks.

Compare the use of blood doping with intermittent hypoxic training (IHT).

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

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(b)

(i) Define aerobic capacity. Give an example of an activity or sport in which aerobic capacity is a key fitness component.

Definition: .....

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Example: .....

[2]

(ii) Describe how features of an individual's physiological make-up may affect their maximal oxygen uptake (VO_2 max).

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

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(c) The image shows a hurdler jumping over a hurdle during a race.

(i) Identify the type of flexibility most appropriate for a hurdler and explain why it is important.

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

(ii) Explain how physiological adaptations from flexibility training benefit the performance of the hurdler.

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

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(d) Assess how intrinsic risk factors can be managed to prevent injuries in sport.

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8

(a) A performer who weighs 820 N generates a ground reaction force of 1800 N during a vertical jump.

(i) Which **one** of the following is the net force acting **upwards** on the performer?

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

A 98 N ☐

B 980 N ☐

C 1718 N ☐

D 2620 N ☐

[1]

(ii) Explain how the performer generates the ground reaction force during a vertical jump.

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

(iii) Describe how force plates can be used to improve the performance of a vertical jump.

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

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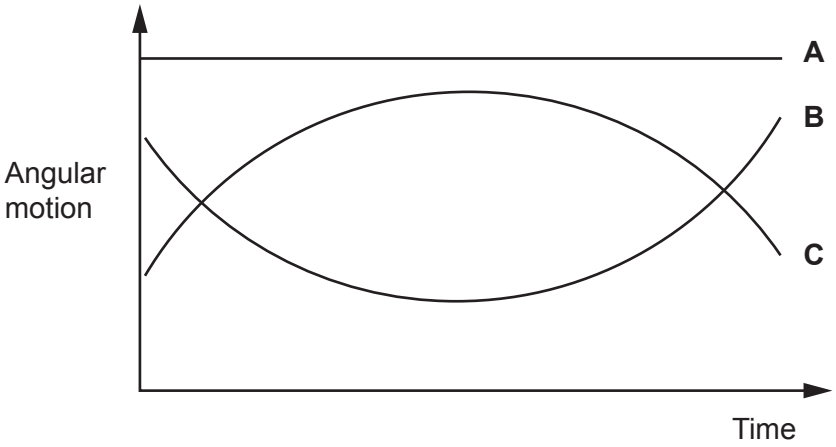
(b) The image shows a graph that represents the angular motion of a performance of a pike somersault.



Identify the quantities of angular motion labelled **A**, **B** and **C** on the graph.

Explain your answers.

A: .....

Explanation: .....

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B: .....

Explanation: .....

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C: .....

Explanation: .....

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[6]

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(c) Describe the release factors affecting the horizontal distance travelled by a projectile.

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

(d) Upward or downward lift forces can be explained using Bernoulli's principle.

Explain Bernoulli's principle.

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

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SECTION C

9* The images show a basketball player during the preparation and execution phases of a free throw.

Preparation phase

Execution phase

Analyse the movements at the shoulder, elbow and wrist joints during the preparation and execution phases of the free throw.

Your answer should include for each joint:
- movements produced
- named agonist and antagonist muscles involved
- the role of fixator muscles.

Explain and evaluate the use of SALTAPS and PRICE in the treatment of sporting injuries in the upper body. **[20]**

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END OF QUESTION PAPER

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EXTRA ANSWER SPACE

If you need extra space use these lined pages. You must write the question numbers clearly in the margin.

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