



**2005 Physical Education GA 3: Written examination**

**GENERAL COMMENTS**

The 2005 paper was the last paper to be completed during the current accreditation period. With a newly accredited course commencing in 2006, it is important that teachers and students who read this report are mindful of changes to the *Physical Education VCE Study Design*, VCE Physical Education Assessment Handbook, examination criteria and examination paper in 2006.

In this report, an answer, or range of suitable answers, is provided for each examination question, along with comments on any prevalent errors, misinterpretations or misunderstandings. It is not intended that these suggested solutions cover all possible correct answers. Where a number of answers are listed, these were all acceptable alternatives. Where a question was worth two marks, students were expected to provide two correct responses, unless otherwise specified. Students must read questions carefully, as careless mistakes were often made when the questions were not read carefully.

**SPECIFIC INFORMATION**

**Question 1**

Marks	0	1	2	3	Average
%	10	36	47	7	1.5

**1a.**

Any one of:

- taping
- wearing a brace
- ankle strengthening exercises.

This question was generally well done. A common error was to suggest that checking the ground prior to the event would prevent injury. The focus of the question, however, was on the injury rather than venue preparation.

**1b.**

Any two of:

- increase blood flow to the area
- remove toxins and waste products
- reduce inflammation.

Most students were able to suggest that heat increases blood flow. Many suggested 'softening of scar tissue', but in the time frame given in the question scar tissue would not have formed, therefore this answer was incorrect

**Question 2**

**2a–c.**

Marks	0	1	2	3	Average
%	7	25	34	35	2.0

**2a.**

Aerobic

**2b.**

Any of:

- CO<sub>2</sub>
- H<sub>2</sub>O
- heat.

**2c.**

Carbohydrates

Parts a–c. were generally well answered.

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2d.

Marks	0	1	2	Average
%	47	30	22	<b>0.8</b>

Answers attracting full marks included an explanation such as, 'Because she can maintain a higher average power output than her competitors'. Answers such as 'She should run at an even pace' only received one mark.

Many students gave general answers for this question, some of which stated that Georgie would be able to 'run faster' during the race without explaining how a high aerobic capacity makes this possible. Other students mentioned sprinting at the end of the race without adequately explaining how the anaerobic capacity for this was made available due to high aerobic capacity.

2e-g.

Marks	0	1	2	3	Average
%	23	33	30	14	<b>1.4</b>

2e.

There is a contribution from the anaerobic energy systems.

This was well answered by most students, which is pleasing given that this concept has been examined for a number of years and has not always been well answered.

2f.

Improved economy means that an athlete can run at a given speed at a reduced energy cost **or** at a faster speed at the same energy cost.

Many answers related to wind resistance; few students were able to link efficient movement to increased speed or reduced energy cost for the same speed.

2g.

Possible correct responses included:

- decreased levels of aerobic enzymes
- decreased stroke volume
- decreased blood volume
- decreased haemoglobin
- decreased cardiac output
- muscle atrophy (**not** of the cardiac muscle – there is no evidence for this)
- decreased a-VO<sub>2</sub>diff
- decreased lung volumes
- decreased VO<sub>2</sub> max
- reduced lung elasticity.

### Question 3

Marks	0	1	2	3	4	Average
%	24	24	22	17	13	<b>1.7</b>

3a.

Either of:

- endurance events
- long duration events.

Specific examples of events were not accepted, as the question specified 'type'.

3b.

Any of:

- fats
- FFA
- triglycerides
- glycerol.

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3c.

Decreased levels of CHO are available so it is harder to break down fats to produce aerobic energy. The body is unable to use fats if no oxaloacetate is created from glucose metabolism.

Parts a. and b. were well done. In part c. most students gave part or all of the traditionally understood explanation of 'running out of carbohydrates and starting to burn fats, which take more oxygen to break down'. Although students were given credit for this answer, recent research suggests that the phenomenon is more accurately understood as the reduced ability of muscles to metabolise fats caused by reduced glycogen levels. Few students provided an answer along this line.

## Question 4

4a.

Marks	0	1	2	3	4	Average
%	21	27	28	16	8	1.7

ai.

Reduce kilojoule/food intake **and** increase exercise to increase energy expenditure.

aii.

Any of:

- decreased blood pressure
- decreased atherosclerosis or arteriosclerosis (descriptions of the symptoms of these were also accepted)
- decreased cholesterol
- decreased triglycerides
- decreased type II diabetes.

In part ai. some students did not specify an 'increase' in exercise and 'decrease' in kilojoules, but generally the question was handled well by most students. Part aii. was poorly answered. Many answers were vague, general and tried to link 'strain' or 'pressure' on the heart to body fat levels rather than giving a specific answer.

4b.

Marks	0	1	2	3	4	Average
%	2	15	36	23	23	2.5

bi.

Social – any of:

- motivation from partners
- social interaction
- no gear is required.

Physical – any of:

- low skill required
- low risk of injury
- low impact
- low intensity.

bii.

Any two of the following, with some explanation:

- crèche
- childminding
- café
- beauty salon
- hairdresser
- organised social opportunities
- passive recreational facilities; for example, spas, saunas, massage, physiotherapists.

Part bi. was well answered. In part bii. a common error was to provide an answer such as 'pilates', which directly involves exercise.

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4c.

Marks	0	1	2	Average
%	42	42	17	<b>0.8</b>

Any two of:

- type II diabetes
- colon, bowel, prostate, stomach or breast cancer
- osteoporosis
- respiratory problems
- high blood pressure
- postural problems.

Answers to part c. were often general.

4d.

Marks	0	1	2	Average
%	68	23	8	<b>0.4</b>

Two of the following points:

- they promote loss of water and glycogen rather than fat loss
- may result in loss of lean tissue and increased hunger, therefore actually increasing energy intake.
- they can also cause ketosis, headaches, bad breath, fatigue and nausea.

Alternatively, a detailed explanation of one of the above effects was also accepted.

A common error was to focus on excess carbohydrates being stored as fat rather than the effect of low carbohydrate, high GI food.

4e.

Marks	0	1	2	Average
%	6	81	12	<b>1.1</b>

ei.

Any legitimate characteristic was accepted, for example:

- neighborhood walk and talk – low intensity, cheap, accessible.

eii.

They all involve weight-bearing activity.

Part ei. was generally well answered. In part eii. few students were able to identify weight-bearing as the key factor in the prevention of osteoporosis.

## Question 5

5a–b.

Marks	0	1	2	Average
%	7	55	37	<b>1.3</b>

5a.

There is greater media coverage and a greater number of spectators.

5b.

Any one of:

- mouth guards
- protective eye wear
- face shields.

Question 5 was generally well answered.

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## Question 6

### 6a.

Marks	0	1	2	3	Average
%	15	17	31	37	1.9

Any one of the following, with an appropriate explanation:

- graphite shafts
- larger heads
- titanium heads
- improved ball cores
- dimpled balls
- perimeter weighting
- increased club length (driver).

Many students continue to give general responses related to 'better' equipment.

### 6b–c.

Marks	0	1	2	3	Average
%	15	29	36	20	1.6

### 6b.

Any of:

- biomechanical analysis
- increased video feedback
- increased flex or power from improved training programs.

### 6c.

An example of a high-level answer might be, 'Visualisation of the successful and accurate completion of the shot'.

## Question 7

Marks	0	1	2	3	4	5	6	Average
%	3	6	13	20	26	25	7	3.7

### 7a.

Any two of:

- respect of players
- patience/persistence
- enthusiasm
- organised/well prepared
- role model behavior
- effective communication skills
- motivator
- flexible.

### 7b.

Cognitive

### 7c.

Any two of:

- short, simple instructions
- provide a demonstration
- provide positive feedback
- break skill down into parts
- repeated efforts
- close down the environment
- relate to something they know.

### 7d.

Massed practice

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Parts a–c. were generally well done. Few students were able to correctly identify the correct answer to part d.

## Question 8

Marks	0	1	2	3	4	Average
%	2	9	23	34	32	<b>2.9</b>

### 8a.

Any one of:

- to identify components of fitness
- to identify key muscle groups
- to identify energy systems
- to identify strengths and weaknesses in a player's game
- to develop a training program.

### 8b.

Yes, because the heart rate stays constant within five b.p.m. between five and ten minutes – the heart rate plateaus.

### 8c.

Any one of:

- plot movement patterns
- calculate W/R ratio
- video analysis
- statistical analysis.

Most students were able to correctly answer all parts of this question, although many students confused games analysis with fitness testing or training. In part c. many students listed fitness tests or described training methods or activities.

## Question 9

Marks	0	1	2	3	Average
%	29	30	29	12	<b>1.3</b>

	Role in energy production
<b>haemoglobin</b>	A molecule in red blood cells that attracts O <sub>2</sub> and transports it in blood to muscle cells.
<b>mitochondria</b>	The site of aerobic glycolysis within the cell.
<b>oxidative enzymes</b>	Increase the <b>rate</b> of reaction in aerobic energy production.

The roles of haemoglobin and mitochondria were well described. Only a minority of students recognised the role that oxidative enzymes have in increasing the rate of aerobic energy production.

## Question 10

Marks	0	1	2	3	4	Average
%	17	23	24	23	14	<b>2.0</b>

### 10a.

Either of:

- responsible for the re-synthesis of ATP molecules
- provides the anaerobic source of phosphate body energy.

A common error was to describe the ATP-PC system rather than the role of Creatine Phosphate in it.

### 10b.

Shot putter

Part b. was well done.

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## 10c.

An example of a two-mark answer is, 'this increases the availability of ATP, which improves anaerobic power output (increase IRM, increase peak torque), or increases the replenishment of ADP to ATP (recovery time)'. A less detailed answer such as 'Increases available levels of CP' received only one mark.

Most students were able to gain at least one mark for part c.

## Question 11

Marks	0	1	2	3	4	5	6	Average
%	6	13	18	20	18	14	10	3.2

### 11a.

Advantage – any one of:

- clear directions
- know where they stand
- fear of consequences may motivate some players
- team spirit is high (when winning).

Disadvantage – either of:

- loss of team spirit when team is not having success
- doesn't work for sensitive players.

Many students wrote about the specific example of Adam and his father rather than the 'style' of coaching as was asked in the question.

### 11b.

Blood will be redistributed to the gut to aid in digestion, resulting in less blood to working muscles. Food will sit in the stomach for a long time and affect performance.

It is commonly understood that blood is redirected from working muscles to the gut to aid digestion. It should be noted that while this was accepted as correct (and was the most common response), research does not support this, suggesting instead that any performance decrement is due to the discomfort of a full stomach and the slowness of the breakdown of such a meal.

### 11c.

Dehydration, nausea – abdominal cramps may result. In the case of dehydration, an explanation could be, 'Salt concentration will increase in the gut, therefore water will be extracted from the tissue into the gut, resulting in fluid loss in the tissue and dehydration'.

Most students recognised that salt tablets will result in dehydration, but only a minority explained the mechanism by which this occurs.

## Question 12

Marks	0	1	2	3	4	Average
%	5	16	31	31	16	2.4

### 12a.

Any two of:

- uncontrollable shaking or shivering
- pale skin
- loss of fine motor function
- blue lips
- slow pulse
- shallow breathing
- vagueness.

### 12b.

Any two of:

- decreased elasticity

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- decreased enzyme function
- reduced blood flow to muscles
- change in muscle fibre recruitment patterns
- decreased efficiency of motor patterns.

Alternatively, one of the points above could be given with a detailed explanation.

Question 12 was generally well answered.

### Question 13

Marks	0	1	2	3	Average
%	17	22	27	34	1.8

#### 13a.

##### ai.

High GI food

##### aii.

High carbohydrate meal (not necessarily low GI)

#### 13b.

Either of:

- increases the ability of the blood to carry oxygen, resulting in higher  $VO_2$  max
- increases red blood cell volume and therefore increases the body's oxygen carrying capacity.

Most students demonstrated a sound understanding of dietary recovery from an endurance event in this question.

### Question 14

Marks	0	1	2	3	Average
%	4	22	43	31	2.0

Any three of:

- increases body/muscle temperature
- increases/maintains blood flow
- increases/maintains range of motion
- prevents stiffness
- prevents venous pooling
- increases the rate of removal of LA from tissue
- maintains an elevated heart rate to speed up transition to game intensity
- removes hydrogen ions.

Many students reworded the same answer more than once and therefore did not obtain full marks. Otherwise, the question was handled well by most students.

### Question 15

#### 15a–b.

Marks	0	1	2	3	Average
%	23	23	21	34	1.7

#### 15a.

Extension

#### 15b.

The agonist and the antagonist work together in the bicep curl; the bicep shortens under tension and the tricep lengthens under tension.

#### 15c–e.

Marks	0	1	2	3	4	Average
%	12	29	26	18	16	2.0



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**15c.**  
Diagram B

**15d.**  
Calcium

**15e.**  
The motor neuron **and** the muscle fibres that it innervates.

**15f.**

Marks	0	1	2	3	4	Average
%	12	29	26	18	16	<b>0.4</b>

The number of motor units stimulated to contract **and** the rate of firing of motor units can be varied.

Parts a–c. were well understood. In part d. many students answered ACH or Acetyl Choline rather than calcium. Students found part f. difficult, with few able to identify the frequency of stimulus as well as the number of fibres recruited.

## Question 16

Marks	0	1	2	3	4	Average
%	11	21	26	26	16	<b>2.2</b>

**16a.**  
Closed skill

**16b.**  
Isometric

**16c.**  
They reduce tremors and an archer can release the arrow between heartbeats.

**16d.**  
Any of:

- meditation
- visualisation
- aerobic training.

Parts a. and b. were well done. In part c. many students provided an answer based on ‘calming nerves’ rather than one related to heart rate and tremor reduction.

## Question 17

Marks	0	1	2	3	4	Average
%	33	44	14	6	3	<b>1.0</b>

**17a.**  
Line B

**17b.**  
Slow twitch fibres are recruited before fast twitch fibres, as the graph shows their glycogen levels deplete quicker.

**17c.**  
Any one of:

- depletion of glycogen stores
- depletion of CP stores
- accumulation of H<sup>+</sup> ions
- decrease in CNS transmitters
- neural fatigue.

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This question was very poorly done. Most students did not recognise that preferential recruitment of ST fibres in this activity meant that they would deplete faster. In part c. most students were able to correctly identify glycogen or CP depletion.

## Question 18

Marks	0	1	2	3	4	Average
%	29	39	20	10	2	1.2

### 18a.

Either of:

- the male has a greater muscle mass, resulting in a higher absolute score
- the female has a higher percentage of body fat.

Many students focused on gender-related lung or heart capacity rather than body composition.

### 18b.

ml/kg/min

This was generally well answered.

### 18c.

Because it takes body weight into account, which is important given that running is a weight dependent activity.

Most students were able to correctly point out that ml/kg/min takes into account body weight but few could explain how this related to performance in a running activity.

## Question 19

Marks	0	1	2	3	Average
%	49	22	15	15	1.0

### 19a.

Any of:

- decreased anaerobic threshold
- decreased lactate tolerance
- reduced ability to buffer/oxidise lactate during efforts, results in increased lactate accumulation.

Answers to this question were often general, relating to 'decreased fitness'.

### 19b.

More time is needed to remove lactate between efforts. Reduced aerobic capacity also affects the ability to restore ATP-PC stores between efforts. Reduced aerobic capacity will result in greater reliance on the anaerobic energy system and therefore increase the production of lactate.

The explanations were often general and poorly explained.

## Question 20

### 20a.

Marks	0	1	2	3	Average
%	21	29	40	10	1.4

Barbell power cleans:

- one set of barbell power cleans is not enough.

Hip extension:

- one minute recovery between sets of hip extensions not enough
- the number of sets is too high (six sets of 70% RM)
- the RM is too high (70% is too high for six sets).

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There was one error in the barbell power cleans and two in the hip extension exercises. Many students wrongly assumed that there was one error in each exercise. Another common error was to fail to specify which exercise the mistake was made in.

## 20b.

Marks	0	1	2	Average
%	52	14	34	<b>0.8</b>

### bi.

Barbell power cleans:

- because at 60% RM the number of sets should be increased to develop power.

Hip extension:

- one minute doesn't allow full recovery of ATP/CP
- couldn't maintain 70% RM for six sets
- six sets is too many.

### bii.

Barbell power cleans:

- three to six sets (depending on % RM).

Hip extension:

- three to five minutes recovery time
- if maintain 70% RM, drop sets to three to four
- if maintain six sets, drop 70% RM to 50%.

## Question 21

Marks	0	1	2	3	4	5	Average
%	5	10	18	29	37	1	<b>2.9</b>

### 21a.

Plyometrics

### 21b.

#### bi.

Any of:

- increase the duration of intervals
- increase the number of intervals
- decrease the rest periods.

Parts a. and b. were generally well done. In part b. common errors were to change more than one variable when overloading or to increase the overload by suggesting implausible increases.

#### bii.

Any one of:

- increase the weight
- increase the number of reps
- increase the sets.

### 21c.

Anaerobic threshold training

The majority of students identified continuous training as the method for the 800m runner in part c. The specific type of training detailed is 'anaerobic threshold training'. Students who answered continuous training were awarded one of the two marks available.

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## Question 22

### 22a–b.

Marks	0	1	2	3	Average
%	16	5	17	62	2.3

Any of:

- family
- media coverage
- peers
- role models, etc.

### 22b.

An appropriate explanation for the factor suggested was needed here.

Parts a. and b. were well answered.

### 22c–d.

Marks	0	1	2	3	Average
%	32	6	14	49	1.8

### 22c.

Any one of:

- increased work commitments
- increased family commitments
- decreased body image.

### 22d.

An appropriate explanation for the factor suggested was needed here.

In parts c. and d. many students listed a factor that was not related to ageing, which made accurately explaining the mechanism of the effect impossible.

## Question 23

### 23a–c.

Marks	0	1	2	3	Average
%	29	24	26	21	1.4

### 23a.

Chronic

### 23b.

The difference between the oxygen concentration in the arteries and the oxygen concentration in the veins.

### 23c.

Because greater amounts of oxygen are being absorbed into the muscles and used to produce aerobic energy during exercise.

Most students answered parts a–c. well.

### 23d–e.

Marks	0	1	2	3	4	Average
%	32	28	23	14	3	1.3

### 23d.

Any two of:

- increased cross-sectional area of the fibres
- increased cell size
- increased number and size of myofibrils per fibre
- increased amounts of myosin and actin
- increased sarcoplasm

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- increased connective tissue
- increased number of fibres or cells (hyperplasia).

## 23e.

All of the above plus:

- increased capacity of the ATP-CP system
- increased glycolytic capacity
- increased speed of contraction
- increased speed of nerve impulse transmission
- increased muscle capillaries
- increased recruitment of motor units
- increased enzyme activity
- increased size and number of mitochondria.

In parts d. and e. many students found it difficult to distinguish between microscopic changes (part d.) and other chronic changes (part e.).