2003 Assessment Report

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

2003 Physical Education GA 3: Written examination

GENERAL COMMENTS

The paper was accessible to all students with most completing all questions. Teachers should continue to emphasise to students the importance of reading and interpreting the question stem accurately.

Many students performed poorly in the questions which required an understanding of games analysis, fitness tests and their interpretation, and specific fitness programs. Teachers must continue to expose students to a wide range of testing, analysis and fitness program sessions to ensure that students are able to integrate their knowledge of theory into practical activities and apply this knowledge in an examination.

The solutions suggested below are accurate but they are not intended to be completely comprehensive in covering the complete range of possible satisfactory responses; possible high-level and lower-level answers have been provided for comparison in some instances.

GENERAL COMMENTS

Question 1

This question was generally well done with most students able to clearly identify a characteristic of each type of aerobics. Some students answered part bii in very general terms, e.g. 'females'. More successful answers identified a more specific group.

1a–b

Marks	0	1	2	3	Average
%	9	23	34	34	**1.92**

1a

- the activity is indoors
- social interaction
- participants enjoy the music
- variety of activities in the classes
- an instructor is available to assist and motivate

1bi

- no pressure on joints, non weight bearing

1bii

- people with injuries doing rehabilitation
- overweight people
- the elderly

Question 2

Some students misinterpreted parts ai and aii. In part ai students were expected to provide answers related to the preparation of players and in part b related to rehabilitation techniques. Many answers had these in reverse or simply provided four responses related to player preparation. Another common error was to provide vague or very general responses, e.g. 'better training'.

In part b a significant number of students described or sketched quadriceps strengthening and stretching exercises such as squats and standing quad stretches.

Part c was generally well done.

In part d many students did not follow the question prompt which indicated that they should use the figure provided as a basis of the description of the sliding filament theory.

2a–b

Marks	0	1	2	3	4	5	6	Average
%	3	7	15	24	26	18	7	**3.44**

2ai

Two of:

- improved training methods or application of principles (or more specific detail)
- greater emphasis on flexibility in training

- improved strapping
- use of protective equipment (e.g. thigh pads)
- increased use of the interchange bench.

2aii

Two of:

- improved rehabilitation techniques/methods/devices, e.g. RICER, TENS machines, hyperbaric chambers
- improved initial fitness meaning faster recovery
- four on the bench so players can be rotated meaning recovering player can be rested.

2bi

Hamstring curls or a description or diagram (must indicate direction of movement).

2bii

Any hamstring stretch description (static or PNF; not ballistic as the program is for rehabilitation).

2c–d

Marks	0	1	2	3	Average
%	23	17	23	37	**1.74**

2c

Isotonic concentric.

2d

Description should use the terminology in the diagram and contain two pieces of information eg. z lines move closer together.

- the I band reduces in width.
- the A band remains the same length
- the H zone may disappear
- any correct explanation of the earlier processes, e.g. myosin cross bridges attach to actin filaments and pull the actin in towards the centre

Question 3

It was expected that most students would recognise that a very high proportion of white twitch fibres should characterise an elite 100 m sprinter. Thus C is the correct answer, but some recent research has indicated that the ratios of white to red fibres may not be so extreme and may be closer to the ratio indicated in diagram A. Students who responded with diagram A were also marked as correct.

In parts b and c, a common error was to restate the same characteristic in reverse, e.g. low glycogen stores in part b and high glycogen stores in part a.

3a–c

Marks	0	1	2	3	4	5	Average
%	9	15	17	21	20	18	**2.82**

3a

Diagram C.

Two of: **3bi–ii**	Two of: **3ci–ii**
Slow twitch	Fast twitch
Lower power output High oxidative enzymes High capillary density High mitochondria density Low glycolytic capacity Low glycogen stores Low PC stores High triglyceride stores Slow relaxation time High myoglobin content Increased endurance capacity/slow to fatigue Red in colour	Higher-intermediate levels/rates power output Low myoglobin content Low-intermediate oxidative enzymes Low-intermediate capillary density Low-intermediate mitochondria density High glycolytic capacity High glycogen stores High PC stores Lower triglyceride stores Faster relaxation time White in colour

Question 4

In part a many students focused on the greater volume of oxygen required to break down fat rather than describing the phenomenon of glycogen sparing as a chronic training effect.

In part bi, many students responses were well outside an acceptable range, in some cases students suggested a period of one (or more) weeks and in other cases one to two hours. The latter may reflect a focus on the pre-event meal rather than a carbohydrate loading regime.

A common error in bii was to answer ‘increase fluid intake’; while broadly accurate this is not a specific characteristic of a ‘tapering’ regime.

In part c most students appeared to recognise the distinction between low and high GI carbohydrates. Parts d and e were generally well done by most students.

4a–c

Marks	0	1	2	3	4	5	Average
%	11	23	25	21	14	6	**2.23**

4a

There will be a greater reliance on fat and a decreased reliance on CHO (at a given sub maximal workload).

4bi

Increase CHO intake over 24–36hrs (to between 7–10 g/kg body wt); (the acceptable range was broadened to 24–96 hrs (1–4 days).

4bii

Reduce training load (over 3–4 days).

4ci

Meal A

4cii

The foods in meal A have generally lower glycaemic index (GI) or slow release energy.

4d–e

Marks	0	1	2	3	4	Average
%	3	9	20	32	36	**2.89**

4di–ii

Acceptable answers included:

- wear light coloured loose fitting clothes
- ice vests
- wear a hat (legionnaires)
- wet towels
- wetting skin/clothes regularly
- acclimatisation
- carbo-hydration
- start earlier in the day.

4e

Haydn should use active recovery because the activity levels will assist in reducing lactate levels which will be high as a result of the high intensity 5 minutes (above anaerobic threshold) sprint at the end.

Question 5

This question was generally well answered.

5a–b

Marks	0	1	2	3	Average
%	5	17	37	41	**2.13**

5a

Reduce training intensity or reduce number of sessions.

5bi

- swimmer knows exactly what to do/clear purpose
- fear of consequences can motivate some athletes
- discipline can breed success

5bii

- swimmer cannot react without the coach
- aggressive style may reduce motivation in the swimmer
- loss of spirit when athlete not so successful

Question 6

Most students answered part a correctly. Very few students correctly identified vasodilation and vasoconstriction as the correct responses in part b. Common incorrect answers included increases in stroke volume heart rate and cardiac output.

6a–b

Marks	0	1	2	3	Average
%	14	78	6	2	**0.94**

6a

Line A

6bi–ii

- vasodilation of capillaries (blood vessels) into muscles
- vasoconstriction of capillaries (blood vessels) into other areas
- vascular regulation
- hormonal regulation

Question 7

Most students were able to identify appropriate factors; however, many found it difficult to provide an explanation of how each produced the effect. Many students lost marks by repeating factors from part a in part b although this was clearly indicated as not acceptable in the stem of the question.

In this, and other similar questions (see Question 23) many students listed 'enjoyment' as a reason for participating in an activity. This showed little understanding of the factors such as peers, family involvement, intrinsic rewards, catharsis etc which lead to the performer enjoying the activity.

7a

Marks	0	1	2	3	4	Average
%	6	5	7	22	60	**3.25**

7ai

- family
- peers
- school program
- geographical location media exposure of the sport
- socioeconomic status

7aii

Sample higher level answer:

> Media … the person might have watched yacht races on TV and it looked like fun so they contacted a local club to try the sport.

Sample lower level answer:

> School … they tried it at school and liked it.

7b

Marks	0	1	2	3	4	Average
%	7	12	10	28	43	**2.89**

7bi

Must be different to the factors the student listed in part a.

- peers
- recognition/status
- family
- physical exercise
- geographical location
- achievement/competition
- media coverage
- description of intrinsic or extrinsic rewards
- socioeconomic factors

7bii

Sample higher level answers:

> Peers … A person developed friendships with other sailers and so they decided to keep participating to be with their friends.
>
> Family … Other members of a person's family were participating in the sport and kept encouraging them so they decided to keep participating.

Question 8

Part a was well done by most students but in part b some had difficulty explaining how the modification resulted in a skill improvement.

8a–b

Marks	0	1	2	3	Average
%	8	8	21	63	**2.39**

8a

Sample answers:

Football	smaller ball/grounds/modified rules, e.g. no picking the ball up off the ground
Basketball	smaller ball/court, lower rings/boards
Rugby	smaller ball/grounds touch not tackle

8b
Sample high level answers:
- a smaller football means that players will have more success in marking
- lower rings in basketball mean the player will experience more success in shooting for goal.

Question 9
This question was well done by most students.
9a–c

Marks	0	1	2	3	4	Average
%	4	8	23	45	20	**2.69**

9a
ATP-PC
9bi–ii
ATP-PC and Anaerobic Glycolysis/Lactic acid system
9c
Cardiovascular fitness (Aerobic power/capacity)

Question 10
Most students were able to identify the two fuels asked for in part a. Part b proved difficult for many students who confused lactate threshold with lactate tolerance or believed that the program in question targeted aerobic capacity.
10a–b

Marks	0	1	2	3	Average
%	6	36	35	23	**1.75**

10ai
ATP-PC or PC (*not just ATP*)
10aii
Muscle Glycogen (carbohydrate or glucose is OK)
10b
Lactate tolerance or anaerobic capacity.

Question 11
A common error in part a was to attempt to explain the difference in performance between males and females where the question asked for physiological factors producing the performance decrement in both male and female athletes.

Part b was generally well done but a number of students provided respiratory rather than cardiovascular factors.

In part d many students answered with specific gender characteristics rather than attempting to provide reasons for the trend indicated.
11a

Marks	0	1	2	Average
%	48	39	13	**0.64**

11ai
- build up of fatiguing by-products (lactate)

11aii
- reduced capacity to provide energy using ATP-PC

11b–d

Marks	0	1	2	3	4	5	Average
%	9	17	23	26	19	6	**2.46**

11b
- larger heart (ventricular) volume
- greater blood volume
- higher haemoglobin

11c
- greater power/wt ratio in males
- males greater muscle bulk = higher power output
- lower body fat percentage in males
- males have faster reaction times

11di–ii

- more females competing in endurance events
- decrease in cultural barriers to participation of women in sport
- females' training is closer to that of males
- more endurance events conducted so experience and training more accessible

Question 12

Most students were able to identify appropriate programs although many found it difficult to explain how a characteristic of that program could lead to the increase in participation.

While there are some programs which operate across more than one of the groups identified, students were asked to use different programs for each group and yet some did not.

12a–c

Marks	0	1	2	3	4	5	6	Average
%	7	5	12	11	24	11	30	**3.90**

12ai–ii

8–15 years old for example.
Little Athletics – children will be active in an organised environment on a Saturday morning when parents can be involved. This will mean other siblings may want to take up athletics when they reach the appropriate age.

12bi–ii

30–40 years old for example.
Super rules football – only play every two weeks and have shorter quarters so more recovery time, therefore more players are likely to continue playing.

12ci–ii

60+ years old for example.
Masters games movement – provides organised activities and competitions to encourage older people to be active in a variety of sports and activities.

Question 13

In part a most students recognised the errors in the program and in part b showed a sound understanding that only one variable should be altered for overload.

Part ci was generally not well done with many students giving answers based around chronic responses to the training program such as muscle micro tears and repair.

In part c muscle not turning to fat was well understood, but some students had difficulty explaining why weight gain may occur post training.

The role of protein was not well understood with many students focusing on its role as a fuel source rather than its role in muscle development.

13a–b

Marks	0	1	2	3	4	Average
%	16	17	22	24	21	**2.16**

13ai

87.5 kg squats – this is 90+% of 1 RM which is too high for developing power and almost impossible to do suggested value between 27–72 kg (30–80% 1RM)

13aii

12 sets of hamstring curls is too many suggested; value is 3–8 sets

13bi

No; 3 variables have been changed yet should be one only.

13c–d

Marks	0	1	2	3	4	5	6	Average
%	12	15	20	20	16	11	6	**2.68**

13ci

Increased blood flow to the muscle or venous pooling

13cii

Increased size of FT fibres (not increased number of muscle fibres)

13di

Muscle will not/cannot turn to fat (needs more for 1 mark). May lose muscle tone if put on weight if higher food intake is maintained.

13dii
Protein is essential for the building of muscle but it is not necessary to have such a high (40+ %) of dietary protein. A normal diet contains sufficient protein for building muscle.

Question 14
Part a was slightly better answered than the similar question on the 2002 paper but there are still many students who do not understand the interaction of the energy systems. Students confused oxygen debt and oxygen deficit in part b. Part c was generally less successfully answered.

14a–c

Marks	0	1	2	3	4	5	Average
%	35	22	17	12	8	6	**1.53**

14a
This is possible due to the involvement of the anaerobic system/s.
14b
Oxygen deficit is 'the period during exercise when the oxygen consumption is below that necessary to provide all the energy for the activity aerobically'.
OR
Similar explanation in terms of 'borrowing' energy from the anaerobic systems to make up the difference
14c
This is to allow the aerobic system to replenish the anaerobic systems. (Replenish ATP-CP stores and remove lactic acid, i.e. the lactic and alactic components of oxygen debt).

[Tissue repair and replenishment of myoglobin/haemoglobin also occur]

Question 15
Many students did not understand anaerobic glycolysis and what occurs to the Lactic Acid produced as evidenced by the number of inaccurate responses to part a.

In part b few students recognised that the elevation of point C indicated increased lactate tolerance rather than increased lactic acid threshold.

15a–d

Marks	0	1	2	3	4	Average
%	35	32	20	10	3	**1.12**

15a
Some LA is being oxidised during exercise.
15b
Training has produced a greater LA tolerance or ability to tolerate greater acidity (buffering is also an acceptable answer).
15c
LA tolerance training, interval training.
15d
95+%.
(Many students answered 85+% which was accepted although 95+% is more specific when LA tolerance is the target of the program).

Question 16

Marks	0	1	2	3	Average
%	12	5	23	60	**2.31**

Most students produced satisfactory responses to this question. Less successful answers listed activities which would take place other than at school and/or did not indicate how the activity would increase the numbers joining clubs.

Sample answer

Brief Description of Activity	Resources needed	How this will lead to an increase in students joining clubs.
Invite the coach from the local tennis club to hold a guest clinic at the school at lunchtime	PE staff to provide balls and racquets and book tennis courts	Students may have positive experience of the game and want to join the local tennis club

Question 17
This question was quite poorly done. In part a, most students were able to obtain one mark for an answer related to muscular atrophy with age. Few received a second mark with many answering 'bone density'. The term

'musculoskeletal' is a general one but many students interpreted it as indicating that one muscular and one skeletal answer was required.

In part b, while able to identify appropriate chronic adaptations, many students were unable to explain how the adaptation resulted in an increased V O_2 max.

17a–b

Marks	0	1	2	3	4	5	6	Average
%	26	15	18	21	8	9	3	**2.08**

17a

- reduced muscle bulk/cross-sectional area
- reduced size and number of mitochondria
- decreased a-v O_2 difference (muscle O_2 extraction capacity)
- decreased concentration of enzymes

17b

Any two of the following adaptations could have been identified:

- increased stroke volume or Q (not both)
- increased a-v O_2 difference
- increased Hb content or RBC count
- cardiac hypertrophy.

Samples of appropriate explanations:

- increased stroke volume means more blood is pumped out each heart beat therefore more blood gets to the working muscles
- increased a-v O_2 diff means more O_2 is extracted from the blood in the muscles and used for aerobic respiration.

Question 18

Marks	0	1	2	Average
%	36	11	53	**1.17**

A common error in this question was to focus on the outcome of the strategy for the company i.e. increased product sales rather than the outcome stipulated in the stem of the question, i.e. increased participation in the sport. Many students cited the sponsorship of the Melbourne Cup by a brewery, (probably due to the timing of the examination). This was a particularly poor example as the relevant examination criteria focuses on participation levels rather than increased spectator numbers.

Sample answer

Marketing strategy	Outcome
• promotion of role models by clubs • subsidising the sport to have it offered in school holiday programs • insisting on sexy clothing to promote the sport and attract interest	• people will want to participate because they want to be like their heroes • increase initial participation with a view to increasing continued participation • increased media exposure increases interest in the sport and participation levels will rise.

Question 19

Some students had difficulty in clearly identifying three different effects and simply reworded/repeated the same one. A common error was to focus on the effect on the sponsor rather than on the sport or the team

19a–b

Marks	0	1	2	3	4	Average
%	13	16	17	25	29	**2.41**

19ai–iii

Any three of:

- poorer training facilities, equipment
- can't buy the best players/coaches so reduced on-field success
- less money available for marketing to attract spectators to the games.

19b

If a player behaves badly or the team is involved in a scandal this may have a negative impact on the sponsor's business or if the team performs poorly sponsors receive reduced or negative publicity.

Question 20

In part a many students indicated that a games analysis was needed to determine strengths and weaknesses of individual players rather than to determine the requirements of the sport.

Part b was generally well answered. In bii a specific type of interval training was required as interval training is very broad.

Part c answers generally reflected some of the misunderstandings of part a and was not well done overall.

20a–c

Marks	0	1	2	3	4	5	Average
%	10	21	25	22	15	7	**2.32**

20a

To allow the coach to determine which components of fitness and energy systems need to be targeted in a training program.

20bi

ATP-PC.

20bii

Short or sprint interval training (not just interval)

20c

Information on movement patterns including changes of direction, number of shots, work to rest ratios, intensities of exercise (may include taking heart rate statistics), muscles used, skill errors.

Question 21

Parts a and b were well done. Students had difficulty in providing an explanation in part c. In part d most indicated that they expected greater relative improvement in sprint 1 but in many cases they were not able to accurately explain why.

21a–b

Marks	0	1	2	Average
%	11	30	59	**1.48**

21a

ATP-PC

21b

Speed or power/anaerobic power or anaerobic capacity

21c–d

Marks	0	1	2	3	4	Average
%	15	28	30	18	9	**1.76**

21c

Less recovery means less replenishment of ATP-PC system meaning increasing levels of LA between tests.

21d

Sprint 8 would improve the most because aerobic system is more effective in replenishing ATP-PC between each interval or aerobic training means they can turn on their aerobic system faster decreasing reliance on anaerobic system or more able to oxidise any lactate produced reducing muscle fatigue.

Question 22

Marks	0	1	2	3	Average
%	14	19	31	36	**1.87**

This question was well answered by most students.

Any three of:

- depletion of ATP-PC stores
- depletion of glycogen stores
- lactic acid accumulation
- calcium accumulation in the t-tubules
- ischaemia
- increased muscle temp
- decreased pH levels
- dehydration.

Question 23

Most students appeared to have an understanding of the difference between intrinsic and extrinsic rewards and were able to provide suitable examples. Enjoyment was not considered a suitable response as the reason behind enjoyment was deemed necessary to indicate a sound understanding.

23a–b

Marks	0	1	2	3	4	Average
%	9	8	18	37	28	**2.69**

23ai–ii
Any two of:
- personal fitness
- challenge
- body image and/or body shape
- self esteem
- personal best time.

23bi–ii
Any two of:
- name in the paper
- medal/certificate
- competitors T-shirt/cap
- recognition from peers.

Question 24
Many students clearly do not understand blood pressure. Most were able to answer parts a and c but few were able to provide an accurate explanation of systolic blood pressure in part b.

24a–c

Marks	0	1	2	3	4	Average
%	13	30	33	15	9	**1.76**

24a
Line B represents diastolic blood pressure.

24b
Systolic blood pressure is the force with which the blood is pumped out of the left ventricle of the heart; this is the pressure the blood exerts on the walls of the aorta (a lower level answer would be 'the force of blood being pumped out of the heart').

24c
Heart rate would be approx 200 bpm (20-year-old at close to maximum heart rate).

Question 25
Most students understood that the specified training intensity was too low to increase anaerobic threshold and were able to suggest that a heart rate over 85%+ would be necessary to produce this improvement. In part b many answers were of a very general nature and did not clearly explain the link between increased stroke volume (or other chronic aerobic training effect) and lower heart rate.

25a–b

Marks	0	1	2	3	4	Average
%	27	20	26	16	11	**1.65**

25a
This training session is unlikely to contribute towards an improvement in the athlete's anaerobic threshold because 60–65% heart rate maximum is too low an intensity (in an elite athlete) to improve anaerobic threshold or, the lactate levels are too low.

25b
An explanation of Q = SV x HR, i.e. as SV increases at a given Q the heart rate will be lower.