

General Certificate of Education  
June 2003  
Advanced Level Examination



**SPORT AND PHYSICAL EDUCATION**  
**Unit 4**

**PED4**

Thursday 12 June 2003 Afternoon session

**In addition to this paper you will require:**  
a 12-page answer book.

Time allowed: 1 hour 30 minutes

**Instructions**

- Use blue or black ink or ball-point pen. Pencil should only be used for drawing.
- Write the information required on the front of your answer book. The *Examining Body* for this paper is AQA. The *Paper Reference* is PED4.
- Answer **four** from **five** questions.
- Do all rough work in the answer book. Cross through any work you do not want marked.

**Information**

- The maximum mark for this paper is 64.
- Mark allocations are shown in brackets.
- You will be assessed on your ability to use an appropriate form and style of writing, to organise relevant information clearly and coherently, and to use specialist vocabulary, where appropriate.
- The degree of legibility of your handwriting and the level of accuracy of your spelling, punctuation and grammar will also be taken into account.
- You will be awarded up to 4 marks for the quality of your written communication.

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**Physiological, Biomechanical and Psychological Factors which Optimise Performance**

Answer **four** from **five** questions.

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1

Total for this question: *15 marks*

- (a) **Figure 1** contains Weiner's dimensions of attribution which are used to help explain success or failure.

	Internal attribution	External attribution
<b>Stable attribution</b>	<b>A</b>	<b>B</b>
<b>Unstable attribution</b>	<b>C</b>	<b>D</b>

**Figure 1**

- (i) Give an example of **each** of the categories, represented by the letters **A**, **B**, **C** and **D**, for a sprinter who loses when competing at an opponent's home venue. *(4 marks)*
- (ii) The same sprinter will have another race at the same venue in a month's time. Which of the attributions could they change in order to bring about a successful outcome? Justify your answer in terms of the dimensions of attribution. *(3 marks)*
- (b) Athletes' muscles may consist of a number of fibre types. These types are suited to particular intensities of work. **Figure 2** shows muscle fibre usage for three different work rates. Identify muscle fibre types, **A**, **B** and **C**. *(3 marks)*

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- (c) Explain how a muscle can generate varying forces of tension, and how the motor unit recruitment pattern differs between a weightlifter and an endurance runner. *(5 marks)*

2

**Total for this question: 15 marks**

- (a) A hockey coach has worked with the same squad for a number of years, taking them from the youth section through to adult. Discuss, in terms of leadership, how this relationship between the coach and squad would have developed over this period of time. (3 marks)
- (b) Explain, with reference to Chelladurai's multi-dimensional model of leadership, how the captain can affect the quality of the performance of the hockey team. (5 marks)
- (c) Before puberty, girls and boys do not differ significantly in body size and/or composition. What are the changes that occur in body composition as a result of puberty? (2 marks)
- (d) **Figure 3** shows a range of  $\text{VO}_2$  max values for female non-athletes, male non-athletes, elite female athletes and elite male athletes.

	<b>Range <math>\text{VO}_2</math> max value ml/kg/min</b>	<b>Average <math>\text{VO}_2</math> max value ml/kg/min</b>
Female non-athletes	32–44	38
Male non-athletes	35–52	44
Elite female athletes	48–61	55
Elite male athletes	56–85	71

**Figure 3**

Using the information in **Figure 3**, discuss the  $\text{VO}_2$  max values for **each** group. What structural and physiological reasons could account for the differences in  $\text{VO}_2$  max between the groups? (5 marks)

**TURN OVER FOR THE NEXT QUESTION**

3

**Total for this question: 15 marks**

- (a) Two footballers are asked to take part in a penalty shoot-out. One accepts the invitation, the other refuses.
- (i) Explain, in terms of *achievement motivation*, the decision of **each** player. (4 marks)
  - (ii) Discuss how the two footballers would view the next penalty shoot-out against a goalkeeper of a higher standard. (3 marks)
- (b) **Figure 4** shows the oxygen uptake of a footballer undertaking exercise followed by a recovery period.

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- Why does the footballer incur an “oxygen deficit” during exercise? (3 marks)
- (c) Excessive Post Oxygen Consumption (EPOC) is considered to have two components.
- (i) State **two** aims of the **first** component and explain how it is achieved in the body. (3 marks)
  - (ii) What causes the EPOC of the same performer to vary? (2 marks)

4

**Total for this question: 15 marks**

Research on athletes has found differing effects of *somatic state anxiety* and *cognitive state anxiety* on performance.

- (a) Comment on the levels of somatic state anxiety and cognitive state anxiety that an athlete might experience leading up to and during a major competition. (3 marks)
- (b) Explain, with appropriate examples, how an athlete can control cognitive anxiety. (4 marks)

In field athletics, the events are affected by a variety of forces.

- (c) To maximise the horizontal distance of a shot during flight, identify **three** mechanical factors that should be taken into account. (2 marks)
- (d) (i) If air **resistance** is negligible, sketch a diagram to show the flight path of a shot from the moment of release to the moment immediately prior to landing. (2 marks)
- (ii) Add vectors to your diagram to represent the vertical and horizontal components of the velocity at:
- the point of release;
  - the highest point of the flight path;
  - a point in the downward flight path, level with the height of release;
  - a point before landing. (4 marks)

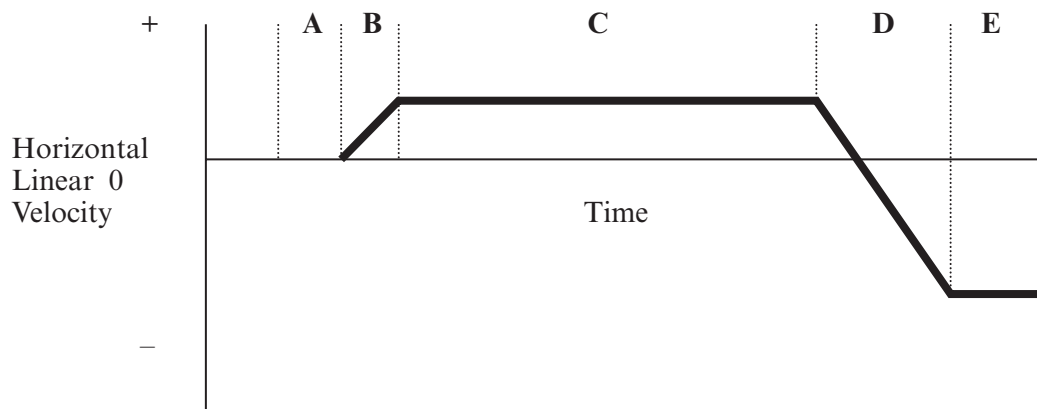
**TURN OVER FOR THE NEXT QUESTION**

5

**Total for this question: 15 marks**

If performers are to maintain interest and improve performance in sports such as ice hockey, it is essential that the performers develop self-efficacy.

- (a) Explain the difference between *self-efficacy* and *self-confidence*. (2 marks)
- (b) An ice hockey coach wants to develop *self-efficacy* in his performers. What strategies could he use to develop this? (6 marks)
- (c) **Figure 5** identifies the changes in horizontal linear velocity experienced by a puck that has been struck by an ice hockey stick and then collides with, and rebounds from, the end wall.



**Figure 5**

Describe and explain the horizontal motion of the puck associated with **each** of the time periods identified as **A**, **B**, **C**, **D** and **E** in the graph. (7 marks)

**END OF QUESTIONS**