

General Certificate of Education
June 2004
Advanced Level Examination



SPORT AND PHYSICAL EDUCATION
Unit 4

PED4

Friday 18 June 2004 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.
- Up to 4 marks will be awarded for the quality of your written communication.

Physiological, Biomechanical and Psychological Factors which Optimise Performance

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

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

All sports performers have attitudes. Attitudes are “ideas charged with emotion (positive or negative) which pre-disposes a class of actions to a particular social situation” (Triandis 1971).

- (a) Suggest **two** methods for measuring attitudes. (2 marks)
- (b) Identify and briefly explain the **three** components of attitudes. (4 marks)
- (c) Describe how **each** of the components you have identified in (b) might be used to change attitudes. (3 marks)



Figure 1

Source: www.empics.com

- (d) Use Newton's Laws of Motion to explain how the sprinter shown in **Figure 1** leaves the starting blocks. (6 marks)

2

Total for this question: 15 marks

Performers in many activities require muscles to exert various levels of strength to perform actions.

- (a) *Spatial summation* and *wave summation* are both ways of varying the strength of contraction of a muscle. Explain what is meant by **each** of these terms. (5 marks)
- (b) Explain how the involvement of the *muscle spindles* increases the strength of a muscle contraction. (3 marks)

Performance in any activity will be affected by the level of arousal. **Figure 2** shows a relationship between the degree of *arousal* and the quality of performance, using the *drive* and *inverted U* theories.

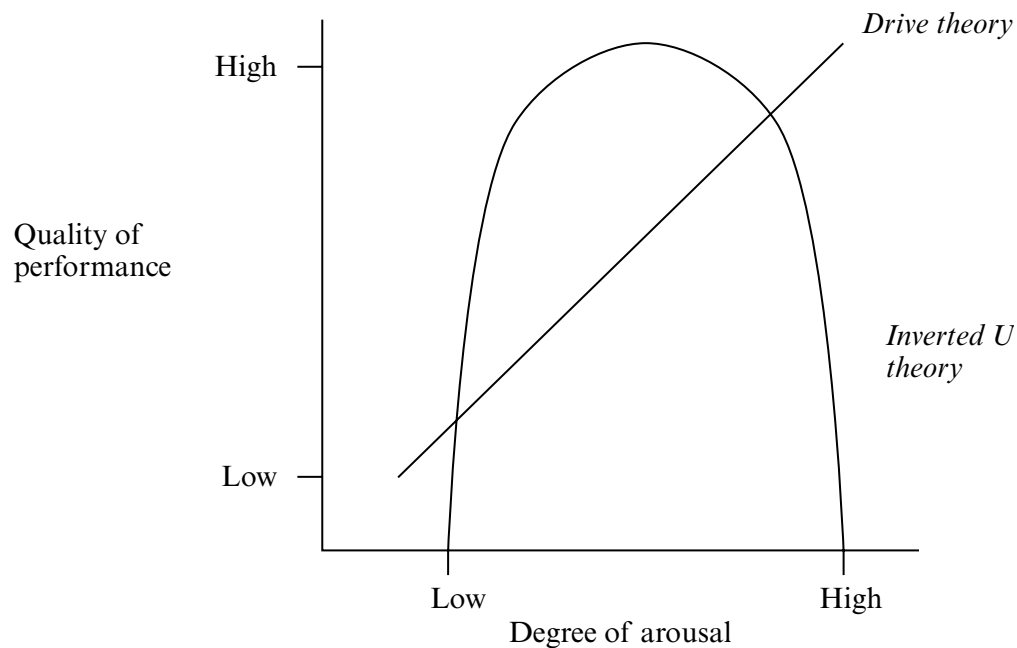


Figure 2

- (c) Briefly explain the **two** theories shown in **Figure 2** and compare their effectiveness in describing the relationship between arousal and sporting performance in **differing tasks**. (7 marks)

Turn over ►

3

Total for this question: 15 marks

Elite performers are invariably required to perform in front of an audience, even when undertaking physiological tests. **Figure 3** shows the possible effects, according to Zajonc (1965), of the presence of others on sports performance.

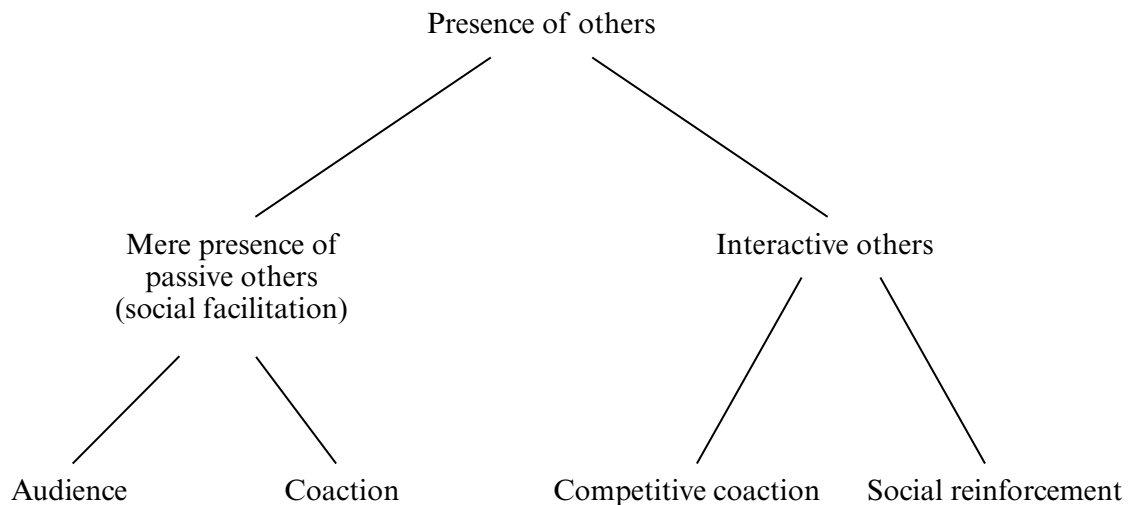


Figure 3

Source: Adapted from Wesson, Wiggins, Thompson and Hartigan, *Sport and PE* (Hodder and Stoughton, 1998)

- (a) Explain, using appropriate examples, what is shown in **Figure 3** and how the presence of others affects performance. (5 marks)
- (b) Recent research has pointed to *distraction* as being the main effect of the presence of others. How could performers reduce the effect of distraction? (3 marks)
- (c) **Figure 4** shows the typical values of various physiological measures found in elite male performers.

Physiological measure	Value
$\dot{V}O_2$ max ($\text{dm}^3 \cdot \text{min}^{-1}$)	5.6
Maximum heart rate (bpm)	196
Maximum stroke volume (cm^3)	187
Lactate threshold ($\text{mmol} \cdot \text{l}^{-1}$)	2.4

Figure 4

- (i) What do you understand by the term $\dot{V}O_2$ max? (2 marks)
- (ii) Suggest reasons why $\dot{V}O_2$ max is regarded as such an important measure of a performer's ability. (2 marks)
- (d) Describe and explain how *lactate threshold* varies as fitness improves. (3 marks)

4

Total for this question: 15 marks

Ice hockey is often regarded as a very physical game, with many collisions occurring during normal play.

A stationary ice-hockey puck was struck with an ice-hockey stick and travelled across the ice until it struck and rebounded from a wall.

Figure 5 shows the changes in horizontal linear velocity experienced by the puck. Assume that air resistance and friction on the ice are negligible.

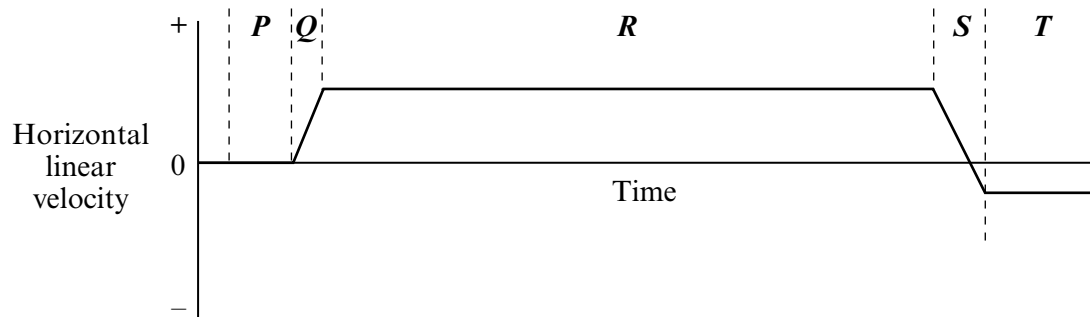


Figure 5

- (a) Describe and explain the horizontal motion of the puck associated with each of the periods of time identified as **P**, **Q**, **R**, **S** and **T** in **Figure 5**. (7 marks)

The collisions that occur in ice hockey may be the result of assertion or aggression

- (b) Distinguish between the terms *aggression* and *assertion* in relation to sporting performance. (2 marks)
- (c) Suggest why playing competitive games can often lead to aggressive behaviour. (3 marks)
- (d) What can a referee do to control aggression during a sporting competition? (3 marks)

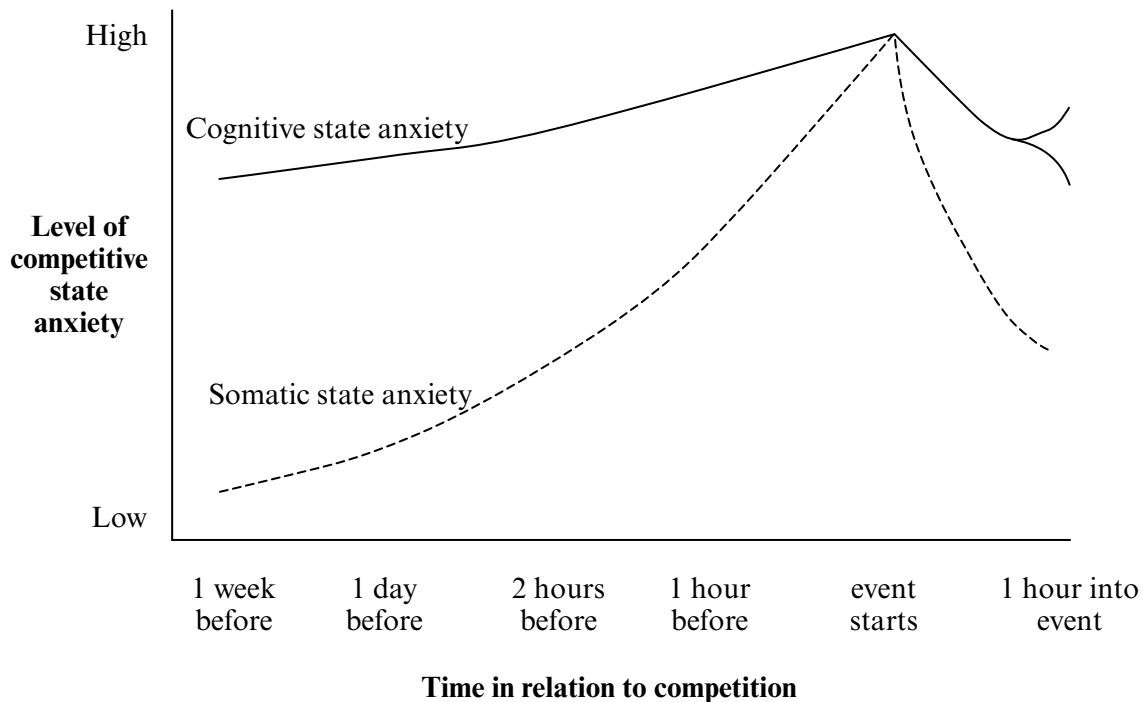
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5

Total for this question: 15 marks

An elite player's performance and anxiety concerning that performance may vary. **Figure 6** shows the results of research, using a CSAI-2 questionnaire (Martens *et al*, 1990) to show how cognitive state anxiety and somatic state anxiety change prior to and during competition.

**Figure 6**

Source: Woods, *Applying Psychology to Sport*, (Hodder and Stoughton 1998)

- (a) (i) What do you understand by the terms *cognitive and somatic state anxiety*? (2 marks)
- (ii) Use the information in **Figure 6** to describe how *cognitive state anxiety* and *somatic state anxiety* change prior to and during competition. (3 marks)
- (b) Explain the effects of an increase in *cognitive state anxiety* on a performer with
- (i) an initial low level of arousal, and
- (ii) an initial high level of arousal. (2 marks)
- (c) During performance, the body is able to use both fats and carbohydrates to provide energy. Describe how the different forms of carbohydrates are made available for energy use in the muscles. (2 marks)
- (d) (i) Very little fat is stored in muscle fibres, yet it remains a valuable source of energy during aerobic exercise. Explain how the fat stores of the body become available to working muscles. (3 marks)
- (ii) What are the **disadvantages** of using fat as an energy source during exercise? (3 marks)

END OF QUESTIONS

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