

CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Advanced Subsidiary Level

MARK SCHEME for the October/November 2013 series

9396 PHYSICAL EDUCATION

9396/12 (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:

Applied Anatomy and Physiology

- 1 (a) Identify the items 1–5 in the table below, to describe a movement analysis of the hip and ankle joints of the striking leg during a penalty kick, from Position A to the finishing Position B. Include the type of muscle contraction, the type of movement and the joint type.**

5 marks for 5 of:
1st answer only

	Muscle Contraction	Movement	Joint type
Hip Joint	1. Isotonic/concentric	2. Flexion	3. Ball & Socket
Ankle Joint		4. Plantar flexion	5. Hinge

- (b) Identify the muscle fibre type a marathon runner would predominantly use during a long-distance race. Explain how the structure and function make the fibres suitable for this activity.**

4 marks for 4 of:

- 1 Slow twitch muscle fibres / type 1 / slow oxidative
- 2 High number of mitochondria
- 3 High myoglobin content
- 4 High capillary density
- 5 Ability to resist fatigue
- 6 High aerobic/oxidative capacity
- 7 Low speed of contraction
- 8 Small motor neuron size
- 9 Small muscle fibre diameter
- 10 Low force production
- 11 Low glycolytic content
- 12 Low Myosin ATP levels
- 13 Low PC stores
- 14 High triglyceride stores
- 15 Wide Z-line thickness
- 16 Few fibres per motor neuron

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(c) During exercise, the heart rate increases.

(i) Explain how neural and hormonal factors regulate the heart rate during and after exercise.

4 marks for 4 of:

- 1 Controlled by medulla/cardiac (control) centre
- 2 Sympathetic pathway – increases heart rate
- 3 By releasing adrenaline/noradrenaline
- 4 Increase stroke volume / ejection fraction
- 5 Parasympathetic pathway / vagus nerve – decreases heart rate
- 6 By producing Acetylcholine
- 7 (Both) act on sino atrial node/SAN

(ii) Identify and explain the factors that affect the stroke volume of the heart during exercise.

2 marks for 2 of:

- 1 Venous return – increases causing more blood to be returned to the heart
- 2 Contractility – stronger/more forceful/powerful the cardiac muscle contraction – bigger SV
- 3 Ejection Fraction – increased percentage volume of blood per contraction
- 4 Starling's Law/Frank Starling Mechanism – elasticity of cardiac muscle/ventricles stretch more allowing more blood to be pumped out
- 5 Increased end diastolic volume

(d) During a sporting contest the body requires an efficient supply of blood.

(i) Outline the function and processes of the pulmonary circulatory system.

4 marks for 4 of:

Credit function to permit process

- 1 (function) transport deoxygenated blood from right ventricle / heart to lungs
- 2 (process) via pulmonary artery
- 3 (function) carbon dioxide removed/oxygen re-saturated
- 4 (process) occurs in the lungs
- 5 (function) (re-)oxygenated blood returned to the (left side of the) heart/left atrium
- 6 (process) via pulmonary vein

(ii) During an activity, such as a marathon, performers run at a sub-maximal level for most of the race. Explain the changes in blood pressure that occur, within the heart, during sub-maximal exercise.

3 marks for 3 of:

- 1 Systolic phase pressure increases
- 2 (Average figures) 120mmHg increase up to 200mmHg
- 3 (cause) increase in cardiac output/heart rate
- 4 (cause) vasoconstriction of arterioles / vascular shunting
- 5 Systolic pressure decreases when steady state reached
- 6 Diastolic phase pressure shows little change

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(e) When exercising, the respiratory system plays an important role in gaseous exchange.

(i) Describe the changes that occur to the mechanics of breathing during exercise.

3 marks for 3 of:

- 1 (During exercise) rate and depth of breathing increases
- 2 (Inspiration aided by specific muscles) sternocleidomastoid/scalenes/pectoralis minor
- 3 Increase the size/volume of the thorax/chest cavity
- 4 (Expiration aided by specific muscles) internal intercostal muscles/abdominals
- 5 Pull ribcage quickly downwards

(ii) A structured endurance training programme causes long term physiological changes to occur. Explain how the gaseous exchange process becomes more efficient.

5 marks for 5 of:

- 1 Increased capillary density / more capillaries at alveoli and/or muscle
- 2 Increased blood flow to lungs / greater pulmonary diffusion/gradient
- 3 Increased maximal minute ventilation
- 4 Increased number and size of mitochondria
- 5 Increased myoglobin content
- 6 Increased $a\text{-VO}_2$ diff/ VO_2 max
- 7 Increased blood volume/plasma
- 8 Increased red blood cells/erythrocytes/haemoglobin
- 9 Lower blood viscosity
- 10 Increased oxidative enzymes
- 11 Increased glycogen/triglyceride stores
- 12 Decreased lactate threshold/OBLA
- 13 Cardiac hypertrophy/bradycardia – less oxygen used by heart – more available

[Total 30]

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Section B:

Acquiring, Developing and Performing Movement Skills

2 (a) Skilful performances are often:

- goal directed
- follows technical model
- aesthetically pleasing

Describe practical examples of the performance of movement skills to show what is meant by each of these characteristics.

3 marks for 3 of:

(Must be relevant practical examples)

- 1 (Goal directed) e.g. the tennis player pre-plans/intends her serve to get close to the edge of the service box with spin/known result
- 2 (Follows technical model) e.g. the batsman in cricket uses a learned/repeated forward defensive shot to hit the ball
- 3 (Aesthetically pleasing) e.g. the gymnast shows fluid dance moves to link her moves together so that they look good/equiv

(b) Bandura's Theory of observational learning includes the four elements: attention, retention, motor reproduction and motivation. Explain each of these elements for learning a movement skill in sport.

4 marks for 4 of:

n.b. – do not credit repeated terms – attention/retention/motivation

- 1 (Attention) observer/performer cues in to or selectively attends to or focuses or concentrates (on aspects of display or demonstration)
- 2 (Retention) observer/performer needs to remember the demo or movements or behaviours watched
- 3 (Motor reproduction) observer/performer must be capable of performing the skill / information must be at a level relevant to performer / performer must be able to match the demonstration
- 4 (Motivation) observer/performer must have drive to or want to learn to copy model

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(c) Motor skills can be classified as discrete, serial or continuous. Using a practical example for each, describe these classifications.

3 marks for 3 of:

(Each description should have a practical example to score the mark)

(Discrete)

- 1 The skill has a clear beginning and end / there are specific sub-routines to the skill
e.g. a penalty kick in football

(Serial)

- 2 The skill is made up of two or more discrete elements / the sub routines are readily separated / there are separate skills involved in the whole movement / each element has a clear beginning and end
e.g. a triple jump

(Continuous)

- 3 The skill is flowing/fluent / the end of one sub routine becomes the beginning of the next / the skill cannot easily be split up into sub-routines / there is no clear beginning and end
e.g. cycling

(d) Effective feedback is important when learning motor skills. Describe each of the following types of feedback:

- Intrinsic
- Terminal
- Concurrent
- Positive

4 marks for 4:

(Accept practical examples if they convey the description of each type)

(Intrinsic)

- 1 The feeling you get from movement / the kinesthesia or proprioception / information from within yourself

(Terminal)

- 2 Information that you receive at the end of the activity / when the activity is finished

(Concurrent)

- 3 Information that you get during the activity / you get information at the same time as performing the activity

(Positive)

- 4 Information you receive that is motivational / encouraging / (positive) reinforcement / praise / reward / receiving a stimulus that reinforces the S-R bond

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(e) Using a practical example, explain how a motor programme of a movement skill is created and stored.

5 marks for 5 of:

(Must use a practical example/s) for marks to be awarded)

- 1 Programmes formed through repetition / practise/overlearning
e.g. repeat the tennis serve
- 2 Programmes formed through association with other movements
e.g. associate the serve with throwing overarm
- 3 Programmes formed through meaningfulness/need
e.g. the tennis serve is needed to play a game
- 4 Programmes formed through novelty/interest
e.g. over-arm tennis serve may be a new skill to learn
- 5 Programmes formed through emotional intensity
e.g. tennis serve, taught enthusiastically
- 6 +ve reinforcement/reward/encouragement helps to build programmes
e.g. performer's tennis serve praised for being correct
- 7 Programmes are stored / encoded in long term memory

(f) Describe the role of perception in the basic model of information processing when performing a motor skill.

5 marks for 5 of:

(Allow practical examples as part of description if relevant)

- 1 Perception interprets or judges information, if the correct perception performance is good
- 2 Different individuals have different perceptions of the same stimuli / performance may differ because of different perceptions / others may be more creative therefore perceptions are individualised
- 3 Perception filters/selects information – enabling irrelevant information to be ignored / enables focus and selective attention/concentration / detection of appropriate stimuli
- 4 Perception codes information – to make sense of it to the individual
- 5 DCR process
- 6 Perception includes use of the memory – the more experiences the more information the performer can draw on
- 7 Perception uses motor programmes from LTM – recognition of appropriate movement patterns/stimuli
- 8 Perception uses schema to refine/inform processing – to make performance effective

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(g) Describe the drive reduction theory and explain how it affects the learning of motor skills in sport.

6 marks for 6 of:

- 1 Drive/need/motivation/desire to achieve / solve a problem / to win/learn
- 2 Practise/rehearsal/performance takes place to satisfy this need or drive
- 3 If skill is performed successfully then learning is reinforced
- 4 Drive reduced when success (perceived) is experienced
- 5 Therefore motivation to do more decreases
- 6 Too much practice leads to drive reduction / reactive inhibition
- 7 New tasks/goals/motivation is needed to remove this reduction in drive
- 8 Therefore need for more motivation
- 9 Therefore need to rest / take breaks / use distributed practice

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Section C:

Contemporary Studies in Physical Education and Sport

3 (a) Describe the characteristics of play. Explain the value of play to both children and adults.

6 marks for 6 of:

Sub max 2 marks (characteristics)

- 1 For everyone / spontaneous
- 2 Intrinsic reasons / feel good factor / immediate enjoyment
- 3 No / without predetermined rules / time limits
- 4 Non serious / fun
- 5 Freedom of choice / when and where to play / voluntary

Sub max 2 marks (value to children)

- 6 Learn to share
- 7 Learn to negotiate / sometimes disagree / decision making
- 8 Learn social interaction / work with others / rules of interaction / learn to fit in
- 9 Learn leadership and response to leadership
- 10 Encourages confidence
- 11 Allows children to learn the rules of life
- 12 Freedom from authority
- 13 Opportunity to pretend / fantasy / creativity

Sub max 2 marks (value to adults)

- 14 Gives opportunity for fantasy
- 15 Allows escape from reality of life
- 16 Stress relief
- 17 Allows return to childhood

(b) Give reasons why some people do not take part in sport or physical activity.

5 marks for 5 of:

- 1 Lack of opportunity / few facilities / poor infrastructure
- 2 Lack of time/money/resources
- 3 Illness/disability / fear of not being good enough / lack of confidence
- 4 Lack of initial training / family support / peer pressure
- 5 Fear of discrimination/prejudice/stereotyping
- 6 Sport having a low status within social group / cultural limitations
- 7 Lack of ability / fitness / obesity
- 8 Lack of education / knowledge about benefits of involvement

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(c) Describe four skills that can be learned by taking part in outdoor recreation.

4 marks for 4 of:

- 1 How to accept / cope with a challenge/adventure / self reliance / overcoming fear
- 2 Leadership and response to leadership
- 3 Team work / dependence on others / trusting skills of others / social skills
- 4 The value of physical activity / lifetime sport
- 5 Learn about conservation/countryside
- 6 Personal survival / safety in dangerous situations
- 7 Value of planning/preparation
- 8 Map-reading / canoeing / walking / camping skills

(d) The oath sworn on behalf of Olympic Athletes states:–

“In the name of all competitors, I promise that we shall take part in these Olympic Games without doping and without drugs and in the true spirit of sportsmanship”.

(i) Explain the measures which could be taken to solve the continuing problem of drugs in sport.

5 marks for 5 of:

- 1 Life time bans / name and shame
- 2 Out of competition-time testing
- 3 Increased monetary input into research/testing/technology
- 4 Sensitising through education programmes / moral and health issues
- 5 Unified policies/programmes to deal with the problem
- 6 Increased awareness / advertising / use of role models
- 7 Stricter laws / criminal offence

(ii) Using examples from sport describe what is meant by the true spirit of sportsmanship.

3 marks for 3 of:

(Must use example(s) – max 1 mark if no examples)

- 1 No deviant behaviour / cheating / gamesmanship / playing fair
- 2 Playing to the rules / acceptance of official decisions
- 3 Respecting fellow competitors
- 4 Self control in intense situations
- 5 Losing / winning gracefully / modestly
- 6 Play / allow opponents to play as well as they can

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(e) (i) Explain the benefits of sponsorship to the elite performer.

4 marks for 4 of:

Provides money for:

- 1 Allows for full time training
- 2 Equipment /coaching
- 3 Allows time /costs for travel to competitions
- 4 Provides security at the end of playing career
- 5 Publicity/promotion / exposure of the performer in the public eye / role model
- 6 Allow for full time concentration on sport

(ii) List three reasons why sponsors would choose to invest in sport.

3 marks for 3 of:

- 1 A relatively inexpensive way of advertising / publicising / high exposure of goods
- 2 Increased sales / revenue
- 3 Tax evasion / benefits
- 4 Use to provide hospitality to customers
- 5 Improve the image of the sponsor
- 6 Philanthropic
- 7 Gain control of event / camera positioning

[Total: 30]