

General Certificate of Education  
January 2007  
Advanced Level Examination



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

**PED4**

Wednesday 31 January 2007 9.00 am to 10.30 am

**For this paper you must have:**

- 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 to be marked.

**Information**

- The maximum mark for this paper is 64.
- The marks for part questions are shown in brackets.
- 4 of these marks will be awarded for the Quality of Written Communication.
- You will get up to 4 extra marks for using good English, organising information clearly and using specialist vocabulary where appropriate. You will also get marks for good handwriting, spelling, punctuation and grammar.

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**Physiological, Biomechanical and Psychological Factors which Optimise Performance**Answer **four** from **five** questions.

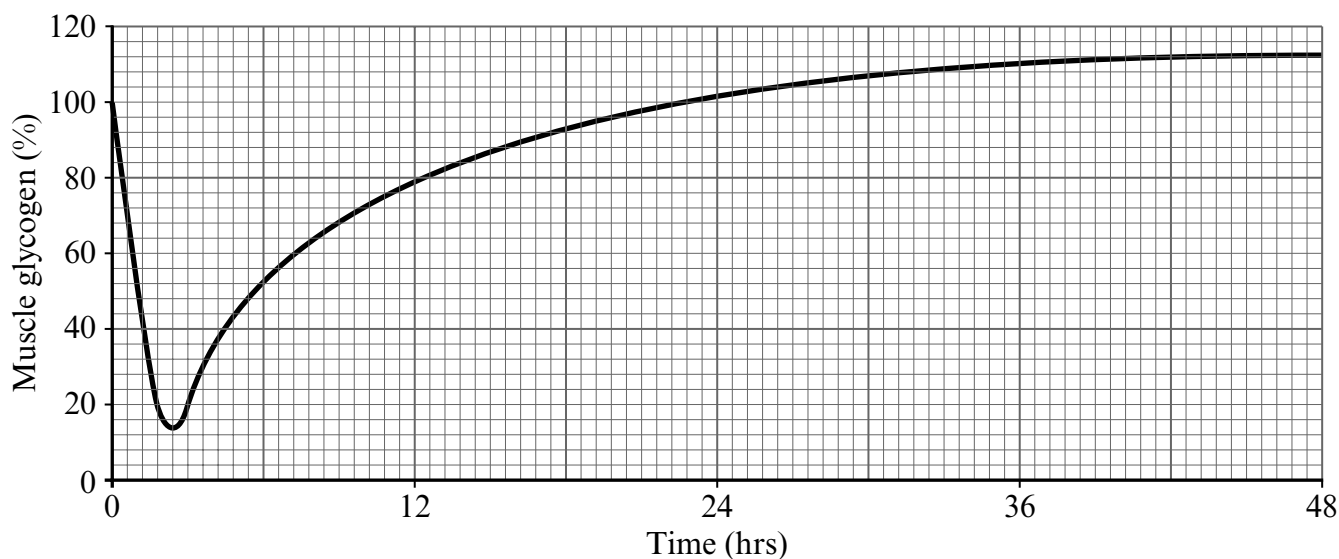
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**1****Total for this question: 15 marks**

Research has tried to establish a link between the psychology and physiology of performance. Trait theories may be used to explain several psychological constructs.

- (a) (i) Briefly explain *personality* according to *trait theory*. (3 marks)
- (ii) Sport may increase or decrease the likelihood of aggressive behaviour occurring among competitors. How may *trait theory* be used to explain *aggression* in sport? (2 marks)
- (iii) Explain how *trait anxiety* affects a performer. (3 marks)

**Figure 1** shows the levels of muscle glycogen in an elite performer who takes part in a 2 hour period of intensive exercise followed by a recovery period.

**Figure 1**

- (b) (i) Describe **and** explain the effects of the exercise and recovery periods on the levels of glycogen in the elite performer. (4 marks)
- (ii) How might this elite performer prepare for a competition that will last longer than 2 hours? (3 marks)

2

Total for this question: 15 marks

The 1500 metres race for men at the 2004 Athens Olympics was won in 3 min 34.18s, while the same event for women was won in 3 min 57.90s.

- (a) Identify **five** *structural* or *physiological* characteristics that could account for these differences in times between males and females. (5 marks)
- (b) Explain how the **majority** of energy required by an athlete in a 1500 metre race is produced. (4 marks)

Competitors at the 2004 Athens Olympics who did not get beyond the heats may eventually suffer from learned helplessness.

- (c) What do you understand by the term *learned helplessness* **and** suggest the likely cause of it? (3 marks)
- (d) Sufferers of learned helplessness may require attribution retraining.  
Explain what *attribution retraining* is **and** suggest why it is effective. (3 marks)

3

Total for this question: 15 marks

Elite sports performers need to develop power of both the body and the mind in order to be successful.

The major leg muscles used in the drive phase of sprinting are the gastrocnemius, quadriceps, gluteals and hamstrings. Exactly the same muscle groups are also used in high jumping.

- (a) Explain, using the idea of *vectors*, how these same muscle groups can produce both maximal horizontal motion and maximal vertical motion. (5 marks)
- (b) The acceleration that a performer achieves when sprinting or high jumping is related to impulse. What do you understand by the term *impulse*, **and** how does the athlete use impulse during their sprint or take-off? (3 marks)

Elite performers will train hard and develop high self-efficacy.

- (c) (i) What do you understand by the term *self-efficacy*? (2 marks)
- (ii) What strategies may be used to improve the self-efficacy of a performer? (5 marks)

4

**Total for this question: 15 marks**

Many sporting competitions are now decided by ‘penalty shoot-outs’. In these situations, some performers readily accept responsibility while others prefer not to be involved.

- (a) Explain these observations in terms of *achievement motivation*. (6 marks)

When taking a penalty, performers will rely on their muscles to produce maximal contractions.

- (b) What are the characteristics of the type of *muscle fibres* used to produce maximal contractions? (6 marks)
- (c) Explain how the *muscle spindle apparatus* may be used to adjust the strength of a muscle contraction. (3 marks)

5

**Total for this question: 15 marks**

In order to perform effectively as a team, game players must train together.

Steiner (1972) suggested that the relationship between the individual members of a team and their overall performance may be expressed as:

**actual productivity = potential productivity – losses due to faulty group processes**

- (a) (i) Explain the terms *actual productivity* and *potential productivity*, **and** the factors that might affect them. (3 marks)
- (ii) Suggest potential causes of *losses due to faulty group processes*. (4 marks)
- (b) In terms of the physical preparation of a team, what do you understand by the term *periodisation*? (3 marks)
- (c) Following exercise, individual members of a team may experience *Excess Post-exercise Oxygen Consumption* (EPOC).
- (i) What are the functions of the *fast component* of EPOC? (2 marks)
- (ii) Explain how the functions of the *slow component* are achieved. (3 marks)

**END OF QUESTIONS**

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