

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2007 question paper**

**0413 PHYSICAL EDUCATION**

**0413/01**

Paper 1, maximum raw mark 80

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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## Section A

### 1 Definition of the term somatotyping

- is a way of describing body build
  - it looks at how fat, muscular and linear the body is, in that order
  - it describes each extreme of body build on a scale of 1 to 7
- [1]

### 2 A reason for the increase in the number of recreational facilities

- more private companies involved in providing facilities
  - exercise more socially accepted
  - more exposure of sports on TV creates greater demand
  - people are more aware of health issues
  - people have more leisure time so increase in demand
- [1]

### 3 An activity that would suit an ectomorph

- basketball
  - high jump
  - volleyball
  - long distance running
  - activities where height and low body weight are an advantage
  - if candidates give an example of a named performer who is an ectomorph, credit can be given
- [1]

### 4 A feature of physical well-being

- no illness or injury
  - heart, lungs and other body systems working well
- [1]

### 5 The effects of lactic acid on muscles

- tired/fatigue
  - painful/sore
  - burning sensation
  - stop working
  - stitch
- [1]

### 6 Private companies find it difficult to make a profit from running swimming pools

- the water may need be heated throughout the day and night
  - the water will need to be treated throughout the day and night
  - has to be staffed even if its empty of people
  - staffing has to assume a certain level of use
  - constant training of staff who work in the pool/lifeguards needed
  - difficult to know how much it will be used at certain times of the day
  - high maintenance
- [2]

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**7 Name the two muscles marked**

- **A** deltoid
  - **B** pectora
- [2]

**8 Applying first aid treatment for a blister**

- do not burst a blister
  - keep clean and dry
  - cover with gauze
  - prevent from further rubbing as blisters are caused by friction
  - do not pick off the scab that may form
  - seek medical help/advice
  - cool down the area
- [2]

**9 What is the benefit of fibre in a diet and name a source**

- (a)**
- it clears out the gut
  - prevents constipation
  - prevents bowel cancer
  - it makes you feel full so you eat less
- [1]

- (b)**
- cereals, bread, potatoes
- [1]

**10 Name two harmful effects of consuming large quantities of alcohol**

- affects co-ordination
  - balance
  - affects judgment
  - affects hearing and speech
  - lowers levels of glycogen in muscles so they cannot work as long or hard
  - causes dehydration (hangover)
  - long term can lead to liver damage
  - long term can lead to kidney damage
  - loss of drive in all aspects of life, including an interest in performing sports
  - slows reactions
- [2]

**11 Name an indoor activity, describe a danger**

Candidates must name a sport – no mark awarded. If no sport is named marks cannot be awarded.

- (a)** The activity must be one that is usually conducted indoors – activities such as 5-a-side football should be credited e.g. slippery surfaces, obstructions, facilities inappropriately equipped for activities, such as glass windows where ball games are played. [1]

**(b) Describe how you would overcome this danger**

The solution should not include 'following the rules' but must relate to the danger identified in the first part of the answer e.g. non-slip preparation on the floor, restrict facilities to more appropriate activities to avoid injuries. Have signs erected warning participants of potential dangers. Correct footwear. [1]

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**12 Three external factors that can affect a performer’s ability to play at the highest level**

- the location of venues for training
- access to Centres of Excellence
- availability of transport
- access to high quality coaching
- financial support/support from governing bodies/working
- support from family/friends
- medical support – physiotherapy
- opportunity to participate in regional/national competitions
- opportunities for taking part in elite coaching groups
- religion/culture

[3]

**[Total: 20]**

**Section B**

**Factors Affecting Performance**

**B1**

**(a) What is meant by the term *motivation***

- the driving force that makes you decide what to do and how much effort you put into the activity
- the urge/need to succeed

[1]

**(b) Anxiety can cause a reduction in the level of performance. Describe two ways in which a performer can overcome this difficulty**

relaxation

- breathe slowly and deeply
- relax different muscle groups
- distraction e.g. listening to music
- resting

visualisation

- go through the event in your mind
- see yourself taking part in the event and doing well
- mental rehearsal

Candidates can gain marks from either area of the mark scheme

[2]

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**(c) Describe an open and closed skill from a named activity**

Candidates must name an activity to gain marks. The skills must come from the same game/activity and must demonstrate an understanding of an open and closed skill. It is most likely that neither skill would be at the extreme of the continuum but must indicate features of an open or closed skill.

- e.g. basketball – free throw (closed) – lay up (open)  
 football – taking a goal kick (closed)  
 – saving a shot at goal (open)
- hockey – penalty stroke (closed)  
 – dribbling a ball (open)
- tennis – serve (closed)  
 – a running forehand stroke (open)
- badminton – serve (closed)  
 – playing a clear (open) [2]

**(d) If the performer was fitter how would the graph change?**

- (i) resting heart rate = 78 – 80 [1]
- (ii) The candidates must complete this question on the graph starting at point A. The graph drawn by the candidate must show two of the three improvements:
- a more gradual increase from point A to the working heart rate
  - a lower working heart rate
  - a steeper line from the point at which exercise stops and returns to the resting heart rate [2]
- (iii) • the heart grows larger, its walls a little thicker, it holds a greater volume of blood and contracts stronger  
 • the body makes more blood which increases the amount of red blood cells so more oxygen can be carried  
 • arteries grow larger and more elastic so blood pressure falls [1]

**(e) Name the types movement, key features and joint**

<u>Type of movement</u>	<u>Key features</u>	<u>Joint</u>
Flexion	<b>The bending of a joint</b> <b>Drawing back the foot to kick a ball</b>	Knee Elbow
<b>Abduction</b>	Movement away from a limb and away from the central axis of the body	<b>Hip</b> <b>Shoulder</b>
Extension	<b>The straightening of a limb at a joint</b>	Elbow Knee

The answers are in bold print – one mark awarded the correct completion of each box

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**(f) What does the multi-stage fitness test measure?**

- (i) • aerobic fitness  
• cardiovascular endurance

[1]

**Describe how you would carry out this test. Include details of any equipment used.**

**(ii) Equipment**

- a space that will allow participants to run 20 m on a flat surface
- pre-recorded tape
- a means to record the level reached
- two lines marked on the ground

Administration

- run shuttle runs between the two lines
- your foot must be on or over the line before the bleep from the tape
- the timing of the bleep speeds up each minute
- when you can't keep up with the speed of the bleeps you must drop out.
- the levels and number of shuttles completed are recorded

[3]

**Describe another test which will assess the same component of fitness**

**(iii) Alternative method of testing cardiovascular fitness using little space**

Havard Step Test (alternative methods of measuring the test can be accepted)

- complete 30 steps a minute for 5 mins
- rest 1 minute then take pulse for 15 seconds
- calculate score

Length of exercise in seconds x 100

5.5 x pulse count

- the higher the score the fitter you are

OR

- after test take pulse count for 30 seconds (P1, P2, P3)
- take pulse every minute after the cessation of the exercise
- put the pulse rate into the following equation
- $\frac{5 \times 60 \times 100}{2(P1 + P2 + PR)}$

The Cycle Ergometer Test

- set the pedal speed to 60 revs per min
- load set to 150 watts (male) 100 watts (female)
- pedal for 5 minutes
- take pulse for the last 15 seconds
- lower the score the fitter you are

The Cooper Test

- mark out a track, knowing the distance covered, usually a 400 m running track
- ensure warm up is carried out
- a whistle blows to start the run
- participants run as fast around the marked out track as possible
- laps covered are recorded (pen and paper needed)
- participants stop when whistle is blown after 12 minutes (stop watch required)
- the further you run the fitter you are
- cardiovascular endurance is calculated from tables

[3]

**[Total: 20]**

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## Health, Safety and Training

### B2

#### (a) Describe what will happen to an athlete when an Oxygen Debt occurs

- the athlete will gulp in air to pay off the oxygen debt
- he/she will have to stop all out effort
- the volume of oxygen consumed during recovery from exercise in excess of that which would normally be consumed in the same period [1]

#### (b) Two reasons why performances might decrease

Overtraining so the performer is:

- tired/rest time
- has pain and soreness in the joints so unable to perform at their best
- loss of appetite and energy
- feelings of anxiety
- more susceptible to cold and minor illness
- inappropriate training programme

Performer may become:

- bored with training
- lack of progress results in demotivation
- injury (=usually stress related) [2]

#### (c) Complete the equation

carbon dioxide [1]

**Name the respiratory system this equation describes and explain one key feature**

- aerobic fitness
- cardiovascular endurance
- aerobic respiration (plus an explanation)
- it supplies sufficient oxygen for the performer to complete the exercise
- it requires activities to be less intense
- if sufficient oxygen is available the activity could be carried on almost indefinitely
- there is no oxygen debt to pay back at the end of the activity [1]

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**(d) (i) Describe two factors that determine how much energy is needed**

- age – young children and the elderly need less energy
- gender – males usually need more energy than females of the same age
- lifestyle – the more active you are the more energy you need. A top athlete will need more energy than an office worker. [2]

**(ii) An athlete preparing for a long distance running event, will often use his/her diet to increase energy levels immediately before the event**

To gain a mark candidates must name and give a simple description of carboloading.

- carboloading
- just before the event switch to light training and eat lots of carbohydrates [1]

**(e) The performer loses heat through evaporation and radiation**

**(i) Evaporation**

- the sweat glands create more sweat
- sweat is released through the pores in the skin
- the process of converting a liquid (sweat) into a vapour thus enabling heat particles to escape resulting in the body cooling
- body hairs lie flat to aid evaporation

Radiation

- vasodilation takes place – the blood vessels under the skin widen.
- increase in the amount of blood that flows near the skin
- heat is transferred through the skin

[Total of 3 marks awarded for part (i) 2/1 or 1/2] [3]

**(ii) Some sports take place in cold, wet conditions and in some cases the performer's body temperature can drop. Explain how the body reduces the effect of playing in such conditions.**

- you will stop sweating
- the blood vessels under the skin contract. This is called vasoconstriction
- less blood will flow near the surface so less heat is lost
- the muscles start a series of small contractions to produce heat and this is called shivering
- body hairs stand up to trap body heat [2]



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**(f) Describe two key elements of circuit training**

- a circuit usually has 8 – 15 stations
- you do different exercises at each station
- either there is a time limit or a given number of reps at each station
- a rest can be included between stations
- a circuit can be made specific for an activity [2]

**(ii) Choose two of the principles of training and describe how they would affect the planning of the circuit training**

The answers must relate to a long distance running event

- specificity – the exercises must try to develop endurance  
exercises must be specific to the main muscle groups used in running  
ensure the training reflects the distances being covered in the running event.
- progression – the increase must be gradual  
due to the nature of the running event over exercising can lead to stress related injuries  
if there is no increase in training there can be no improvement in performance  
due to the nature of the event, overtraining can cause tiredness and affect the ability to continue training
- overload – There should be reference to the distance and time that relate to the fact that the training is for a long distance running event.  
increase the number of times you complete the circuit  
increase the number of times that you spend on each station  
increase the number of reps at each station  
increase the amount of time spent training
- reversibility – the training programme must be maintained to avoid reversibility. Mix up circuits so that there are hard and easy sessions to avoid tiredness and injury. [2]

Candidates should choose 2 of the above points and provide one application for each point.

**(iii) What are the advantages of using a Circuit Training programme**

- training can include a wide variety of exercise
- easy to adapt to a sport
- an efficient use of training time
- training can be done indoors or outdoors
- circuits can be done with little equipment
- fun [2]

**What alternative training methods could be used to get ready for the event?**

- (iv)**
- continuous training
  - fartlek training
  - lateral training with description [1]

**[Total: 20]**

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**Reasons and opportunities for participation in physical activities.**

**B3**

**(a) Define the term *physical recreation***

- A physical activity that you do just for pleasure, in your leisure time. Should not include serious sport or activities that people play for a living [1]

**(b) Reasons why where you live can affect the activities you play**

- if you live in rural areas you may need transport to access facilities
- specialist facilities can be located some distance from your home and therefore, not accessible
- in rural areas there may be few facilities available
- there will be few opportunities for country activities i.e. climbing, skiing in towns
- access to coaching may restrict opportunities
- certain activities are based in cities i.e. basketball
- cultural i.e. certain countries practice certain sports; skiing in Nordic countries, football in Brazil [2]

**(c) How are sporting opportunities enhanced by links between school and clubs**

- students can play sports that are not available in school
- clubs can provide qualified coaches to visit schools
- students can join clubs after leaving school
- schools can supplement their facilities by using those at a local club
- use clubs for residential courses e.g. sailing, climbing
- some schools do not offer extra curricular activities
- clubs tend not to close during holiday periods so students can continue to participate during these times
- sports in schools are governed by term times, clubs will offer out of season training opportunities
- clubs can use school facilities which will reduce the costs of running a club
- school/club liaison officers can be created to promote the increased links [2]

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**(d) Reasons for the increase in the number of professional performers.**

- greater opportunities to participate
- more individuals can access sponsorship
- greater financial rewards for participants
- opportunities for participation require greater travelling so greater costs to participate at a higher level
- dual use facilities encourage club to use school based facilities.
- demands on time to train in order to play at the highest level has increased so time to work is more difficult
- more sports turning professional
- fewer barriers for professionals i.e. can participate in Olympic games

[3]

**(e) The negative effects on sport by over exposure on television**

- people get bored by seeing so much sport on the television
- if live sport shown is not exciting people will become disinterested
- fewer people attend the live games/events so they become less well supported and become less interesting
- only the top teams/events/games are shown so smaller events are ignored
- minority sports will find it difficult to attract attention
- minority sports may find it difficult to attract participants
- TV companies may try to change the rules of a sport to benefit their coverage which the public might not find acceptable
- if TV companies withdraw coverage of an event/game it could affect the success of that activity.
- if a broadcasting company buys exclusive rights to a game/event the public may have to pay specifically to watch the broadcast
- some sports may become so popular that it affects the coverage of other activities
- if too much sport is shown on television, there may be an increase in the number of 'armchair' sportsmen/women
- over exposure can create a negative image of the sport
- fewer participants therefore less talent/smaller pyramid

[5]

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**(f) Factors contributing to the increase in women’s participation in sport**

- (i)
- reduction in what was seen as the traditional values women’s roles in the home, looking after the family cultural role of women
  - time and energy  
increase in child care arrangements that are available, increase in the amount of technology in the home which reduces the amount of time needed to run a household
  - financial arrangements  
women have more opportunities to work and be financially independent
  - greater independence  
an improvement in financial independence enables women to have their own transport so they can access facilities
  - change in understanding  
it was a common belief that women were physically unable to participate in certain activities such as long distance running, triple jump
  - change in attitudes towards women  
women who were involved in sport were perceived as unfeminine
  - increase in role models  
women have achieved a higher sporting profile
  - decrease in the number of sports that are not considered to be appropriate for women  
many governing bodies have developed their sports – women’s football, rugby, boxing etc.
  - increase in media coverage  
more women sports are covered in all areas of the media. More women presenters on sports programmes
  - greater understanding of health issues  
women are more aware of health issues such as the impact of exercise on reducing osteoporosis
  - specialist activities/sessions  
many sports such as yoga, step aerobics, etc. have been developed, sports centres have introduced women only sessions.
  - fashion  
exercise has become very fashionable for a variety of reasons, going to the gym etc. has become an expected part of some women’s lives

[1]

**(ii) Despite the increase in female participation more girls than boys stop taking part in sport immediately after they leave school**

- many of the activities that girls take part-in in school are difficult to play as an adult – e.g. rounders
- although there is an increase in opportunities for girls there are still far less opportunities for participation than for boys
- outside of school there is still less organized sport for girls
- at the age students leave school it is still unfashionable for girls to participate in sport
- cultural differences

[2]

**[Total: 20]**