



2004 **Physical Education GA 3: Written examination**

GENERAL COMMENTS

The VCE Physical Education examination in 2004 appeared to be accessible to most students. The majority of students completed all questions.

A single answer or range of suitable answers is provided for each question below, along with comments on any prevalent errors, misinterpretations or misunderstandings.

SPECIFIC INFORMATION

Question 1

Marks	0	1	2	3	4	Average
%	15	12	27	35	11	2.2

This question was generally well answered; however, a common error was to provide responses pertaining to other systems. It should be noted that VO₂ Max is not an acute effect of training or a chronic respiratory training effect. Some students gave non-specific answers, for example 'increased breathing' rather than 'increased respiratory rate'.

1a

ai. Muscular system

- increased muscular temperature
- increased speed and strength of contraction
- increased enzyme activity
- increased motor unit recruitment
- increased phosphate release
- depleted glycogen stores
- increased LA and CO₂ by-products
- increased size of muscle (due to increased blood flow).

aii. Cardiovascular system

- increased HR, Q and SV
- increased blood pressure
- increased a-vO₂diff
- vasodilation
- redistribution of blood flow to working muscles.

aiii. Respiratory system

- increased respiratory rate
- increased tidal volume
- increased pulmonary diffusion/oxygen uptake
- increased minute ventilation.

1b

- increased tidal volume
- increased pulmonary diffusion/oxygen uptake
- decreased residual volume
- increased inspiratory reserve volume
- increased vital capacity
- increased minute ventilation during exercise.

Question 2

Marks	0	1	2	3	4	Average
%	3	14	33	38	13	2.5

A common incorrect response for part a was 'stretching'; this was considered to be a part of warm up and was therefore precluded as an acceptable answer.

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2a

- strapping/braces/taping
- massage
- proper shoes for support
- clearance of playing field.

2b

- more males participate in sport
- a higher proportion of males participate in sport.

2c

- males are more likely to participate in contact sports
- males are generally less flexible
- males are often more aggressive.

Question 3

Marks	0	1	2	3	4	5	Average
%	1	4	10	21	44	19	3.6

Most students answered parts a and b correctly. Many had difficulty providing three discrete results of applying ice in the short-term, but most were able to identify two outcomes.

3a

DRABC

3b

SALTAPS

3c

- reduce internal bleeding/blood flow to working area/vasoconstriction/bruising
- reduce pain/act as an analgesic
- reduce/prevent swelling.

Question 4

Marks	0	1	2	3	4	5	Average
%	8	16	24	27	20	6	2.6

In part a, most students were able to identify the correct training frequency; however, many received only one of the two marks as they did not provide further details of how the training principle of frequency could be applied. In part c, a common error was to reword the same answer for the two advantages.

4a

- training must be at least three times per week for improvement
- there must be rest days between sessions.

Alternatively, an accurate comment regarding the number of sessions required for improvement versus maintenance was accepted.

4b

In hockey, using the stick to hit the ball requires elbow extension (or shoulder girdle movement) in a similar movement to a medicine ball throw.

4c

- it requires little equipment
- most fitness components and energy systems can be trained
- the variety helps maintain interest and motivation
- it can cater for large numbers at once.

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Question 5

Most students scored highly on this question. Students were expected to provide more detail than 'enjoyment' by identifying the source of the enjoyment; for example, intrinsic rewards, social contact with peers, or financial rewards. Students who listed enjoyment as a reason for participation were not awarded a mark.

5a

Marks	0	1	2	3	Average
%	10	5	35	51	2.3

ai. Factors:

- role models
- media coverage of the sport
- geographic location – lives close to a track
- peers/family/school/socioeconomic.

aii. Explanation:

- her parents participated so she might take it up (one mark)
- her parents used to compete or are involved and may drive her to training so she was more likely to compete (two marks).

5b

Marks	0	1	2	3	Average
%	15	8	33	44	2.1

bi. Factors:

- role models/peers/family
- extrinsic/intrinsic rewards.

bii. Explanation:

- role models: Jana saw the success of athletes like Cathy Freeman and wanted to emulate their success by continuing to train hard and improve (two marks).

Question 6

Marks	0	1	2	3	4	5	Average
%	8	32	33	5	9	12	2.1

Part a was generally well done. The question asked students to 'outline' rather than 'state' and therefore required more detail than just listing a factor.

Some students failed to recognise that the question was about the changes occurring in an individual between the ages of 8 and 14. Answers about changes to living arrangements or financial limitations were not accepted.

In part b, the program needed to be 'state or national' and specifically aimed at increasing activity in teenage girls. Many students listed local programs that catered for all women or for both men and women.

6a

- peers/increased commitments (job, boyfriend, school)
- changing body image/self image
- change of PE from primary to secondary school
- gender stereotyping
- 'she may have more school commitments like homework'.

6b

- compulsory school sport
- Active Australia – Active Girls Campaign
- Girls Breakfast Program.

High quality answers explained how the program increases participation for teenage girls.

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Question 7

Marks	0	1	2	3	4	Average
%	2	6	17	31	44	3.1

Many students were successful in all parts of this question. Some misread part d and gave answers such as 'increased numbers starting to play the game' rather than an effect on those who are currently playing.

7a

- fast twitch
- white
- type II.

7b

- vertical jump
- cargent jump
- jump and reach.

7c

- plyometrics/weight
- resistance training.

7d

The players may aspire to:

- train harder
- become professional
- improve their standards
- set higher goals.

Question 8

Marks	0	1	2	Average
%	3	29	68	1.7

Most students were able to achieve full marks for this question. Those who did not tended to list rather than give an explanation, or simply restated the same point in different words.

High-quality answers centred around the increased likelihood of continued participation as a result of increased player safety, the effects of positive reinforcement and increased self-esteem.

Question 9

Parts a and b were answered well by most students; however, a minority erred by providing answers which were the same response reworded. In part c, many students showed a poor understanding of 'spot reduction'. A common error in part cii. was to suggest that sit-ups are a suitable form of exercise for reducing abdominal fat. This was particularly striking as many had accurately explained in part ci. why 'spot reduction' does not work.

9a

Marks	0	1	2	3	Average
%	1	8	29	62	2.5

ai. Advantages:

- improved motivation
- better quality program (personalised)
- appropriately safe program.

aii. Disadvantages:

- high cost
- lack of independence
- lack of social stimulus.

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9b

Marks	0	1	2	Average
%	1	16	83	1.8

Reasons for the trend:

- body image/embarrassment
- time efficient/convenient
- less cost.

9c

Marks	0	1	2	3	4	Average
%	26	30	27	13	4	1.4

ci.

High level answers contained a detailed explanation pointing out that:

- negative energy balance removes fat from **all** areas storing excess body fat (one area cannot be isolated)
- tone rather than fat loss can give the impression of weight loss.

cii.

Students were expected to state that a program incorporating aerobic exercise (low intensity, long duration) must be followed. To receive full marks, a brief statement outlining such a program was expected. Suitable responses included 'aerobic exercise three times per week for longer than 20 minutes' or specific examples like the '1000 steps per day' program.

Question 10

Marks	0	1	2	3	Average
%	5	22	45	28	2.0

Part a was well answered by most students. In part b, a common error was to list factors that were not related to gender, which was the central tenet of the question.

10a

- more girls/people are taking up the sport
- there is greater media coverage of the sport.

10b

Factors:

- body image issues
- male dominance of sport
- less media coverage/fewer role models
- ethnicity: some cultures discourage girls from participating in sport.

Question 11

Marks	0	1	2	Average
%	12	9	79	1.7

While there were many possible correct answers most students named the Paralympics and were able to accurately complete part b.

11a

Wheelchair sports, riding for the disabled, swish, goalball, blind cricket, any sport in the Paralympics, 'Willing and Able', Rainbow Riders, Sailability.

11b

It increases awareness and opportunity. There is increased access and increased social support.

Question 12

Marks	0	1	2	3	4	5	Average
%	2	2	4	10	16	67	4.4

The majority of students received full marks for this question.

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12a

- ride to school day
- cycling celebrity visits to schools
- advocate for bicycle paths
- encourage parents to ride with their children
- bicycle education
- riding buses.

12b

Group	Strategy	Explanation of impact on participation.
City/Shire Council (Local Government)	• 40km school zone • more bike paths • compulsory helmets • have police do a blitz in school areas	• cars going slower. Parents more likely to allow students to ride due to increased safety • no cars on bike paths • reduces the risk of head injuries • teaches students to ride safely
School administration	• Bike Ed. or Cycle On • Provide bike security area	• makes children more aware of road rules and correct cycling procedures. Increases skills so more students are likely to want to ride • students may ride to school if they know their bikes will be safe

Question 13

Marks	0	1	2	3	4	5	Average
%	3	15	27	38	14	3	2.6

Part d was generally poorly answered, with many students believing that the leg position was for 'comfort' or to 'make the sit-ups harder'.

13a

Flexion

13b

Abdominals

13c

Eccentric or isotonic eccentric (not just isotonic)

13d

It isolates the contraction to the abdominal muscle group and prevents the hip flexors from working.

Question 14

Marks	0	1	2	3	4	5	6	Average
%	8	14	17	20	18	14	8	3.0

In part e, many students had difficulty explaining the all or none law. This may be related to an inadequate understanding of microscopic muscle structure, as many suggested that 'all neurons contract', 'all fibres in the muscle contract' or 'the whole muscle contracts'. Few students mentioned the notion of a threshold.

14a

Isometric

14b

Multi-pennate or pennate

14c

Mesomorph

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14d

An increased number of motor units contracting leads to greater tension (strength) generated by muscle.

14e

When the stimulus threshold is exceeded, the fibres controlled by the motor neuron contract maximally. If the threshold is not exceeded, the fibres will not contract at all.

Question 15

Marks	0	1	2	3	4	5	Average
%	10	27	19	11	19	14	2.4

A common error in part b was to list a modified sport. Other parts of this question were well answered by most students.

15a

- increased technology
- less PE and sport in schools
- fewer PE specialists in primary schools
- working parents
- other non-sporting recreational options are available.

15b

- compulsory PE in schools
- Active for Life
- Active Girls Campaign
- Jump Rope for Heart
- walking school bus
- AustSwim.

15c

- increased ability and interest
- improved skills
- increased success
- increased awareness of the benefits of participation.

High level answers included a characteristic of the program and then explained how that characteristic can increase participation. For example, 'Compulsory school sport and PE each week gives students the opportunity to learn and enhance new motor skills. This may encourage students to want to participate more.'

Question 16

Marks	0	1	2	3	Average
%	26	14	22	38	1.7

While this area is still the subject of much research, most students were able to identify an appropriate factor. Some had difficulty in providing details of how this factor leads to improved performance.

Factor	Explanation
narrower hips	more efficient running style
smaller pelvic angle/hip tilt	better forward motion in a straight line
longer limb length	greater stride length
increased lean body mass	greater power to weight ratio
longer heel bone	greater power developed from the Achilles
increased muscle stiffness	more able to apply force
greater percentage of FT fibres	higher peak force possible
larger buttocks	greater force generated

Question 17

Marks	0	1	2	Average
%	20	22	57	1.4

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- visualisation/mental rehearsal/imagery (picture yourself successfully completing the task)
- hypnosis – reduces stress, assists relaxation or focus
- goal setting – setting short-term and long-term goals to maintain motivation.

Many students provided general details of what the athlete might do without providing a method that a sports psychologist might use to assist an athlete in preparation for an event.

Question 18

Marks	0	1	2	3	Average
%	6	19	34	41	2.1

Most students answered this question well. Those who did not often restated the question as an answer.

‘Warm up’	Results in increased muscle temperature and therefore greater flexibility to prevent tearing/straining the muscle.
‘Drink up’	Decreases the chance of dehydration or heat exhaustion which can lead to reduced blood volume and constricted blood flow, leading to fatigue.
‘Gear up’	Protective equipment is worn to prevent contact injuries (for example, a cricket helmet to prevent head injuries/concussion from fast bowlers). Alternatively, specific examples such as wear a hat/sunscreen to prevent sunstroke were accepted.

Question 19a–c

Marks	0	1	2	3	4	5	6	Average
%	4	8	12	28	26	15	7	3.4

19a

ai. Anaerobic Glycolysis or Lactic Acid System

aii. Speed endurance or anaerobic capacity/anaerobic power

Both parts of Question 19a seemed to be understood.

19b

bi. Shot put: power/muscular power.

bii. Power lifting: strength/muscular strength.

Some students may have been distracted by the name of the event, ‘power lifting’, and incorrectly identified power as the main component.

19c

- a reduced capacity to produce lactate will reduce the amount of energy that can be derived from anaerobic glycolysis and therefore reduce the overall power output
- reduced muscle mass results in decreased ability to use the anaerobic systems.

Many students misinterpreted part c as being about LA Threshold or LA Tolerance when it was actually asking about the energy production in anaerobic glycolysis.

19d

Marks	0	1	2	3	Average
%	76	16	7	1	0.3

di.

- transmitter tiredness – depletion of ACH in the neuromuscular synapse
- CNS inhibition – less electrical stimulation from brain, therefore slower muscle contractions
- transmitter tiredness AND CNS inhibition.

dii.

Ingest electrolytes or drink sports drinks.

Part d was generally poorly done. Many students provided answers related to performers overcoming ‘nerves’ or mental preparation. To receive full marks students had to provide an explanation of the factor they had identified.

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19e-f

Marks	0	1	2	3	Average
%	68	21	10	2	0.5

19e

- aerobic capacity will improve the ability to maintain or restore ATP/PC levels and therefore the ability to undertake sprint efforts
- aerobic training will enable lactate to be oxidised more effectively and not accumulate to the same extent.

Many students focused on later sprints relying on the aerobic system rather than the role of the aerobic system in replenishing anaerobic energy sources during periods of recovery.

19f

Lactate threshold (OBLA)/anaerobic threshold

19g

Marks	0	1	2	3	4	Average
%	23	26	22	14	15	1.7

gi.

Mitochondria are the sites of aerobic energy production. Less mitochondria means less aerobic glycolysis in the muscle cell and decreased ability to use oxygen.

gii.

A decreased heart volume means reduced cardiac output so less blood/oxygen is being pumped to the working muscles, resulting in reduced aerobic output.

Question 20

Marks	0	1	2	3	4	Average
%	78	15	5	2	1	0.4

This question was generally poorly done.

20a

There is a finite capacity for oxygen deficit which is reached (or almost reached) in these three events.

20b

- the rate of energy release is lower in the longer events and therefore the speed is reduced
- for the 1500m race, the speed is slower because the rate of energy release is less compared to that for the 400 and 800m races.

Question 21

Marks	0	1	2	3	Average
%	77	12	10	1	0.4

Part a was generally well answered, although many found it difficult to accurately articulate their explanation. Very few students were able to accurately answer part b.

21a

- lactate can be oxidised before being released into the blood stream
- a delay in the release of lactate into the blood will lower the concentration.

21b

Hydrogen ions (pH level)

Question 22

Marks	0	1	2	3	4	Average
%	18	7	51	20	5	1.9

A common error in part ai. was 'the Sit and Reach test' which is actually a test of static flexibility. In part aii. many students suggested the vertical jump, which is a recognised test of power rather than strength.

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Part b was generally well done.

22a

ai.

Trunk twist test (bend, twist and touch) or a description of such a test.

aii.

Maximum leg press or leg dynamometer

22b

Sam will be the better midfielder because of his higher aerobic capacity.

Question 23

Marks	0	1	2	3	4	5	6	Average
%	15	23	22	18	11	7	4	2.3

Part b proved difficult for many students but most were able to accurately answer the other three parts of the question.

23a

Insulin

23b

Because the molecule is not fully broken down. The lactic acid produced in anaerobic glycolysis still contains some energy.

23c

They contain simple carbohydrates which are quickly (better) broken down and therefore readily available in the bloodstream.

23d

Meal A

Question 24

24a

Marks	0	1	2	Average
%	48	16	35	0.9

Carbohydrate use is proportional to the **intensity** of exercise. More intense exercise uses a greater proportion of carbohydrates and a lower proportion of fats.

Many students wrote about 'hitting the wall' but did not focus on the direct relationship between the intensity of the exercise and the preferential utilisation of a fuel.

24b

Marks	0	1	2	3	4	5	Average
%	58	10	10	12	6	4	1.1

bi.

Glycogen sparing

bii.

More fats are used earlier during endurance events which allows glycogen to be 'spared' for higher intensity exercise later in the performance.

biii.

Two of the following, or a detailed answer:

- increased levels of enzymes associated with fat metabolism, increasing the ability to oxidise fats
- increased storage of fat/triglycerides within the muscle fibre
- enhanced ability to mobilise free fatty acids
- the glycogen utilisation mechanism is less sensitive to stimuli.

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Question 25

Marks	0	1	2	Average
%	17	36	47	1.3

- EPO
- blood doping

This question was well done by the majority of students

Question 26

Marks	0	1	2	3	Average
%	11	18	31	40	2.0

This question was well done by the majority of students.

26a

Strength or power

26b

Cancer, increased aggression, heart problems, acne, psychological problems, liver damage, diabetes, salt and water retention, high blood pressure, kidney damage, stroke, secondary sexual characteristics (for example, reduced testicular size), being banned from sporting body.

Question 27

Marks	0	1	2	3	4	5	6	7	8	Average
%	4	5	8	13	18	21	17	10	4	4.4

Part c was generally poorly answered. In part d, a number of students confused testing with training, suggesting that the test would be 'training' for improved performance.

27a

Cardiovascular endurance/aerobic capacity/aerobic power

27b

Aerobic

27c

- a constriction of the bronchi leads to a reduced ability to inspire or expire air
- increased mucus secretion narrows air tubes and lessens air passages.

27d

- to provide feedback
- to judge the effectiveness of the training program
- for motivation.

Students needed to provide a detailed explanation of one point or identify two points in a discussion.

27e

- expense
- lack of available of equipment
- they're not elite athletes therefore should not be taken to maximum effort
- only one test can be conducted at a time.

Question 28

Marks	0	1	2	Average
%	11	17	72	1.6

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28a
Agility

28b
It is more specific to the game of tennis.