

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Advanced Level**

## **MARK SCHEME for the October/November 2013 series**

### **9396 PHYSICAL EDUCATION**

**9396/31**

Paper 3 (Theory), maximum raw mark 90

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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**Section A**  
**Exercise and Sport Physiology**

- 1 (a) The 2012 Olympic Men's 400 metre title was won with a time of 43.94 seconds. Describe how the energy is provided to run a 400 metre race.

**6 marks for 6 of:**

1. Anaerobic / without oxygen / sarcoplasm
2. (Initially in first few seconds) stored ATP splits/breaks down
3. ATP breaks down to ADP + P + energy
4. ATP-PC system / phosphocreatine system / alactic system
5. PC = C + P(i) + energy/creatine + phosphate/PC broken down;
6. **Energy** used for ATP resynthesis / ADP + P + energy = ATP/ADP + PC = ATP + C
7. Lasts 5–10 seconds / first 80-100 metres of race
8. Lactic acid system / Lactate anaerobic system /anaerobic glycolysis
9. Glycogen/glucose breakdown
10. ...by enzyme phosphofructokinase / PFK / glycogen phosphorylase / GPP
11. Forms pyruvate / pyruvic acid
12. Lactate / lactic acid formed

- (b) Explain the term OBLA and identify the factors that affect it during exercise.

**4 marks for 4 of:**

**Sub max of 3 marks:**

(Explanation)

1. OBLA – Onset of blood lactate accumulation
2. Occurs at 55–60% of VO<sub>2</sub> max untrained performers / 85-90% trained performers
3. Lactic acid reaches 4 millimoles per litre or 4 mmol/litre

**Sub max of 3 marks:**

(Factors)

4. Intensity of exercise
5. Respiratory exchange rate / RER
6. Muscle fibre type used in activity
7. Rate of blood removal / buffering capacity of blood
8. Fitness level of the performer / training
9. Soda loading / bicarbonate of soda (can delay OBLA)

- (c) Athletes should apply the Principles of Training correctly to improve their performance levels.

**Outline the principle of specificity, applied to a training programme.**

**4 marks for 4 of:**

1. Training must be relevant to the sport (**NOT: specific to sport**)
2. Intensity of training personalised to performer / calculate personal training intensities
3. Train using correct energy system
4. Train the relevant muscle groups
5. Train the relevant muscle fibre types / fast twitch / slow twitch
6. Replicate sporting skills / movements / sporting environment
7. Train the relevant fitness components e.g. speed / stamina / power or equivalent

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8. Train for similar time / duration of activity / intensity of activity

**(d) Following exercise, a performer may experience delayed onset of muscle soreness (DOMS). How can a cool-down reduce the chance of DOMS occurring?  
3 marks for 3 of:**

1. Oxygen demand remains above normal levels / HR remains elevated
2. Blood vessels remain dilated / **increased** blood flow to working muscles
3. **Increased** oxygen to muscles
4. Increased removal of lactic acid/carbon dioxide
5. Increased venous return
6. Stops blood pooling

**(e) Sporting activities may require different types of strength.**

**(i) Name and explain two types of strength and outline how each is used in a sporting activity.**

**2 marks for 2 of:**

(Accept first two answers only / term and explanation for one mark)

1. Maximum strength + maximum force in one contraction / e.g. weight lifting or shot putter
2. Explosive/elastic/dynamic strength + fast repeated contractions / e.g. triple jumper or gymnast vault
3. Strength endurance/muscular endurance + repeated contractions to **withstand fatigue** / high force of contraction sustained for an extended period of time (30 sec +) e.g. swimmers or rowers
4. Static strength + ability to maintain an isometric contraction / hold body in a position of stillness for a period of time / e.g. gymnastic balance or waiting on the starting blocks

**(ii) Weight training is a method of improving strength. Explain how a weight training programme can be designed to develop each of these two different types of strength.**

**6 marks for 6 of:**

**Sub max 3 for each type of strength** (type of strength must be identified):

1. **Calculate** one rep max  
(Maximum strength)
2. High weights and low reps
3. 85–100% of 1 Rep Max / 1–6 reps
4. 3–8 sets
5. Pyramid sets / increase weights and decrease number of reps
6. Recovery – 3 minutes+ / full recovery (between sets)  
(Explosive/elastic strength)
7. Medium weights and reps
8. 70–75% of 1 Rep Max / 10–12 reps at speed
9. 3–5 sets
10. Recovery – 3 minutes+ / full recovery (between sets)  
(Strength endurance)

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11. Light weights and high reps
12. 50-60% of 1 Rep Max / 15–20 reps
13. 3–5 sets
14. Recovery – 30–60 seconds / partial recovery (between sets)  
(Static strength)
15. Very high weights and 1 rep only
16. 130–200% of 1 Rep Max / held for 5–20 seconds
17. 3–8 sets
18. Recovery – 30–60 seconds / partial recovery (between sets)

**(f) Performers use ergogenic aids to try and improve their performance. Explain the benefits of carbohydrate loading and describe how an endurance athlete would use this method before a race.**

**5 marks for 5 of:**

(Benefits)

1. Increase muscle glycogen stores / super-compensation
2. Avoids having to use fat as an energy source
3. Delays fatigue / increases endurance capacity / increased ATP/energy production / delays hitting the wall

**Sub max of 4 marks:**

(Method 1)

4. Reduce glycogen levels (7 days before race)
5. Achieved by increased endurance training / training at high intensity
6. Then three days of low carbohydrate diet / diet high in proteins and fats
7. (3/4 days before race) tapering / reduction in training levels
8. (and) high carbohydrate diet / e.g. pasta **(allow: the night before the race)**
9. Trained/elite athletes may rest for several days before eating high carbohydrate diet
10. Increased water consumption helps the process

(Method 2)

11. Day before, complete 3 minutes of high intensity exercise
12. Opens a Carb window
13. Immediately/within 20 minutes intake high carbohydrate diet
14. Carb window only lasts 2 hours / carbohydrates must be eaten within two hours of exercise.

**[Total: 30]**

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**Section B**  
**Psychology of Sports Performance**

- 2 (a) Define the terms aggression and assertion. Describe three methods a coach can use to reduce aggression in a performer.**

**5 marks for 5 of:**

**Sub max of 2 marks:**

(definitions)

1. aggression is the intent to harm outside the rules of the game
2. assertion is forceful behaviour within the rules

**Sub max of 3 marks:**

(eliminating aggression)

3. somatic relaxation techniques / lower arousal / calm down / breathing exercises / use biofeedback
4. Cognitive relaxation techniques / imagery / mental rehearsal / count to 10 / meditate / positive self-talk
5. Selective attention / block out cues that might cause aggression / stress performance rather than outcome goals / set non-aggressive goals / reduce importance of event
6. Use of punishment / negative feedback / educate about outcomes / recognise implications of aggression
7. Remove from the situation / remove performer from aggressive cues / substitute/change positions in team / walk away
8. Positively reinforce non-aggression / use assertion techniques / displace feelings / take aggression out on something else
9. Use positive / assertive / non-aggressive role models / give position of responsibility to performer

- (b) A performer's need to achieve is often viewed as necessary for good sports performance.**

**Describe the features of a 'need to achieve' performer.**

**4 marks for 4 of:**

1. Shows approach behaviour
2. Is more competitive
3. Likes a challenge
4. Shows persistence / determination / does not give up easily
5. Likes / seeks feedback from others
6. Takes risks / is confident / (aspires to) mastery orientation
7. Not afraid to fail / views failure as a route to success
8. Attributes success internally or to stable factors
9. Attributes failures to unstable or to controllable factors

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**(c) Identify three characteristics of an effective leader in sport.**

**3 marks for 3 of:**

1. Good communication skills
2. Highly motivated / enthusiastic
3. Clear goal / vision / focus on what needs to be done
4. Empathy / gets on well with team mates / can see others' points of view
5. Good at sport themselves
6. Good knowledge of the sport
7. Charismatic / has presence / commands respect / influential / good motivator
8. Is flexible in approach / can adapt / can use a variety of different styles

**(d) Bandura's self-efficacy theory shows that self-efficacy or self-confidence can be influenced by the following four factors:**

- **performance accomplishments**
- **vicarious experiences**
- **verbal persuasion**
- **emotional arousal**

**Explain how each factor can influence self-efficacy in sport.**

**4 marks for 4 of:**

1. (Performance accomplishments)  
experiencing success can raise confidence that can influence performance
2. (Vicarious experiences)  
observation of success can raise confidence
3. (Verbal persuasion)  
encouragement can increase confidence
4. (Emotional arousal)  
the level of arousal can affect confidence / controlling arousal can help confidence

**(e) Elite performers in sport competitions often describe themselves as being 'in the zone'.**

**Explain the term zone of optimum functioning.**

**4 marks for 4 of:**

1. An emotional/affective response / enjoyment/satisfaction/fulfilment
2. Referred to as a peak flow experience
3. Associated with the perception of 'doing well' or having a good performance
4. High level of confidence / self-efficacy / mastery orientation
5. Is relaxed / lack of stress response / not anxious
6. Ideal/optimal level of arousal of the performer / high level of motivation that is under control / high level of inner drive / self-motivation / optimum level differs between individuals
7. Performer has maximum concentration and effort / is focused / has appropriate attentional control / (often) narrow / internal attention / cue utilisation is good
8. Movements are automatic / little conscious control / autonomous

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**(f) Identify the four components of Weiner’s attribution model. Give a practical example for each component identified.**

**4 marks for 4 of:**

(Practical example must be given for marks to be awarded)

1. External/extrinsic/environmental/uncontrollable attributions e.g. the weather/luck/task difficulty/other players etc.
2. Internal/intrinsic/dispositional/personal/controllable attributions e.g. effort/determination/ability etc.
3. Stable/unchanging/persistent/enduring attributions e.g. task difficulty/opposition/ability etc.
4. Unstable/changeable attributions e.g. effort / tactics / luck etc.

**(g) ‘Trait’, ‘social learning’ and ‘interactionist’ are three different personality theories. Describe these three theories of personality and explain how they affect sports performance.**

**6 marks for 6 of:**

**2 marks max for each theory** (explanations must relate to sports performance):

(Trait perspectives)

1. Natural / innate / stable / enduring / generalised behaviours
2. In sport you will display similar behaviours in all situations.

(Social Learning)

3. We observe **and** copy behaviour / copy significant others/role models.
4. In sport this can be positive if others show functional behaviour / can be negative if they show dysfunctional behaviour.

(Interactionist)

5. Characteristics determined by interaction between traits and situation / interaction with the environment.
6. Behaviour changes depending on the perception of the demands of the situation/environment / in sport you may be competitive because the situation demands that you are.

**[Total: 30]**

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**Section C**  
**Olympic Games – A Global Perspective**

**3 (a) Explain the features of the Ancient Olympic Games which have acted as a blue print for the Modern Olympic Games.**

**6 marks for 6 of:**

1. Regarded as a festival of sport
2. Had an opening ceremony / no cheating oath taking ceremony
3. Held over a five day period
4. Originally only a running race / 192metres
5. Pentathlon / present day events such as discus/javelin/running/long jump / other “ancient” events that were included in first Modern games
6. Longer distance athletic races
7. Heralds went round all land proclaiming the forthcoming event / similar to Olympic torch
8. Athletes were expected to train / Greeks took sport seriously / best athletes took part
9. Event was held every four years
10. Truce / warfare ceased in an attempt to unify all states / Greek nation very split
11. All states contributed to the expense of new stadia
12. Women not allowed to watch or take part / women not allowed in the first Modern Olympic Games
13. Prize giving ceremonies / (ancient) olive wreath or branch **and** medals in Modern Olympics

**(b) Each nation which hosts the Modern Olympic Games hopes for a positive legacy. Explain how this legacy can be used to benefit the host nation.**

**6 marks for 6 of:**

1. New neighbourhoods / use of village for housing
2. Employment / jobs created (most marked pre games)
3. Skills/use of technology in building / increase knowledge base
4. Increase in sport participation / new sports to be experienced
5. Disability awareness
6. Centre for tourism and culture / develop visitor income
7. Legacy momentum / the capacity of a country to continue economic upward growth
8. Knowledge base gained used to promote further innovation and development
9. Other cities to be used as training centres
10. Promotes cultural integration / pride / feel-good factor / brings nation together
11. Educational programmes (which contribute to positive models of behaviour)



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(c) How might a country identify and nurture talent in order to win Olympic medals?

6 marks for 6 of:

1. Elitist methods / select the best / give these athletes full backing / at the expense of others / focus on certain sports
2. Pursue the win at all costs ethic / encourage / turn a blind eye to deviance
3. Government / state gives status and funding to high level sport
4. (Create a structure/methods to) identify and test talent at a young age / sports schools / highly structured PE programmes
5. State funding for talent development / scholarships
6. (Create a) competition structure / avenue for international competition
7. Have many athletes in a programme so that wastage is not noticed
8. Create coaching / training / facilities / training camps / support structure for top level athletes
9. Encourage a sporting culture / involvement from a young age in sporting activity

(d) How might the host nation ensure the safety of the athletes taking part in the Olympic Games and protect them from terrorist attacks?

3 marks for 3 of:

1. Understanding that terrorist attacks will receive high levels of publicity in world games / terrorist attacks likely
2. High levels of security at all facilities/village
3. Funding to ensure high levels of policing
4. Accreditation system for all athletes and officials
5. Advanced policing technology
6. Assistance from other nations to identify areas of concern

(e) Describe the bidding and selection process to select the host of the Olympic Games.

4 marks for 4 of:

1. Bidding is an 8 year process / begins 9 years before Games.
2. Cities submit bid / candidature file to IOC (**Not: Countries**)
3. Candidates reply to a questionnaire / 23 subject areas
4. Give detailed plan / arguments supporting their bid
5. Must have municipal/commercial/social support
6. Backed by government guarantees
7. Lobbying of / personal approaches to IOC members to ensure their votes
8. Expensive attempts by prospective hosts to influence IOC members
9. Members of **evaluation commission** visit bid cities (not IOC members)
10. Information for voting comes from answers to questionnaire / evaluation commission report / city presentation to IOC session

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**(f) Explain the importance of the Paralympic Games.**

**5 marks for 5 of:**

1. Given importance alongside Olympic games / host city bids for both at same time
2. Avenue for development of positive attitudes towards people with disabilities / removal of stereotyping / prejudice
3. Avenue for integration and inclusion of people with disabilities
4. Showcase for people with disabilities to show their ability
5. Showcase for overcoming difficulties / severe limitations
6. To give people with disabilities role models / awareness of opportunities
7. Promote the ethics of inclusion in sporting society / promote sport for all
8. Used as a model for social change
9. Use of the word Paralympic meaning parallel
10. Overcoming barriers of human rights / tolerance / acceptance
11. Another opportunity to bring nations together

**[Total: 30]**