



## General Certificate of Education

# Sport & Physical Education 5581/6581

*PED4 Physiological, Biomechanical and Psychological  
Factors which Optimise Performance*

## Mark Scheme

*2006 examination – January series*

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

## Unit 4

### General Instructions

In the mark scheme	;	separates single marks
	/	indicates alternatives
	CAO	correct answer only
	Equiv.	Means allow any equivalent answers.

1. (a) 1. ATP-PC/ system/phosphocreatine system/alactic system; *Sub max 1 mark*

2. PC stored in muscles; *Sub max 3 marks*  
 3. PC = C + P(i) + energy/creatine + phosphate;  
 4. Energy used for ATP resynthesis;  
 5.  $ADP + P + \text{energy} = ATP$ / $ADP + PC = ATP + C$ ;  
 6. ATP broken down into  $ADP + P(i) + \text{energy}$ ;  
 7. Anaerobic/no  $O_2$ ;  
 8. Glycolysis;  
 9. Lactate/lactate acid; *Max 4 marks*

- (b) 1. EPOC/Excess Post Oxygen Consumption; (*Do not credit  $O_2$  debt/deficit*);  
 2. Aerobic energy needed;  
 3. Demand/need for/require oxygen/  $O_2$ ;  
 4. Restoration of PC/ATP/Phosphogens;  
 5. Resaturation of myoglobin with oxygen; (*Do not credit haemoglobin*)  
 6. Lactate/lactic acid breakdown/removal;  
 7. High temperature/high metabolic rate;  
 8. Energy for high heart rate/breathing rate; *Max 4 marks*  
 (*Do not credit high breathing rate unless qualified*)

- (c) 1. Trait anxiety – enduring/innate personality trait/a predisposition/all situations perceived as threatening;  
 2. State anxiety – temporary emotional response to a situation/situation specific;  
 3. Cognitive (state anxiety) – psychological/feelings of nervousness, apprehension and worry; (*Do not credit mind/head*)  
 4. Somatic (state anxiety) – physiological/awareness of arousal – sweaty palms, high heart rate, etc.. (*Do not credit body/physical*)  
 (*Must explain to credit*) *Max 4 marks*

- (d) 1. SCAT/Trait Anxiety Inventoray /Competitive Sports Anxiety Questionnaire/SAS;  
 2. Questionnaire/questions;  
 3. Trait anxiety/equiv.

**or**

4. CSAI-2/CSAI/AD-ACL/SAI;  
 5. Questionnaire/questions;  
 6. State anxiety/cognitive and/or somatic (state) anxiety/equiv *Max 3 marks*  
 (*Credit first answer only*)

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- 2 (a) (i) 1. Fast-twitch have – faster contractions/twitches/faster (myosin) ATPase;  
 2. More PC;  
 3. Lower lactate tolerance/fatigue easily;  
 4. More glycogen;  
 5. More anaerobic enzymes/greater capacity;  
 6. Less mitochondria;  
 7. Less myoglobin;  
 8. More oxidative enzymes/lower oxidative capacity;  
 9. More force/strength/powerful contractions;  
 10. More sarcoplasmic reticulum;  
 11. Larger motor neurone/(motor) unit/fibre diameter.  
*(Accept reverse of slow twitch)* *Max 5 marks*
- (ii) 1. Lack of PC;  
 2. Lactate/lactic acid build up/OBLA;  
 3. Increase acidity/lowering pH/increase H<sup>+</sup> concentration;  
 4. Effect on enzymes/actin/PFK;  
 5. Lack of calcium ions;  
 6. Glycogen depletion;  
 7. Acetylcholine depletion;  
 8. Dehydration/electrolyte depletion;  
 9. Muscle wisdom/less impulses sent from brain. *Max 3 marks*
- (b) (i) 1. Internal/external/causality;  
 2. Stable/unstable/stability. *2 marks*
- (ii) 1. Luck;  
 2. Effort;  
 3. Task difficulty;  
 4. Ability. *4 correct - 2 marks*  
*3 correct – 1 mark*  
*Max 2 marks*
- (c) 1. Learned helplessness – idea that failure is inevitable/examples;  
 2. Possibly leading to idea of giving up even when success is possible/examples;  
 3. Coach to enable player to achieve success/play weaker opposition/examples;  
 4. Encourage view that success due to stable/internal factors – ability/examples;  
 5. That failure due to unstable/external factors – effort or luck/examples.  
 6. Learned helplessness can be global and/or specific.  
*(Do not credit just give up)* *Max 3 marks*
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- 3 (a) 1. Situation-specific confidence;  
2. Perception/belief of ability to cope with demands. *2 marks*
- (b) 1. Past performances/performers accomplishments;  
2. Provide opportunities for player to experience success;  
3. Vicarious experiences;  
4. Observing others succeed (of similar ability);  
5. Verbal persuasion;  
6. Convince performer they have the ability/skills to succeed;  
7. Emotional arousal;  
8. Help performer interpret their arousal in a positive way;  
9. Goal setting/targets;  
10. Use of performance goals;  
11. Internal attributions/ability;  
12. Use of positive self-talk;  
13. Visualisation/imagery/imagining doing it yourself.  
(Do not credit mental rehearsal) *Max 6 marks*
- (c) (i) 1. Reduced pO<sub>2</sub> at altitude/less oxygen in air/available/lower O<sub>2</sub> concentration;  
2. Body produces erythropoietin/EPO;  
3. More red blood cells/haemoglobin;  
4. Greater oxygen transport capacity/carry more oxygen;  
5. Greater stamina/cardio-respiratory endurance/aerobic capacity;  
6. E.g. marathon/endurance athletes. *Max 4 marks*
- (ii) 1. Reduced pO<sub>2</sub> – unable to train as hard as previously/at sea level;  
2. Altitude sickness/quicker to exhaustion/dehydration;  
3. Loss of fitness while at altitude;  
4. Therefore aerobic performance deteriorates;  
5. No benefit to anaerobic performance;  
6. Requires several weeks/months to be effective; *Max 3 marks*
- 4 (a) 1. Collective identity;  
2. Shared norms/values;  
3. Sense of shared purpose/common goals;  
4. Interaction between members/efforts of one affect the other;  
5. Structured methods/hierarchy of communication;  
6. Task interdependence/work together/task cohesion;  
7. Interpersonal relationships/social cohesion;  
8. Independence from others. *Max 4 marks*
- (b) 1. Named all four stages (in correct order);  
2. Forming – getting to know each other/each other's roles;  
2. Storming – stage of conflict/rebellion trying to establish roles/status;  
3. Norming – become co-operative/cohesive/work together/same norms/values/accepting roles;  
4. Performing – primary aim is group success/common goal/roles and relationships effective/role acceptance. *4 marks*
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- (c) (i) 1. Initial eccentric/downward contraction;  
 2. Stimulates muscle spindle apparatus/detects stretch;  
 3. (Sensory) nerve impulses to CNS;  
 4. Role of gamma motor neurons;  
 5. Spindles are adapted muscle fibres;  
 6. Added to normal fibres/intrafusal fibre contraction;  
 7. (Concentric) contraction more powerful/greater force produced;  
 8. More overload/power/fitness gains. *Max 4 marks*
- (ii) 1. Golgi Tendon organs activated/detect stretch;  
 2. Muscles relax;  
 3. Inhibits stretch reflex/overrides/stops muscle spindles;  
 4. Designed to prevent overstretching/protective;  
 5. Allowing greater range of movement to be used. *Max 3 marks*
- 5 (a) 1. Fats/ fatty acids/glycerol;  
 2. Triglycerides;  
 3. Lactate/protein/amino acids/lactate acid/creatine;
- Sub max 2 marks*
4. Glycogen;  
 5. Glucose/sugar;  
 6. Carbohydrate. *3 marks*
- (b) 1. Ice may be regarded as a friction free surface/friction is negligible;  
 2. During spins angular momentum remains constant;  
 3. Angular momentum is the quantity of rotation;  
 4. Angular momentum = angular velocity x moment of inertia;  
 5. Angular velocity = rate of spin/how fast skater spins;  
 6. Moment of inertia = distribution/spread of mass around axis;  
 7. Changing/reducing moment of inertia affects/increases angular velocity;  
 8. Skater brings arms into body allowing rate of spin to increase.  
*(Accept annotated diagrams/graphs)* *6 marks*
- (c) 1. Occurs when - required behaviour from/by situation;  
 2. Actual behaviour of leader;  
 3. Preferred behaviour of performer;  
 4. All match/are congruent.  
*(Accept annotated diagram showing links)* *3 marks*
- (d) 1. Task or social cohesion;  
 2. Task cohesion - working together and commitment to common goals;  
 3. Social cohesion – group members like each other, get on well and support each other;  
 4. Success can come from task cohesion only/lack of social cohesion/task cohesion more important;  
 5. But generally success follows when both task and social cohesion are high;  
 6. More usual that success leads to cohesion. *Max 3 marks*

### Quality of Written Communication

The GCSE and GCE A/AS Code of Practice requires the assessment of candidates' Quality of written communication wherever they are required to write in continuous Prose. In this unit, this assessment will take place for the candidates' script as a whole by means of the following marking criteria.

The candidate expresses moderately complex ideas clearly and reasonably fluently, through well linked sentences and paragraphs. Arguments are generally relevant and well structured. There may be occasional errors of grammar, punctuation and spelling.

*4 marks*

The candidate expresses straightforward ideas clearly, if not always fluently. Sentences and paragraphs may not always be well connected. Arguments may sometimes stray from the point or be weakly presented. There may be some errors of grammar, punctuation and spelling, but not such as to suggest a weakness in these areas.

*3 – 1 marks*

Ideas are expressed poorly and sentences and paragraphs are not connected. There are errors of grammar, punctuation and spelling showing a weakness in these areas. *0 marks*

**Total** *4 marks*