

Oxford Cambridge and RSA Examinations

Advanced GCE

Physical Education

2566

Exercise and Sport Physiology and the Integration of Knowledge of Principles and Concepts Across Different Areas of Physical Education

Specimen Paper

Additional materials:

Answer paper

TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces provided on the answer paper/answer booklet.

Write your answers on the separate answer paper provided.

If you use more than one sheet of paper, fasten the sheets together.

There are two sections in this paper.

Answer the compulsory question in Section A and **one** question from Section B.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [] at the end of each question or part question.

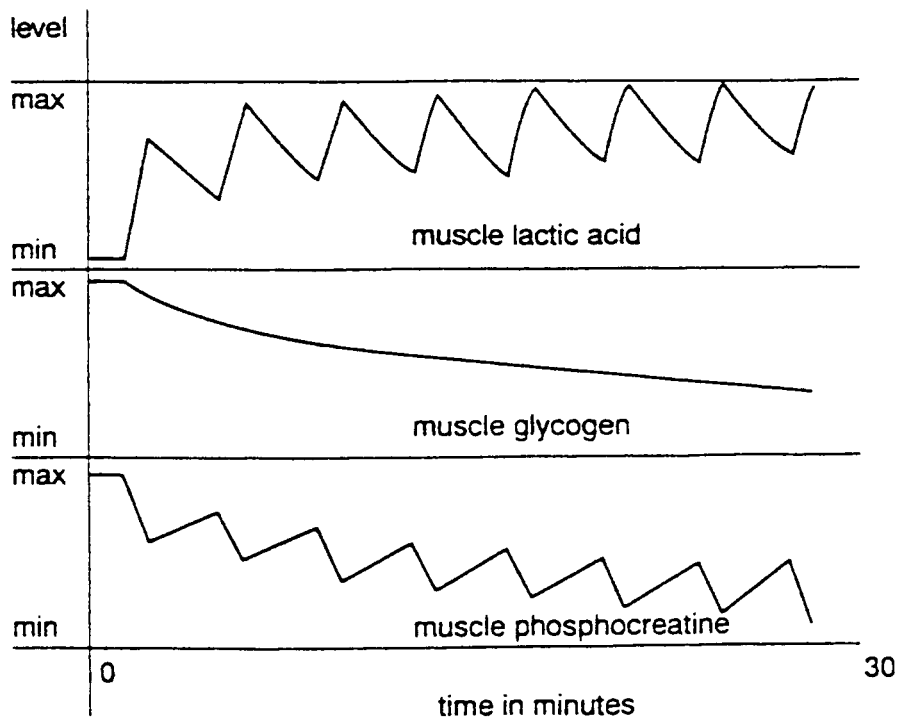
You will be awarded marks for the quality of your written communication in Section B.

SECTION A

Answer the question in this section

Exercise and Sport Physiology: The Response of the Body to Performance and Training

- 1 (a) If an athlete completed a twelve-week programme of intense aerobic training what physiological adaptations would you expect to take place within in the cardiovascular system? [4]
- (b) The amount of oxygen available not only has a direct effect on whether energy is released aerobically or anaerobically, but also affects the type of food fuel used.
- Under what circumstances is carbohydrate used as the predominant food fuel and why? [4]
- (c) From the information presented in the diagram below identify and briefly explain why these changes take place during the training session. [7]



[Total:15]

SECTION B

**Answer one question only, either Question 2 (Scientific Focus)
or Question 3 (Socio-cultural Focus)**

2 Scientific Focus

You must answer from both Part One and Part Two

Marks will be divided between knowledge content and presentational skills. You should write the answer in continuous prose. Where possible, you should link the two parts of the question.

This question identifies the significance of having a scientific background when linking physiology or psychology to movements in school physical education, particularly as they involve fitness and skill development.

Part One: answer either (a) or (b)

EITHER

- (a) Describe the structure of a synovial joint of your choice in relation to its movement possibilities as it occurs in a specific physical activity. Strength training aims to improve the strength of skeletal muscle. Describe a strength exercise that would improve the action of your selected joint. In your answer, identify the muscles being strengthened and indicate muscle function and type of muscle contraction occurring during the exercise.

OR

- (b) What must be taken into account before teaching a movement skill in physical education? What are the advantages and disadvantages of teaching a skill in an activity of your choice by splitting it into sub-routines?

(recommended timing; 30 mins.)

Part Two: answer either (c), (d) or (e)

EITHER

(c)

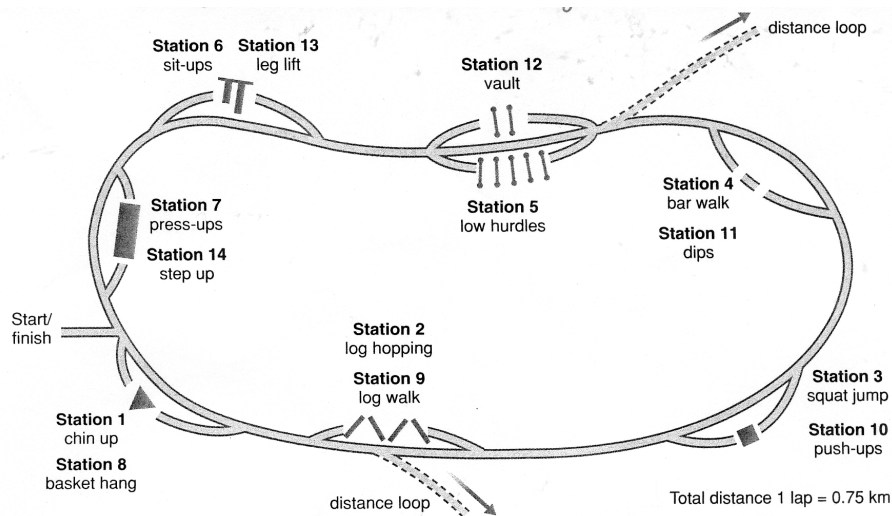


Figure 1 Training circuit of exercise stations along a jogging path (fitness trail).

Having studied Figure 1, describe some of the short-term benefits of this form of fitness training. Explain the principles you would apply in devising a training session for an unfit person who is over 45 years old.

OR

(d) Describe the lever system operating at the knee or elbow in an activity of your choice. Explain the effects of the length of that lever. Discuss the effect of the change of joint angle on load forces in this chosen action.

OR

(e) The teacher of physical education depends on children developing positive attitudes to the activities being taught. Explain what this means in an activity of your choice in terms of cognitive, affective and behavioural components. Explain the positive attitudes you should have for your chosen activity.

(recommended timing: 30 mins.)

[Total: 45]

3 Socio-cultural Focus

You must answer from both Part One and Part Two.

Marks will be divided between knowledge content and presentational skills. You should write the answer in continuous prose. Where possible, you should link the two parts of the question.

Part One

There are a number of educational values which are claimed by physical educationists. Two of these are the potential for self-development and the opportunity to engage in pleasurable experiences.

Examine the possibilities of self-development in a physical education programme, applying your answer to your experience of a particular practical activity. Discuss the extent to which you consider this to be a pleasurable experience.

(recommended timing: 30 mins.)

Part Two: answer either (a) or (b)

- (a) Explain the belief in 19th century public boarding schools that self development occurred in organised sporting activities on the playing field. Discuss the extent to which the enjoyment of sports and pastimes was a central part of popular and rational recreation at this time.

OR

- (b) Compare the relative importance of self-development and pleasure in physical education in the United Kingdom with physical education in either United States or Australian schools. Discuss the educational and ideological factors which may have influenced any similarities and differences between the place of these values in the two countries.

(recommended timing: 30 mins.)

[Total: 45]



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Exercise and Sport Physiology and the Integration of Knowledge of Principles and Concepts Across Different Areas of Physical Education

Mark Scheme

SECTION A

1 (a) (Adaptations to an endurance programme).

1 mark for each of:

- (cardio) Hypertrophy of myocardium/increase in size and strength of heart muscle /increase in chamber size of left ventricle;
- decrease in RHR;
- due to increase in stroke volume;
- increase in maximum cardiac output;
- (vascular) Increase of elasticity of arterial walls;
- increase in capillarisation at skeletal muscle;
- increase in blood volume.

[max 4]

(b) (carbohydrate as the main food fuel).

1 mark for each of:

(anaerobic)

- when the body is working at maximum or near max intensity for longer than 10 seconds;
- insufficient oxygen available so anaerobic system has to be used;
- only carbohydrate can be broken down anaerobically.

(aerobic)

- during the first 20-30 mins of sub maximal exercise;
- body has to overcome initial oxygen deficit;
- fat oxidation needs c12/15% more oxygen than glycogen/conserves oxygen by using glycogen;
- lactic acid produced early on in exercise inhibits enzyme responsible for the breakdown of fat.

[max 4]

(c) (Physiological changes during an anaerobic exercise session).

- Method is interval training, stressing the anaerobic system. [1]
- A form of training in which periods of work are interspersed with periods of recovery. [1] [2]

and 1 mark for each of:

- as the athlete is working anaerobically the levels of lactic acid increase during the work period because LA is a by product of anaerobic respiration;

- during the recovery period some of the LA is flushed out/removed into the blood stream, so levels drop;
- muscle glycogen levels will drop as anaerobic respiration relies on the breakdown of glycogen;
- levels will continue to drop during recovery as glycogen levels will only be replenished when more carbohydrate is eaten;
- during work periods the athlete is working anaerobically so is using available stores of PC to produce ATP;
- during recovery PC can be quickly rebuilt/synthesised (50% in 30 seconds) so levels rise again during recovery period.

[max 5]

[Total: 15]

SPECIMEN SYNOPTIC QUESTIONS - MARK SCHEME

INFORMATION TO HELP EXAMINERS

To meet the requirements of the banded material an asterisk will be awarded for relevant informative knowledge, but more advanced knowledge will be given additional weighting as will application when required by the question. This will be shown in the answer script as:

- * for informative knowledge;
- ** for more advanced knowledge;
- *** for application to a practical situation.

These reflect the objective knowledge criteria.

However, sub-maximum totals apply to retain an overall balance to the question. It is suggested that scripts should be marked for knowledge content in the first instance to account for 20 of the available marks and a second reading should also take **three** additional expository criteria into account using the banded criteria for 25 marks, giving a maximum total of 45 marks.

The three expository criteria are:

- Analytical skills, integration and appraisal;
- Clarity and relevance of presentation and grammatical quality;
- Consistent use of technical language, particularly in the scientific question, **or** evidence of insight and understanding, particularly in the socio-cultural question.

SECTION B

2 SCIENTIFIC FOCUS

Part One (looking for Unit 2562 links between movement, school physical education and fitness training or skill development)

EITHER

2 (a) (AS – Unit 2562: Section A: A & P)

overall sub-max of 10 marks
(movement range in a synovial joint)

- * correct identification of a synovial joint and sound structural details; e.g. type and structural explanation of the joint;
- ** accurate explanation of two types of movement identified.

(strength programme for that movement)

either (a) a specific strength exercise, e.g. shoulder pulley exercise for swimming;
or (b) a general strength exercise, e.g. pull-downs on a training machine.

- * explanation of exercise;
- ** explanation of two muscles being used;
- * explanation of function/intention;

** two types of muscle contraction involved.

with

*** available relative to the accuracy with which the explanation refers to a movement in a specific activity.

Total of 10 knowledge marks available for A & P answer

OR

2 (b) (AS – Unit 2562: Section B: Acquisition. of Skill)

overall sub-max of 10 marks

(What must be taken into account before teaching a skill?)

sub-max of 3 marks:

explanation of:

- * type of skill to be taught/requirements;
- * degree of complexity of that skill/transferability;
- * environment in which it is being taught/organisation;
- * ability level of the performer/teacher;
- * motivational level of the performer/preferences;
- * maturity/gender/background of the performer/teacher;
- * schematic approach being used;

with

*** regular use of an example of a skill.

(advantages and disadvantages of sub-routining)

explanation of: advantages: sub-max of 2 marks:

- * if skill is dangerous/lowers fear level;
- * if skill is complex/difficult;
- * with serial skills;
- * allows success at each stage/less likely to fail overall;
- * helps confidence/motivation.

disadvantages: sub-max of 2 marks:

- * transfer between parts does not always work;
- * some skills cannot be split into sub-routines;
- * loses kineasthetic sense;
- * loses flow of skill;
- * takes more time/over teaching;

with

*** for accurate application to a specific skill.

Total of 10 knowledge marks available for skill answer

Part Two (one to be marked only)

EITHER

2 (c) (A2: Unit 2566: Exercise Physiology)

Overall sub-max of 10 marks
(values of this form of fitness training)

3 marks for:

- * its versatility/it is safe/healthy regardless of age/condition;
- * progress is at rate of individual;
- * number of repetitions/circuits to meet individual condition.

(identification and application of principles)

7 marks for:

- ** moderation/degree of overload/intensity: rest/talk between activities;
- ** warm up/cool down: easy approach/gentle mental approach/return to body in resting state;
- ** duration: at least 30 mins for fat energy release;
- ** variation: of skills and physical demands;
- ** specificity/relevance: mainly aerobic.

Which includes:

an accurate application to an unfit person over 45 years.

Total of 10 marks available for Exercise Physiology answer

OR

2 (d) (A2: Unit 2565: Biomechanics option)

Overall sub-max of 10 marks
(explanation of a lever involved in movement at knee or elbow joint)

- ** explanation of knee action: class 3, including muscle structure
- or elbow action: biceps – class 3, incl. muscle struct.
- or triceps – class 1, incl. muscle struct.

(effects of length of lever)

- * length of lever affects load to be exerted by lever;
- * longer the lever, smaller the value of the load;
- * length of lever affects the speed at which the hand/foot can move;
- * longer the lever, faster the load can be applied.

(effects of change of joint angle)

- ** stronger when straight or fully bent;
- ** moment of effort is more-or-less constant regardless of limb angles;
- ** therefore the load changes with the angle;
- ** because distance from fulcrum to line of action of the load changes with angle;
- *** if accurate identity and explanation of a lever and changes on load forces applied regularly to a specific activity action.

(Diagrams can be produced to support the explanation, but not replace it.)

Total of 10 knowledge marks for Biomechanics answer

OR

2 (e) (A2: Unit 2565: Sport Psychology option)

Overall sub-max of 10 marks

(Applied positive attitudes – cognitive, affective and behavioural)

3 marks for:

explanation of components:

- * cognitive: knowledge and beliefs held by the children for;
- * affective: feelings and emotions towards;
- * behavioural: intended behaviour towards participation.

(Explanation of positive attitudes towards chosen activity)

4 marks for:

reference to:

- * success in or satisfaction from participation;
- * belief in the value of the activity;
- * recognising the encouragement of ‘significant others’;
- * opportunities to continue;
- * prospect of regular participation;
- * a willingness to try other new activities;
- * having a positive physical self concept;

with 3 marks for:

- *** for regular application to the chosen activity.

Total of 10 knowledge marks for Sport Psychology answer

Overall total of 20 scaled knowledge marks for one answer in Part 1 and one answer in Part 2 followed by an assessment of 25 banded marks

N.B.

You should have used the scaled knowledge marks as your initial guide, checking it:

- * reflects standard knowledge; and
- ** represents more advanced knowledge; and
- *** signifies that the answer is applied to a practical activity.

Then take the remaining banded dimensions which are linked with expository skills:

- Analytical skills, integration and appraisal;
 - Clarity and relevance of presentation and grammatical quality;
 - Consistent use of technical language, particularly in scientific question.
- or
- evidence of insight and understanding, particularly in the socio-cultural question.

First of all place the answer in one of the five bands, before identifying its specific place in that band, bearing in mind that each band is worth FIVE marks, in addition to the knowledge marks.

By combining your knowledge and presentational marks you will have a mark total out of 45.

3 SOCIO-CULTURAL FOCUS

Part One (AS: Unit 2563: Contemporary Studies)

Overall sub-max of 10 marks
(self development)

4 marks for:

- * a range of activities helps you to develop physically/both in terms of personal fitness and in physical skills;
- * part of self development is social awareness and physical activities gives an individual opportunities to compete against others/and cooperate in teams with others;
- * though basically concerned with physical development, physical activities involve a great deal of decision-making which involves solving mental problems/and producing mental strategies;
- * games in particular places the player in a moral position of having to choose right from wrong/ and reacting in a sporting way;
- * through physical activities and particularly outdoor education, the individual is faced with situations which tests him/her temperament and in so doing enhances self knowledge, self confidence and leadership potential;
- * many physical education activities have potential aesthetic qualities which encourages creativity/ but also allows an individual to taste excellence;
- ** as a subject in an educational institution, there is the primary objective of transmitting desirable values, one of which would be self development.

or equiv.
(pleasurable experiences)

3 marks for:

- * many aspects of play are retained in physical education and one of these is the significance of enjoyment;
- * one role of physical education is preparation for leisure and as such pleasure is a fundamental motive for active participation in leisure activities;
- * a basis of performance in physical activity is success and the pleasure this gives;
- * in educational terms, learning is best achieved and reinforced when the experience is perceived to be enjoyable;
- * sporting elements in physical education hinge on competition and the opportunity to experience success. When this happens, the emotion is one of pleasure, extending to rapture;
- ** the scope of physical activity in school is a three part experience involving educative, sportive and recreative values, where the teacher and the subject has a part to play.

or equiv.

with

- *** application to a specific physical education activity experience.

Total of 10 marks available for Contemporary answer

Part Two

EITHER

3 (a) (A2: Unit 2565: Historical Studies option)

Overall sub-max of 10 marks

5 marks for:

- * initial development by the boys themselves where they experienced unstructured play activities where they 'tasted reality';
- * most of these activities were ones they brought from home, and sharing new experiences in the school;
- * the activities were very physical testing and developing the boys physically;
- * the many team games taught them to learn social skills;
- * they learnt to 'play up, play up and play the game' / to value loyalty to the team, the house and the school;
- ** the boarding school structure resulted in a great deal of playtime in which values were either subconsciously or manifestly learnt;
- ** the social control factors involving the sixth form and young staff resulted in a character building ethic being perceived on the playing fields;
- ** the understanding that liberal headmasters like Dr Arnold, perceived a moral function of the playground to be 'facing the Devil' as Christian Gentlemen, learning to recognise right from wrong.

or equiv.

(place of enjoyment in popular and rational sport)

5 marks for:

- * popular: enjoyment, yes, but also often pain;
- * fun, yes as part of a festival scene;
- * pleasure, yes, but sometimes for livelihood;
- * rational: enjoyable, but sometimes exclusive;
- * for its own sake in the name of amateurism;
- * sometimes more than fun when a professional;
- * organised to give participants good social and personal experiences;
- ** popular recreation was an occasional pleasurable experience in a harsh society;
- ** rational recreation whilst reflecting a well organised, industrialised society, was often a vehicle to appease the under privileged.

or equiv.

Total of 10 marks available for the Historical answer

OR

3 (b) (A2: Unit 2565: Comparative Studies option)

Overall sub-max 10 marks

(importance of self development and pleasure in UK and/or US/Oz)

3 marks for:

UK, US & Aus. similarities:

- * self dev. & pleasure: part of child centred process;
- * broad curriculum/variety of experiences;
- * extensive opportunities in P.E. lessons and extra-curricular sport;
- * sign. of pleasure arising from play origins.

differences:

- * Aus. has compulsory time for sport for all children;
- or
- * US. focus on intercollegiate sport with reduction in majority of students participating.

or equiv.

(educational and ideological factors)

6 marks for:

- ** educational: Aus. has inherited the British schooling system;
- or
- U.S. has a major policy of social integration/Dewey;
- ** Aus. places individuality and sport high on school agenda;
- or
- U.S. play/heuristic methods adopted from Britain;
- ** ideological: Aus. obsession with sport as a cultural identity;

or

U.S. pursuit of happiness in constitution;

** Aus. young striving culture reflected in sport;

or

U.S. win ethic reflected in commercialism;

** Aus. or U.S. rags to riches/land of opportunity shared by both countries where self dev. is seen to be for all with P.E. a means of achieving it;

** Aus or U.S. notion of 'frontier' strong in both countries where sport, through P.E. is an expression of this.

or equiv.

**Total of 10 knowledge marks for Comparative answer followed by
an assessment of 25 banded marks**

N.B.

You should have used the scaled knowledge marks as your initial guide, checking that:

- * reflects standard knowledge; and
- ** represents more advanced knowledge; and
- *** signifies that the answer is applied to a practical activity.

Then take the remaining banded dimensions which are linked with presentation:

- Analytical skills, integration and appraisal;
- Clarity and relevance of presentation and grammatical quality;
- Consistent use of technical language, particularly in scientific question, or evidence of insight and understanding, particularly in the socio-cultural question.

First of all place the answer in one of the five bands, before identifying its specific place in that band, bearing in mind that each band is worth FIVE marks, in addition to the knowledge marks.

By combining your knowledge and expository marks you will have a mark total out of 45.

BANDED MARK SCHEME
SYNOPTIC ASSESSMENT UNIT 2566 - SECTION B

**The Integration of Knowledge of Principles and Concepts
 Across Different Areas of Physical Education**

Level of response mark scheme. 25 Marks available. The following mark band definitions will be used in conjunction with question specific detail.

| Mark Range | Mark Band Definition |
|-------------------|---|
| 21–25 | A fully comprehensive answer showing advanced analytical skills and level of critical appraisal. Theoretical knowledge drawn from a range of areas has been integrated across different areas of PE and clearly linked to practical performance. Links and connections between areas have been made intelligently and with relevance. Evidence of intelligent, independent opinion and judgements showing considerable insight and understanding. Consistent and relevant use of technical language and specialist vocabulary where required. Complex ideas are expressed very clearly and fluently. Arguments are consistently relevant and well structured. Grammar, punctuation and spelling are accurate. |
| 16–20 | A well-reasoned answer showing sound analytical skills and level of critical appraisal. Knowledge from a range of areas has been shown and the relationship between each area and practical performance has been clearly established. Links and connections between areas are relevant. Evidence of independent response and full understanding of concepts covered. Mainly accurate use of technical language and specialist vocabulary where required. In the main complex ideas are expressed well and paragraphs are logically ordered. Arguments are generally relevant and well structured. Few errors of grammar, punctuation and spelling. |
| 11–15 | A straightforward answer showing reasonable analytical skills and some level of critical appraisal. Knowledge from a range of areas is evident and an attempt at integration has been made. The relationship between theory and practical performance has been highlighted. Links and connections made are obvious ones. Generally the level of understanding is sound, but there are some inaccuracies. Technical language and specialist vocabulary has been used but has sometimes been inappropriate. Ideas are expressed in a reasonably straightforward manner, but some of the ideas are irrelevant. Paragraphs are not always linked to each other and there are noticeable errors in grammar, punctuation and grammar. |
| 6–10 | A simplistic answer with few attempts at analysis or appraisal. Limited knowledge from a range of areas has been included. with little integration and few links to practical performance. The response is mainly descriptive and there is evidence of misinterpretation and misunderstanding. There is occasional use of technical language and specialist vocabulary. Only simple ideas are expressed clearly and arguments lack coherence. Paragraphs are not linked and there are a significant number of errors of grammar, punctuation and spelling. |
| 0–5 | A disjointed answer lacking in coherence. There is little evidence of any analysis or appraisal. Knowledge included is general and superficial and is from a limited range of areas. No attempt at integration has been made and practical examples given are mainly irrelevant. There is a minimal level of understanding and only isolated use of technical language and specialist vocabulary. The answer shows little evidence of planning and errors of grammar, punctuation and spelling are intrusive. |