AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

General Certificate of Education

Sport and Physical Education 5581/6581

PED1
Physiological and Psychological Factors which Improve Performance

Post Standardisation

Mark Scheme

2008 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.

1

The analysis of movement, development of fitness and the use of teaching styles may help teachers to improve the performance of their gymnasts.

Figure 1 shows a gymnast performing a press-up during a fitness session.

(a) (i) Using **Figure 1**, name the main *agonist* **and** the main *antagonist* acting at the elbow as the gymnast moves from **Position A** down to **Position B.**

(*2 marks*)

2 marks for 2 of:
1. Agonist – triceps (brachii)
2. Antagonist – biceps (brachii)

(ii) Name the type of muscle contraction that occurs in the main agonist at:

- **Position A**, whilst the gymnast is stationary

- As the gymnast moves from **Position A** down to **Position B.**   (*2 marks*)

2 marks for 2 of:
*1. Position **A** isometric*
*2. Position **B** eccentric/isotonic*

(iii) Using **Figure 1**, identify through what plane **and** about which axis the action at the elbow joint takes place.   (*2 marks*)

2 marks for 2 of:
1. Saggital median plane
2. Transverse/horizontal/medio-lateral axis

(b) Press-ups may be used as a maximal test for measuring local muscular endurance.

What factors need to be considered by the teacher when conducting maximal tests?   (*3 marks*)

3 marks for 3 of:
1. The test will involve going to exhaustion/push to limits
2. Therefore motivation aspect to be considered
3. Safety considerations or relevant egs/fitness level of participant/health
4. Correct technique/procedure being used
5. Comparison to norms/chart/national averages and others
6. Accessibility of appropriate equipment/working properly/calibrated

(c) Mosston identified a range of teaching styles, each represented by a letter on the model shown in **Figure 2**. The teaching style at **A** is the command style, whilst **F** is the discovery style.

(i) What factors should the teacher consider when selecting an appropriate teaching style?   (*4 marks*)

4 marks for 4 of:
1. ***Task** analysis*
2. *Demands placed on performer*
3. *Classification/complexity/organisation/nature/type of skill*
4. *Danger/safety/egs*
5. *Distribution of practice*
6. ***Learner**-individual/group characteristics*
7. *Students' age*
8. *Students' level of fitness/ability/skill/knowledge/attitude/experience/ behaviour/motivation/personality*
9. ***Situation**/environmental factors/egs - weather*
10. *Staffing/size of group*
11. *Facilities/resources/equipment*
12. *Time constraints*

(ii) The teacher decides to use the discovery style of teaching. Explain this style of teaching identifying the advantages of using this style when teaching activities such as gymnastics. (*5 marks*)

Sub max 1 mark
1. *Involves the teacher guiding the learner to find the correct pattern by giving clues or asking questions/teacher input with learner/making decisions*

Sub max 4 marks
2. *Teacher acts as a facilitator*
3. *Allows more than one solution to the problem/variety of approaches*
4. *Encourages creativity*
5. *Develops decision making skills/more challenging/thinking for themselves/cognitive*
6. *Development of learning is students' responsibility/encourages independence*
7. *Work at one's own pace*
8. *Develop greater understanding of task/more likely to remember*
9. *Increased motivation and/or confidence/interesting/exciting/self satisfaction/sense of achievement*
10. *Improves communication skills/group interaction/team work*

2

Nervous and hormonal systems influence the heart during physical activity. A swimmer completes a 1500 m race, with sub-maximal effort, in 20 minutes.

Describe the variations in heart rate **and** how these changes are achieved during the:

(a) (i) rest period immediately prior to the start of the 1500 m race (*2 marks*)

Sub max 1 mark
1. *Heart rate increases/anticipatory rise*
Sub max 1 mark
2. *Adrenaline/noradrenaline released*
3. *By sympathetric nervous system*
4. *Parasympathetic/vagus system decreases in activity*

(ii) 1500 m race (exercise period) (*4 marks*)

Sub max 2 marks
1. *Heart rate rapidly increases*
2. *Steady state achieved body demands being met/reach plateau*
Sub max 3 marks
3. *Propriceptors/mechanoreceptors detect movement*
4. *Production of CO_2/increased blood acidity/ph falls/increase in H^+ ions*
5. *Stimulates chemoreceptor (in aorta/carotid/carotid body/entry)*
6. *Stimulates medulla in brain*
7. *Increased sympathetic stimulations/release of adrenaline/noradrenalin/ norepinephrine*
8. *Sino atrial node stimulated*

(iii) five-minute recovery period after the 1500 m race. (3 *marks*)

Sub max 1 mark
1. *Heart rate is maintained <u>and</u> then drops*
2. *Heart rate drops rapidly <u>and</u> then slows down*
Sub max 2 marks
3. *Increased heart rate raises blood pressure*
4. *Stimulates baroreceptors*
5. *Increases parasympathetic/vagus system*
6. *Decrease sympathetic system stimulation*
7. *Release of acetylcholine*

Performers perfect their techniques using guidance given to them by their coach.

(b) (i) Name **and** explain, using examples from swimming, **three** methods of guidance that a coach could use. (*6 marks*)

6 marks for 6 of:
1. *Naming of verbal, visual, manual/mechanical guidance*
2. ***Visual*** *guidance – watching/seeing a demonstration/creating a mental picture*
3. *Coach show arm/leg action on side of pool/uses student to demonstrate action*
4. ***Verbal*** *guidance – coach explains the motor skill to be performed*
5. *Coach uses key/specific/general teaching points i.e. break the surface with toes/arm brushing ear*
6. ***Manual/mechanical*** *guidance – the performer being physically placed/forced/supported*
7. *Use of floats/hand/or coach moves swimmers limbs/use rope/hand*

(ii) State **one** form of guidance and outline its potential disadvantages. *(3 marks)*

3 marks for 3 of:
Visual
1. *De-motivation if performer is unable to replicate skill*
2. *Too much information for novice performer*
3. *Poor replication if demonstration is inaccurate*
4. *Static forms soon lose impact*
5. *Unable to see essential detail limits performer*

Verbal
1. *Overload of information*
2. *Difficulty in understanding, particularly novice performers*
3. *Some movements difficult to explain*
4. *Difficult with large groups*
5. *Boring*
6. *Over reliance on feedback*

Manual/mechanical
1. *Performer becoming too reliant on help*
2. *Lack of/limited/distorted intrinsic feedback/kinaesthetic*
3. *Unable to correct independently*
4. *Difficult in large groups*
5. *Limited use in complex/ballistic movements*

3

Athletes such as triple jumpers, will demonstrate a range of skills and abilities whilst performing.

(a)   (i)   Explain the terms *skill* and *ability*.   (*2 marks*)

2 marks for 2 of:
1. *Skill is <u>learnt</u>*
2. *Ability something genetic/inherited/innate/born with*

(ii)   What are the **characteristics** of skilled performance?   (*3 marks*)

3 marks for 3 of:
1. *Consistency/repeatable <u>success</u>/very few mistakes/maximum certainty*
2. *Efficiency/minimisation of time*
3. *Co-ordination/controlled*
4. *Fluency/flowing/smooth*
5. *Adaptable*
6. *Minimal outlay of energy/effortless*
7. *<u>Aesthetically</u> pleasing*
8. *Goal orientated behaviour/predetermined/intention matches outcome*
9. *Precise/accurate/correct*

(iii)   Explain where you would place the triple jump on the discrete - continuous continua, and how this information could be used by a coach to improve an athlete's performance.   (*4 marks*)

Sub max 1 mark
1. *Serial – in btw the two/middle of continuum – several discrete skills put together in order*
Sub max 3 marks
2. *Coach could identify strengths/weaknesses*
3. *Practice parts in isolation/concentrate on weakness/broken down*
4. *Using <u>part method/progressive part method</u>/practice*
5. *Then practice the whole action again with adjustments*

As part of their training programme, athletes undergo regular fitness testing.

(b)   What do you understand by the term *power*? Describe how it can be measured.

(3 marks)

Sub max 1 mark
1. *Power – the work done per unit of time/product/combination of strength and speed*
Sub max 2 marks
2. *Could be measured by vertical jump/sargant jump*
3. *Mark standing reach/height on wall/target*
4. *Measure height/cms/inches achieved and jump height/stretch by a single jump*
    or
5. *Could be measured by standing long jump/broad jump*
6. *Measure from line to heels/distance achieved/cms/inches*
    or
7. *Could be measured by Margaria Test*
8. *Subject sprints up steps three at a time*
9. *Time taken for number of stairs/between 3rd and 9th step*
10. *Power calculated as product of mass/weight, distance and time*
    or
11. *Could be measured by the Wingate Test*
12. *Subject continues to pedal all out for 30 seconds*
13. *Peak Power Output is product of force, distance and time/watts/Relative Peak Power Output/PP divided by body mass/watts*

Training may cause changes to the heart that will aid performance through increased fitness.

(c)   What structural and physiological changes may occur to the heart of an athlete following:

- an endurance training programme
- a strength/power training programme?   (*3 marks*)

3 marks for 3 of:
1. *Larger stroke volume/blood ejected per beat*
2. *Greater diastolic filling*
3. *Starling's Law*
4. *Increased <u>maximum</u> cardiac output*
5. *Increased ejection fraction/proportion of blood ejected*
6. *Increased force of contraction/contractility/heart beats stronger/more powerful*
7. *Cardiac hypertrophy/Athletes Heart*
8. *<u>Endurance</u> – larger ventricular cavities*
9. *Reduced <u>resting</u> heart rate/bradycardia*
10. *<u>Strength</u> – thickening of myocardial wall/ventrical wall thicker*
11. *(Increased) Capillarisation*

(d)   Describe the mechanisms that assist the return of blood to the heart.

(3 marks)

3 marks for 3 of:
1. *Venous return mechanism*
2. *Valves in veins allow blood to flow in one direction only*
3. *Skeletal muscle pump squeezing blood in veins of legs*
4. *Respiratory pump through breathing squeezing blood in chest/cause pressure changes*
5. *Sympathetic nerves causing veins to contract*
6. *Suction pump action of heart*

4

Games players need an adequate supply of oxygen to maintain performance throughout the game.

Figure 3 shows values for the partial pressure of oxygen and carbon dioxide at different points in the pulmonary circulatory system.

(a)   (i)   Describe **three** structural features of lungs that assist the diffusion of respiratory gases.   (*3 marks*)

3 marks for 3 of:
1. *Large surface area of alveoli/capillary density*
2. *Thin (epithelial) membrane/one cell thick*
3. *Short diffusion pathway/nearness of capillaries*
4. *Large differences in concentration (gradients)*
5. *Rapid removal of gases from area/effective blood supply*
6. *Layer of moisture*
7. *Slow movement/compression of blood cell*

(ii)   Using **Figure 3,** explain how the diffusion of oxygen and carbon dioxide takes place.   (*3 marks*)

3 marks for 3 of:
1. *Diffusion takes place when a difference in partial pressures/concentration gradient*
2. *Oxygen moves from atmosphere into alveolus*
3. *Oxygen diffuses from alveolus into pulmonary capillary*
4. *Because of the difference of 159/103 mmHg and 103/35 mmHg*
5. *Carbon dioxide diffuses into alveolus (from pulmonary capillary)*
6. *Because of the difference of 44/38 mmHg*

(iii)   What changes would you expect to see in **Figure 3** if the performer had just undergone a period of strenuous exercise?   (*3 marks*)

3 marks for 3 of:
1. *Reduced pO_2 in (pulmonary) artery*
2. *Increased pCO_2 in arteriole/capillary*
3. *Increased pCO_2 in alveolus*
4. *Reduced transit time in (pulmonary) capillary/blood moves faster through capillary*

A knowledge of learning theories may help coaches to improve the performance of games players.

(b) (i) Using examples, explain how a coach could use *positive reinforcement* to improve the performance of her players. *(2 marks)*

2 marks for 2 of:
1. *Praise*
2. *Use of reward/Man of Match/egs*
3. *Strengthens the S-R bond/increases the probability of repeating the action*
4. *Success at the skill/self satisfaction*

(ii) Explain the terms *negative reinforcement* **and** *punishment,* giving examples of each from a game activity. *(4 marks)*

4 marks for 4 of:
1. *Negative reinforcement – when an adverse stimulus is withdrawn when the desired response occurs*
2. *Eg – removal of criticism from coach when a player is successful/equiv*
3. *Punishment – giving a stimulus to prevent a response reoccurring*
4. *Eg – being shouted at/press ups/sin bin*

(c) What factors should a coach consider to ensure that *observational learning* is effective? *(3 marks)*

3 marks for 3 of:
1. *Make sure the learner understands the importance/relevance to the final performance/meaningful/specific/pays attention*
2. *Audience can see and hear demonstration*
3. *Use of role model/significant other/parent/teacher/coach*
4. *Demonstration by someone of a similar age/ability/sex/attitude/peers*
5. *Breakdown skill into components/highlight main points of technique/show from various angles/speeds/repeat demonstration*
6. *Minimum delay between instruction and demonstration/mental rehearsal*
7. *Allow time for practice/mental rehearsal*
8. *Model is accurate/clear/perfect/quality of demonstration/short duration/succinct*
9. *Reward/reinforce behaviour/successful/winner*

5

For effective performance, games players require the ability to receive, interpret and use information.

(a) (i) Selective attention is an important part of information processing. Using **Figure 4,** identify where *selective attention* occurs **and** explain how it aids performance. *(3 marks)*

3 marks for 3 of:
1. *Short term sensory store/between STSS and STM*
2. *Responsible for selecting relevant information (credit appropriate eg)*
3. *From irrelevant information (credit appropriate eg)*
4. *Allows to focus/concentrate on relevant information/allows to keep information in STM for longer*
5. *To prevent information overload*

(ii) How can a coach improve a performer's selective attention? *(3 marks)*

3 marks for 3 of:
1. *Increase intensity of the stimulus/allow egs brighter ball*
2. *Motivate/arouse the performer*
3. *Referring to past experiences (use transfer)*
4. *Cue identification/direct attention to one aspect of performance/highlight cues*
5. *Learn to ignore irrelevant stimulus/practice with distractions*
6. *Make stimulus meaningful or unique (wave goodbye to a basketball)*

(b) Using **Figure 4**, explain how information processing will differ between a novice and an experienced player in possession of a ball, when confronted by a defender. *(4 marks)*

4 marks for 4 of:
STSS
1. *Novice – may select irrelevant information, or Experienced – select relevant information*
2. *Novice – aware of crowd or other named egs, or Experienced – ignores crowd/focuses on team mates*
STM
3. *Novice – decision making is poor/inappropriate/slower, or Experienced – quicker/appropriate*
4. *Novice – unable to decide whether to pass, shoot or dribble, or Experienced – will choose pass to the right player etc*
LTM
5. *Novice - limited experience/motor programmes, or Experienced – more previous experience/wider variety of motor programmes*
6. *Novice – passes to closest player or runs into defender, or Experienced – variety of different responses for different solutions*

(c) (i) Using **Figure 5**, copy and complete **Table 1** into your answer book to show the type of joint action, the main agonist and the type of muscle contraction that has occurred at the knee. *(3 marks)*

3 marks for 3 of:

Type of joint action	*Flexion*
Main agonist	*Hamstrings*
Type of muscle contraction	*Concentric/isotonic*

(ii) Name, sketch and label the lever system operating at the knee during the performance of this action. *(3 marks)*

3 marks for 3 of:
1. *3rd class/order*
2. *Correct labels – effort or force//fulcrum or pivot/load or weight/resistance*
3. *Correct order – effort in the middle*

(iii) Draw and label the *effort arm* and the *resistance arm* on your sketch.

(2 marks)

2 marks for 2 of:
1. *Effort arm – from effort to fulcrum*
2. *Resistance arm – from resistance to fulcrum*

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.   *3 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.   *2 – 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 3marks