



## General Certificate of Education

# Sport & Physical Education 5581/6581

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

## Mark Scheme

*2005 examination – June 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) (i)

Assertive	Aggressive
1. Overt physical/verbal act	Overt physical/verbal act
2. Examples e.g. rucking out	Example punching below the belt
3. Within laws of game	Outside laws of game
4. No intent to harm/injure opponent	Intent to harm/injure opponent

3 marks

- (ii) 1. Aggressive behaviours are learned;  
 2. But equally, can learn non-aggressive behaviour;  
 3. Through observation/watching/copying/modelling;  
 4. Observation of realistic events more likely to affect learning;  
 5. High profile of performer/role models/high status/significant other;  
 6. Imitation more likely if learner thinks behaviour will be reinforced;  
 7. Or imitation more likely if they think it will not be punished;  
 8. e.g. approved by team mates/coach/audience/not booked.

5 marks

- (b) (i) 1. Deficit – B;  
 2. EPOC – C.  
 (Credit first two letters only)

2 marks

- (ii) 1. Duration = 14 mins;  
 2. F = steady state/period when  $VO_2$  remained constant/consumption = requirement/supply and demand.  
 (Do not credit  $VO_2$  max/max  $VO_2$ /plateau)

2 marks

- (c) 1. Slow – extra oxygen needed;  
 2. For removal/breakdown of lactate/buffering;  
 3. For supply to/maintain breathing muscles;  
 4. For supply to/maintain heart muscles;  
 5. Normalise increased temperature that occurs;  
 6. Lactate mainly converted back into pyruvate;  
 7. Oxidised to  $CO_2$  and water;  
 8. Produces ATP (to credit must link back to 6 or 7)  
 9. In inactive muscles other organs (liver);  
 10. Some lactate converted to glucose/glycogen/protein;  
 11. Cori cycle in liver;  
 12. Some excreted in urine and sweat.

3 marks

- 2 (a) 1. Elite score higher on vigour/anger;  
 2. No difference/lower on other scores for both elite and non elite;  
 3. Iceberg profile;  
 4. Iceberg profile does not guarantee an elite performer 3 marks  
*(Credit annotated diagrams showing iceberg profile)*

**(b) Advantages**

1. High researcher: respondent ratio/lots of subjects at a time/quick/efficient;  
 2. Cheap/cost effective;  
 3. Numerical/objective measures achieved;  
 4. Reliable. Sub max of 3 marks

*(Do not credit easy)***Disadvantages**

5. Weak validity/non specific/too general/too simplistic for complex areas;  
 6. Tendency to give expected answer/lie/respond with demand characteristics/biased questions;  
 7. Difficult to self-assess;  
 8. Ambiguous questions/misinterpretation. Sub max of 3 marks

4 marks

- (c) (i) 1. Impulse is force x time/force applied in unit of time;  
 2. Equates to change in momentum/ $FT = mv - mu$ / $m_1v_1 - m_2v_2/m$  (v-u);  
 3. If mass constant equates to change in acceleration. 2 marks

- (ii) 1. Positive impulse clearly larger than negative impulse.

*Sub max 5 marks per section*

2. X Axis – time;  
 3. Y Axis – force;  
 4. Units of force shown as Newtons;  
 5. Units of time shown as milliseconds/less than 1 second;  
*(Do not credit seconds)*  
 6. Time shown intersecting at zero on force axes *(only credit if labelled force axis)*;  
 7. Positive and negative force labelled;  
 8. Shape of graph – negative and positive components of force shown with negative first;  
 9. Negative and positive components of impulse labelled. 6 marks

- 3 (a) (i) 1. Motor neurone/nerve;  
 2. And muscle fibres.  
 3. Number of motor units used could be varied;  
 4. Size of motor units could be varied;  
 5. All or nothing law;  
 6. Spatial summation;  
 7. Fast-twitch motor units produce more force/slow-twitch less force;  
 8. Repeated nervous stimulation without time to relax;  
 9. Produces stronger contraction in motor unit;  
 10. Wave summation/tetanic/tetanus. 5 marks

- (ii) 1. (Immediate energy) stored ATP/ATP-PC used;  
2. Anaerobic/alactic system/ATP-PC system;  
3. PC breakdown;  
4. To creatine and phosphate;  
5. Energy used/released (*only credit if linked to 4 or 3*);  
6. For ATP synthesis;  
7. Aerobic energy for recovery.

3 marks

- (b) 1. Theory from Zajonc;  
2. Presence of audience causes increased arousal;  
3. Increased drive/arousal means performer tries harder/drive;  
4. Increased likelihood of learnt dominant response;  
5. Effects depend on stage of learning;  
6. Early/cognitive stage – negative effects/social inhibition;  
7. Performer not fully developed appropriate response to demands;  
8. Later/associative/autonomous stages – performance enhanced by presence of audience;  
9. Enhancement effect more likely if simple task/gross skill;  
10. Impairment effect more likely if complex task/fine skill;  
11. If they think they are being judged negative effect is enhanced;  
12. This is known as evaluation apprehension.

7 marks

- 4 (a) (i) 1. Emergent – from within group/elected; (*do not credit emerge*)  
2. Prescribed – selected by someone outside the group/imposed.

2 marks

- (ii) 1. Successful leadership dependant on interaction;  
2. There are a variety of leader characteristics/styles;  
3. e.g. autocratic/democratic/laissez-faire;  
4. Best to adapt style to situation/group/members characteristic/  
5. Individuals vary in preferred style of leadership;  
6. And in expectations of leadership role;  
7. e.g. task orientated/autocratic preferred in team sports/groups;  
8. e.g. person orientated/democratic preferred in individual sports/moderately favourable situations;  
9. Situation varies in terms of demands it makes of leader/state of group (age/size/gender)/dangerous/least favourable;  
10. Task orientated/authoritarian approach needed when quick decisions needed/short preparation time available/least or most favourable situation.

6 marks

- (b) (i) 1. Maximum oxygen consumed/uptake/used/utilised/ability of muscles to use;  
(*Do not credit taken in*);  
2. Per minute/unit of time/Per unit of k/body weight/litres per minute.

2 marks

- (ii) 1. Increasing VO<sub>2</sub> max with increasing % slow twitch fibres;  
2. Direct/linear relationship.

*Sub max 2marks*

3. Slow-twitch fibres better at producing energy/ATP aerobically;  
4. Less susceptible to fatigue/buffer lactate;

5. Better for long duration/low intensity/endurance/slow energy/ATP provision;

*Sub max 2marks*

6. More mitochondria;
7. More myoglobin;
8. More oxidative enzymes;
9. More capillaries.

*5 marks*

5. (a) 1. First Law/Law of inertia– body remains in constant state of motion unless acted upon by a force;
2. High jumper applies force to change state of motion from run up to take off;
3. Second Law/Law of acceleration – magnitude of force governs acceleration (given at take off)/change of momentum;
4. Direction of force also governs direction of acceleration;
5. More force applied more height/vertical acceleration achieved;
6. Third Law/Law of action and reaction – to every force there is an equal and opposite reaction force;
7. Ground reaction force;
8. GRF needs to generate large vertical component for high jumping;
9. Muscular force or named muscle group.

*6 marks*

- (b) (i) 1. (Ability/ internal and unstable) – how good a performer you are and attributions such as “I’m not very good at tennis”, or “our team had too strong a middle for them”;
2. (Effort/internal/unstable) – how much commitment put into performance and statements such as “we were psyched-up to go all-out for that game”, or “I tried as hard as I possibly could”;
3. (Task difficulty/external and stable) – attributions concerning the opponents, such as “they were the league leaders” and attributions to the task itself, e.g., “the moves we tried were just too complicated”.
4. (Luck/external and unstable) – chance, random events and environmental factors, e.g. “we got all the breaks”, or “they had the ref on their side”.

*4 marks*

- (ii) 1. Self-serving bias – attributing successful outcomes to themselves/internally/suitable e.g.;
2. And attribution unsuccessful outcomes to others/externally/suitable e.g.;
3. Tendency/bias to want to protect own self-esteem;
4. Feel better if winning is down to your own efforts/losing outside your control;
5. Coach and performer might attribute performance differently.

*2 marks*

- (iii) 1. Learned helplessness – strong reaction to failure/leading to given up/avoidance behaviour;
2. Even if success is possible;
3. Caused by attributing failure to ability/internal factors;
4. Ability is stable/unchanging;
5. Therefore failure becomes predicted for the future/inevitable;
6. Can be global or specific/equiv

*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*