



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

PHYSICAL EDUCATION

9396/03

Paper 3

For Examination from 2010

SPECIMEN MARK SCHEME

2 hours 30 minutes

MAXIMUM MARK: 90

This document consists of **11** printed pages and **1** blank page.



Section A: Exercise and Sport Physiology

1 (a) Knowledge of the three energy systems underpins exercise and sport physiology.

- (i) Name an energy system and identify the missing information A, B and C for this system. [3]

3 marks in total (from one energy system only)

(ATP/PC system)

- 1 A = PC
- 2 B = sarcoplasm/cytoplasm
- 3 C = creatine kinase

(lactic acid system)

- 4 A = glycogen/glucose/carbohydrate
- 5 B = sarcoplasm/cytoplasm
- 6 C = glycogen phosphorylase/phosphofructokinase/PFK/lactate dehydrogenase/LDH

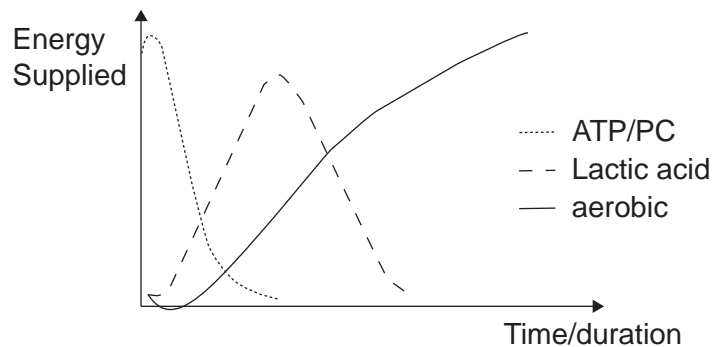
(aerobic system)

- 7 A = glycogen/glucose/fats/carbohydrate
- 8 B = sarcoplasm/mitochondria
- 9 C = glycogen phosphorylase/phosphofructokinase/PFK/lipase

- (ii) Sketch a graph of energy supplied against time to show when each of the three energy systems is predominant in relation to duration of exercise. [3]

3 marks in total

- 1 ATP-PC system/alactic system correctly sketched and labelled
- 2 lactic acid system correctly sketched and labelled
- 3 aerobic system correctly sketched and labelled



(b) A weight training programme can develop maximum strength.

(i) Explain the main features of a weight training programme designed to develop maximum strength. [4]

4 marks in total

General outline/ programme	1	form of intermittent/interval/circuit/pyramid training		} (allow any number within range)
	2	can be altered (depending on level of fitness)/its flexibility		
	3	training principles apply/overload/progression/specificity/warm up/cool down/medical check/pre-test		
	4	heavy weights/low reps/long rest between sets		
Specific values/ session	5	(frequency)	3–7 times a week	
	6	(intensity)	at 85% or more of 1RM	
	7	(time 1)	2–5 sets	
	8	(time 2)	2–6 reps	
	9	(time 3)	with 3–5 minute rest between sets	

(ii) Identify two physiological adaptations that take place during the training programme and explain how each helps to improve maximum strength. [4]

4 marks in total (mark in pairs – explanation must be linked to adaptation for second mark)

SUB MAX 2 FOR IDENTIFICATION

Adaptation	Explanation
1 greater number of motor units recruited	2 increases the contraction of the muscle/for greater force to be generated/improved co-ordination
3 improved synchronisation of motor units	4 motor units contract at same time increasing force generated
5 reduced autogenic/neurological inhibition/Golgi tendon function	6 these mechanisms prevent muscles from exerting more force than the bones/connective tissue can tolerate/reducing these mechanisms (produces greater levels of strength)
7 muscle hypertrophy/more protein synthesis/larger muscles	8 provides more sites for force production/allows for a greater force/contraction
9 muscle hyperplasia/fibre splitting/increases the number of muscle fibres	10 allowing for a greater force of contraction
11 increased levels of muscle phosphogens/ATP/PC	12 increases the efficiency of the ATP-PC/anaerobic system/allowing high intensity exercise to carry on for longer (resulting in an overall gain to maximum strength)

(c) During a period of intense physical activity such as a 400m sprint or 100m swim there is a build up of lactic acid.

(i) Explain why this build up of lactic acid occurs and what impact this build up has on performance. [5]

**Sub max 4 marks for
(why it occurs)**

- 1 increase in recruitment of FG fibres
- 2 insufficient oxygen to meet demand re aerobic respiration
- 3 inadequate removal rate of lactate
- 4 more reliance on lactic acid system to produce energy for ATP resynthesis
- 5 more lactic acid is produced as by product of energy system
- 6 performer reaches their anaerobic threshold/lactate threshold/OBLA/blood lactate concentration suddenly increases

**Sub max 2 marks for
(impact on performance)**

- 7 lactic acid lowers pH, inhibits aerobic enzymes (e.g. lipase)
- 8 lactic acid interferes with cross bridge formation/muscle contraction
- 9 lactic acid stimulates pain receptors

(ii) What can an athlete do to try and offset and delay the build up of lactic acid? [3]

- 1 athlete through training can increase their anaerobic threshold/lactate threshold
- 2 use of interval training/continuous training at or just above LT heart rate/fartlek
- 3 will increase tolerance to lactic acid
- 4 will increase removal rate of lactic acid
- 5 ensure sufficient carbohydrate intake in diet to match training needs
- 6 take sodium bicarbonate to act as a buffer for lactic acid

- (d) The coach is responsible for ensuring that the performer is in peak condition as competition approaches. Using principles of training applied to an example from sport, explain how this may be achieved. [8]

Must use a relevant example from sport

8 marks for 8 of:-

(answers must involve the explanation of the principle)

- 1 (specificity) training should be relevant to the individual and for the sport for which they are training
- 2 (overload) training should make the body work harder than usual. The body will then adapt to this new level and fitness will improve
- 3 (progression) overload should be progressive. As the body adapts to the training demands, then further increases must follow to stimulate further improvement
- 4 (moderation) progressive overload should not be too sudden. This could lead to overtraining and injury to the muscle and/or skeletal systems
- 5 (variance) training should include a variety of training types to maintain motivation
- 6 (reversibility) if training reduces or stops, performance will deteriorate, benefits are lost, aerobic efficiency decreases
- 7 (periodisation) split training into blocks so that peak performance can be reached at the correct time
- 8 (periodisation) macrocycle – long term block, (1–4 years)
- 9 mesocycle – intermediate training block (1–4 months)
- 10 microcycle – short term training block – 1–3 weeks

[Total: 30 marks]

Section B: Psychology of Sports Performance

2 (a) Leadership has been described as the process of influencing individuals and groups towards set goals.

(i) How might a sports team select its leader? [2]

(Source of Leader)

2 marks for 2 of

- 1 Emergent leader/a particular player evolves from the group
- 2 The team vote for the leader
- 3 Prescribed leader/the leader is given to the group/the leader is appointed by higher authority

(ii) With reference to Fig. 3 explain the achievement of optimum performance and satisfaction by a group of sports performers. [6]

(Model of Leadership)

4 marks for 4 of:

(sub max 4)

- 1 (Situational characteristics) different situations can occur
- 2 (Leader characteristics) the personality/skill level/experience of the leader will differ
- 3 (Member characteristics) the skill level/attitudes/experience/friendships will differ
- 4 (Required behaviour) the situation (and the members characteristics) dictate appropriate style of leadership
- 5 (Actual behaviour) the behaviour the leader displays as a result of the situation and the member characteristics and the leader characteristics
- 6 (Preferred behaviour) member characteristics (and the situation) dictate appropriate style of leadership

2 marks for 2 of:

- 7 Performance and satisfaction will be achieved if high congruence occurs between the needs of the group and the situational demands/the closer the match between what the group want and what the situation demands the more satisfied the group will be
- 8 Leaders need to be able to adapt to differing member needs and situations to achieve high performance and satisfaction

(b) Optimum arousal levels are desirable in all sports and at all levels of performance.

Explain the cue-utilisation hypothesis, its links to arousal and its effect on performance. [7]

(Cue Utilisation)

7 marks for 7 of:

- 1 Performers pick up a range of stimuli/cues
- 2 Some information/cues are relevant to the task/not all information is relevant
- 3 At low arousal relevant and irrelevant cues are attended to/all stimuli attended to
- 4 This caused an overload of information
- 5 The overload causes lower performance
- 6 Relevant cues are utilised/irrelevant cues discarded and performance is maximised at moderate levels of arousal
- 7 High/over arousal causes perceptual narrowing
- 8 Important cues may be missed
- 9 Perceptual narrowing causes lower performance

(c) (i) Identify the different attributions according to Weiner's attribution model. [4]

4 marks

4 marks for 4 of:-

(sub max 4)

(related to Weiner's model):

- 1 Attributions can be internal/when your reasons are from within/your responsibility/your effort/ability
- 2 Attributions can be external/when your reasons are environmental/not your responsibility/luck/task difficulty
- 3 Attributions can be stable/when they are not easily changed
- 4 Attributions can be unstable/when reasons are changeable
- 5 Attributions can be controllable/uncontrollable

- (ii) Use practical examples from sport to explain how attributions given for success and failure can affect motivation. [5]

**5 marks for 5 from:
(sub max 5)**

(links to motivations)

- 6 Internal when winning can lead to high level of motivation/Mastery orientation/having high self-confidence/positive outlook/need to achieve
- 7 Internal when losing can lead to low motivation/learned helplessness/the belief that failure is inevitable/failure has been reinforced
- 8 Unstable reasons given when losing or when behaviour needs to be changed leads to high motivation
- 9 Stable reasons given to reinforce behaviour/when winning can lead to high motivation
- 10 Attributions can be biased to enable us to be (highly) motivated/attributional bias/self-serving bias
- 11 We can blame others to push away responsibility/fundamental attributional error to protect ourselves/our self esteem/keep motivated.
- 12 Put less emphasis on internal stable factors to minimise learned helplessness and maximise mastery to raise motivation
- 13 Increase motivation through attributional retraining/changing/helping to change the reasons to maximise/raise motivation

- (d) Apply theoretical principles to practical examples to show how you would change a negative attitude into a positive one. [6]

**6 marks for 6 of:
(must use practical examples)**

- 1 Persuasion/verbal encouragement
- 2 More likely if high status
- 3 Cognitive dissonance/changing an element of the attitudinal triadic model
- 4 Change the beliefs/educate the performer/change the cognitive element/explain early failure/attribution retraining
- 5 Change the affective component/seek to change the emotional response/make the activity fun/increase self esteem/build confidence
- 6 Make the activity safe/perceived to be safe/familiarity with activity
- 7 Give success/make the tasks easier
- 8 Give role models
- 9 Give rewards/praise/positive feedback/positive reinforcement
- 10 Change the behavioural component
- 11 Propaganda
- 12 Change motives

[Total: 30 marks]

Section C: Olympic Games: A Global Perspective

- 3 (a) (i) Explain the reasons why the Ancient Olympic Games were a common feature of life in ancient Greece. [4]**

4 marks for 4 of:–

- 1 Greeks lived and worked in the open air/gods were found in nature/site at Olympia belonged to the earth goddess/worship of the gods was an important feature of life.
- 2 Athletic contests developed along with religious ceremonies and celebrations
- 3 Rules and discipline were a feature of the games/not fight to the death as previous contests/fair and peaceful competition was the main feature
- 4 Games were a festival held in Autumn/sort of harvest festival/rest from agricultural work/celebration of fertility
- 5 Festival attracted athletes and citizens from all states and colonies of Greece/a truce from war/unified Greek states and colonies
- 6 Olympia became a neutral and sacred place/a place of culture
- 7 Training of athletes thought to produce role models for young

- (ii) Explain the benefits to the ancient Greeks of taking part in the Games. [3]**

3 marks for 3 of:–

- 1 Prize was athlon/head wreath/pride and honour in winning an event
- 2 Prize offered by winner to city, nation, ancestors, gods
- 3 Prize winners benefited in other ways e.g. houses, cash
- 4 Athletes compelled to train for ten months prior to the games
- 5 Desire to put physical prowess to the test/ desire to excel/to be the best

- (b) Sheikh Ahmad, president of the Olympic Council of Asia stated that “We have a responsibility to embrace different cultures”.**

How do the Olympic Games promote an appreciation of cultural diversity? [4]

4 marks for 4 of:–

- 1 Belief that sport can override world wide differences/promote greater understanding between nations
- 2 Blend sport and culture with education/as stated in the Olympic charter
- 3 Educate youth that sport can be practiced without discrimination
- 4 Inclusion of different sports/ethnic sports/sometimes as demonstration events
- 5 Understanding through sport of diversity leading to tolerance

- (c) **The concept of the amateur sports person has changed at the highest levels of sport. Explain some of the changes which have taken place.** [5]

5 marks for 5 of:–

- 1 Words amateur and professional have become outdated
- 2 Most sports allow participants to earn money if they are good enough
- 3 Most sports do not distinguish between amateur and professional
- 4 If competitors wish to retain amateur status they do so through a trust fund
- 5 Highly paid professionals now compete in the Olympic Games/e.g. tennis, basketball, soccer
- 6 Sport participants are known as competitors
- 7 All classes and creeds were not embraced by De Coubertin
- 8 Word gentleman became synonymous with amateur in the early modern Olympics/ amateurism depended on social class
- 9 It became impossible to achieve the levels of performance required without full time practice and training
- 10 Scholarship system in USA/state support in Communist countries defied amateurism
- 11 Professionalism came into the games fully when 1984 marketing strategies were introduced to make the games viable

- (d) (i) **Describe the selection process for the host city of the Olympic Games.** [5]

5 marks for 5 of:–

- 1 Potential host cities lodge bids with the IOC eight years prior to the games
- 2 Any number of cities may bid but only one city from a member country will be accepted
- 3 NOC (National Olympic Committee) from each country will oversee bids
- 4 Deadline for entry is usually one year before IOC meet to decide successful candidate
- 5 Members of IOC vote
- 6 City with clear majority wins
- 7 Often not a clear majority, therefore further rounds of voting

- (ii) **How would you suggest that the process could be improved?** [3]

3 marks for 3 of:–

- 1 Reduce/eliminate trips by IOC delegates to potential host countries
- 2 This should reduce bribery accusations
- 3 Introduce a pre-selection process to reduce final numbers
- 4 Keep Games at one venue e.g. Athens to avoid problems
- 5 Exclude commerce/politics/royalty joining in
- 6 Limit numbers of IOC delegates
- 7 Change IOC president more frequently

Or/eq Accept any other valid response

(iii) Why do cities bid to host the Olympic Games?

[3]

3 marks for 3 of:-

- 1 Potential benefits to business/commercial interests of the country
- 2 Acts as a shop window to "sell" the country/attraction of mass audiences
- 3 Attracts tourism
- 4 To be able to use the Games for political reasons/express political superiority
- 5 Revenue from marketing/television/media rights
- 6 Appease the nation/update facilities/remove slums/relocation

(e) What part did the policy of apartheid practiced in South Africa play in the boycotts of the Olympic Games. [3]

3 marks for 3 of:-

- 1 Apartheid segregated people according to race
- 2 Segregation was disadvantage to majority black population
- 3 Policy against aims of Olympic ideals
- 4 IOC withdrew 1960 invitation to South Africa, reluctantly
- 5 This lasted many years until 1992
- 6 Many outstanding sports men and women denied access to compete
- 7 NZ continued sporting relations with SA
- 8 This policy showed approval of apartheid – NZ accepted into games
- 9 Africa therefore boycotted Montreal in 1976
- 10 Further mass boycotts in Moscow 1980
- 11 SANOC (SA Olympic Committee – non-racial but could not influence its own government)

[Total: 30 Marks]

