Version 1.1 0107

GCE 2007
January Series

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Sport and Physical Education 5581/6581

PED4 Physiological, Biomechanical and Psychological Factors Optimising Performance

Mark Scheme

2007 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.

Sport & Physical Education

Unit 4

General Instructions

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

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

(a) (i)
1. Pre-disposition to behave in a certain way/consistent/same behaviour
2. Inherited/genetic/born with/innate;
3. Enduring/stable/unchanging/same personality;
4. Eysenck and introvertism/neuroticism/Catell and 16PF; *3 marks*

(ii)
1. Instinct/drive to be aggressive/build up;
2. Shown as release of aggressive tendencies through sport;
3. Catharsis;

2 marks

(iii)
1. Tendency to become anxious in most situations;
2. Affects state anxiety/Higher competitive state anxiety
3. Competition seen as threatening/higher (evaluation) apprehension;
4. Increased cognitive/somatic anxiety
5. Fear of failure/worries about performance/making mistakes/loss of concentration/nervous/HR/sweaty palms/butterflies/nausea/worries about performance;
6. Increases arousal;
   Arousal can have a positive or negative effect on performance; *3 marks*

(b) (i)
1. Glycogen levels decrease during training and restored during recovery
2. Above resting;
3. It takes 24 hours to recover; *sub max 2 marks*

4. Glycogen used for energy/ATP formation/production;
5. Aerobic/oxygen;
6. Mitochondria/Kreb's cycle/pyruvate;
7. Supercompensation/overcompensation/adaptation; *3 marks*
   (points 4,5 and 6 are in the context of exercise/process)

(b) (ii) 1. Carboloading/glycogen loading/supercompensate/overcompensate/ glycoloading ;
2. Dietary restriction of carbohydrate;
3. Modified training programme/tapering;
4. Increase carbohydrate intake 24hrs prior to event
5. To store more glycogen than normal;
6. Carbohydrate intake during event; *3 marks*

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

(a)
1. Men have higher VO_2 max.
2. They use oxygen for aerobic energy/remove lactate more effectively;
3. Men have less fat/adipose tissue;
4. Men have larger skeleton/bigger frame;
5. Men have more/bigger muscle;
6. Men have more mitochondria/oxidative enzymes;
7. Men have more myoglobin;
8. Men have greater concentration of haemoglobin;/red blood cells/ erythrocytes/blood;
9. Men have larger heart size/larger stroke volume/ increased cardiac output;
10. Men have longer levers/greater mechanical advantage;
11. Lung size/capacity has no effect on performance. *5 marks*

(b)
1. ATP breakdown(resynthesis, regenerated);
2. From glucose/glycogen/carbohydrate;
3. From fat/triglycerides/fatty acids/glycerol;
4. beta oxidation;
5. Aerobic/using oxygen
6. (Anaerobic) glycolysis;
7. Pyruvate;
8. Mitochondria/Kreb's cycle;
9. Lactate formation; *4 marks*

(c)
1. Inevitable/expectation of failure;
2. Loss of motivation/leading to giving up;
3. Global/specific; *sub max 2*
4. Attribute failure to stable/internal factors/ability;
5. Suitable e.g./keeps losing to same competitor *3 marks*

(d)
1. Idea of realising that failure is not inevitable/teaching appropriate attributions; *Sub max 1 mark*
2. Allow performer to achieve success;
3. Attribute success to stable/ internal/ability/controllable factors;
4. Attribute failure to unstable/external factors/luck/task difficulty/effort/
5. Improve self-esteem/confidence/feel/good/motivation; *3 marks*

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

(a)
1. Vectors have magnitude/size;
2. Vectors have direction;
3. Point of application;
4. Line of application; *sub max 3*
5. Force applied to ground by muscles contracting
6. Equal and opposite reaction force moves performer/GRF producing the movement;
7. Vertical and horizontal components to vectors;
8. Sprinter requires large horizontal component/high jumper requires large vertical component; *sub max 3*

(accept annotated diagrams) *5 marks*

(b)
1. Force x time/Ft;
2. Equates to change in momentum/mv-mu; sub max 2
3. Constant mass;
4. Impulse has direction;
5. Single footfall;
6. Positive impulse for acceleration at take off;
7. Negative impulse when foot lands/breaking action;
8. Net impulse positive equals acceleration;
9. Graph annotated; *3 marks*

(c) (i)
1. Belief in ability to cope;
2. Situation specific; *2 marks*

(ii)
1. Performance accomplishments;
2. Previous success;
3. Vicarious experiences;
4. Watching others being successful/modelling;
5. Verbal persuasion;
6. Encouragement;
7. Emotional arousal;
8. Interpretation of own levels of arousal;
9. Visualisation/imagery; *5 marks*

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

(a)
1. Depends on incentive value probability of success;
2. Depends on personality traits/Nach and Naf types;
3. Nach likely to take (penalty)/Naf decline/accepts responsibility;
4. Nach – seek out challenges/takes risks/likes competition/50:50;
5. Enjoy evaluative situations/show that they can do it;
6. Not afraid of failure;
7. Approach behaviours;
8. Task persistence/seeks feedback;
9. Naf – preoccupied with failure/fear of failure/avoids challenges/competition;
10. Dislike evaluative situations;
11. Likely to perform worse;
12. Avoidance behaviours/avoids challenges/avoids 50:50 situations. *6 marks*

(b)
1. Fast-twitch (glycolytic) fibres/type 2b;
2. Fast motor neurone conduction velocity;
3. Large muscle fibre diameter;
4. More sarcoplasmic reticulum development;
5. Low mitochondrial density;
6. Low capillary density;
7. Low myoglobin content;
8. High PC stores;
9. High glycogen stores;
10. Low triglyceride stores;
11. High myosin ATPase / glycolytic enzyme activity;
12. Low oxidative enzyme activity;
13. Fast contraction / relaxation time;
14. High force production/more powerful;
15. Low fatigue resistance.

(Credit first type of muscle fibre named) *6 marks*

(c)
1. Muscle spindles are (stretch) receptors/propriocepters;
2. Force/resistance causes contraction or stretching of a muscle detected by muscle spindles;
3. Results in sensory impulses going to brain/spinal cord/CNS concerning state of contraction;
4. Muscle pre-sets tension based on information held in memory;
5. Gamma bias;
6. Tension adjusted through feedback of information to brain;
7. Gamma neurones activate spindle/intrafusal fibres;
8. Recruit more/bigger motor units*;*

3 marks

5 **Total for this question: 18 marks**

(a) (i)
1. Actual productivity – performance achieved by a team;
2. Potential productivity – teams' possible best performance;
Sub max 2 marks
3. Depends on resources;
4. E.g. ability/skills/knowledge/fitness. *3 marks*

(ii)
1. Co-ordination losses;
2. Player's skills are not interwoven into unity/tactical failings/lack of team work;
3. More interactive the sports the more difficult co-ordination of skills become/accept reverse;
4. Ringlemann effect;
5. Motivational losses;
6. Players not playing to their best/not trying
7. Social loafing; *4 marks*

(b)
1. Dividing training into periods/sections/for specific purpose/goals/targets;
Sub max 1 mark
2. Macrocycle – long term plan of single year/between Olympics/world Championships;
3. Mesocycle – monthly/weeks/period of training on particular aspect;
4. Microcycle – weekly/days/individual training sessions to improve specific area;
5. Just name cycles;

Or

1. Training year divided into competitive phase/peaking/tapering/playing season;
2. Involving preparation phase/pre-season training;
3. Transition phase/active rest/out of season recovery.
4. Three named periods such as pre-season training/out of season training etc.
3 marks

(c) (i) What are the functions of the *fast component* of EPOC.

1. Restoration of ATP / PC levels;
2. Resaturation of myoglobin/haemoglobin with oxygen; *2 marks*

(ii)
1. Removal of lactate/lactic acid;
2. By oxidation/aerobic energy production;
3. In other organs (liver)/muscles/Cori cycle;
4. Conversion to pyruvate- used as energy source;
5. To water and carbon dioxide;
6. Conversion to glycogen / glucose;
7. Some converted to protein / some excreted in sweat and / or urine;
8. Oxygen used to maintain high work rates of heart / breathing muscles;
9. Extra oxygen used as temperature remains high;
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*