Oxford Cambridge and RSA

A Level Physical Education

H555/01 Physiological factors affecting performance

Monday 11 June 2018 – Morning

Time allowed: 2 hours

You may use:
- a scientific or graphical calculator

First name	
Last name	

Centre number						Candidate number				

INSTRUCTIONS
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- 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, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the barcodes.

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 the question marked with an asterisk (*).
- This document consists of **16** pages.

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Section A

Answer **all** the questions.

1 Define what is meant by 'acclimatisation to high altitude' and state **one** sporting activity in which performers would benefit from it.

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

2 Explain why ATP plays a major role in the performance of a smash in badminton.

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3 Identify **two** types of spin and the effect of each on a table tennis ball in flight.

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

4 Compare explosive strength and strength endurance.

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

5 Describe how limb kinematics can be used to enhance performance in sport.

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Section B

Answer **all** the questions.

6 **Fig. 1** shows a netballer preparing to shoot.

Fig. 1

(a) Complete the table below to analyse the position of the right wrist.

Joint type	Articulating bones	Plane of movement	Movement	Agonist	Antagonist
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[6]

(b) Explain what the energy continuum is and justify the position of **one** sporting activity on the energy continuum.

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(c) At the start of an endurance cycling event a cyclist will experience a redistribution of cardiac output.

Explain how and why the vascular shunt mechanism redistributes blood in a cyclist as they begin cycling at the start of the event.

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(d) **(i)** Describe the mechanics of breathing which cause inspiration at rest.

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(ii) Explain why a trained athlete will have a lower minute ventilation at rest than an untrained individual, despite having identical tidal volumes.

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7 **(a)** Blood doping is an illegal physiological aid used by some athletes to enhance performance.

Outline how blood doping is carried out, and give **one** physiological benefit and **one** risk involved.

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(b) A dislocated shoulder in rugby is an example of an acute sporting injury.

(i) Compare acute and chronic injuries.

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(ii) Apart from dislocation, give a sporting example of an acute injury **and** a chronic injury.

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

(iii) Outline the correct medical treatment a sports coach should apply to a dislocation injury.

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(c) **Fig. 2** shows a gymnast performing the splits.

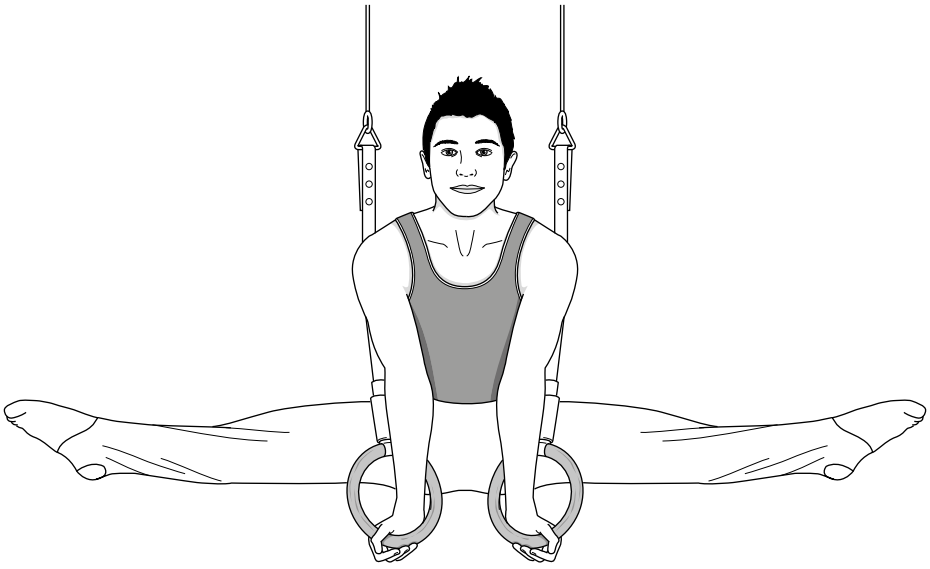

Fig. 2

(i) Describe the factors affecting flexibility that enable the gymnast to perform the splits.

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

(ii) Describe **two** adaptations from training that have enhanced this gymnast's flexibility by increasing the range of motion at the hip joint.

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(d) Describe a high intensity interval training (HIIT) session to improve aerobic capacity, and give **two** reasons why HIIT is considered more effective than continuous training.

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8 **(a)** Define Newton's third law of motion and apply it to a sporting example of your choice.

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(b) **(i)** Using practical examples, explain how the elbow joint can act as a fulcrum for two different lever systems.

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(ii) Calculate the moment of inertia during a biceps curl, given a total mass of 10 kg at a perpendicular distance (r) of 0.5 metres from the weight to the fulcrum. Show your workings.

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

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(c) **Fig. 3** shows a graph of the relationship between moment of inertia, angular velocity and angular momentum during the performance of a tucked somersault.

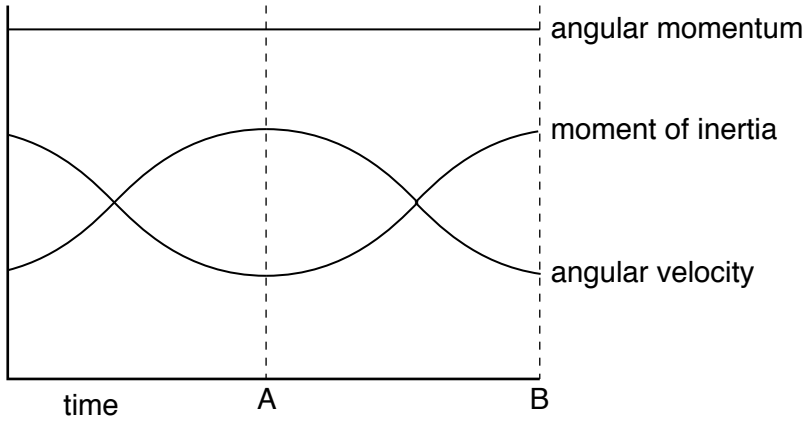

Fig. 3

(i) Explain the shape of the graph, with reference to the tucked somersault, from A to B.

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(ii) Explain, using the angular analogue of Newton's first law of motion, the concept of conservation of angular momentum.

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(d) **(i)** Sketch a free body diagram in the box below, showing the horizontal and vertical forces acting on a football in flight.

[2]

(ii) Sketch a diagram in the box below to show how you would represent the resultant force acting on the football in flight.

[3]

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Section C

9* A team game such as basketball provides opportunities for recovery from high intensity work both during and after the match.

Outline the recovery processes that occur in the first three minutes after exercise and, using a team game of your choice, evaluate the strategies that a player or coach can use to maximise recovery.

Evaluate nutritional ergogenic aids that help the recovery process. **[20]**

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END OF QUESTION PAPER

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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).

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