



**Victorian Certificate of Education  
2006**

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

**STUDENT NUMBER**

Letter

Figures									
Words									

# PHYSICAL EDUCATION

## Written examination

**Friday 3 November 2006**

**Reading time: 3.00 pm to 3.15 pm (15 minutes)**

**Writing time: 3.15 pm to 5.15 pm (2 hours)**

### QUESTION AND ANSWER BOOK

**Structure of book**

<i>Section</i>	<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
A	15	15	15
B	17	17	103
			Total 118

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners and rulers.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.
- No calculator is allowed in this examination.

**Materials supplied**

- Question and answer book of 27 pages.
- Answer sheet for multiple-choice questions.

**Instructions**

- Write your **student number** in the space provided above on this page.
- Check that your **name** and **student number** as printed on your answer sheet for multiple-choice questions are correct, **and** sign your name in the space provided to verify this.
- All written responses must be in English.

**At the end of the examination**

- Place the answer sheet for multiple-choice questions inside the front cover of this book.

**Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.**

**SECTION A – Multiple-choice questions****Instructions for Section A**

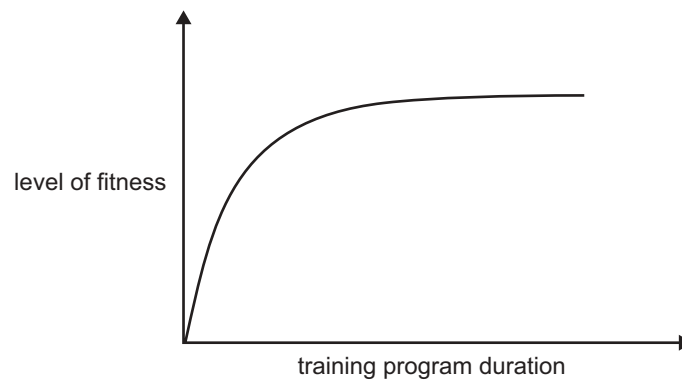
Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions.

Choose the response that is **correct** or that **best answers** the question.

A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

**Question 1**

The rate of fitness improvement as shown in the graph is known as

- A. diminishing returns.
- B. retraining.
- C. de-training.
- D. maintenance.

**Question 2**

An athlete is said to be in oxygen deficit when their oxygen uptake is

- A. less than oxygen demand to produce energy aerobically.
- B. greater than oxygen demand to produce energy aerobically.
- C. equal to oxygen demand to produce energy aerobically.
- D. below resting oxygen levels to produce energy aerobically.

**Question 3**

During the Australian Open Tennis championships in January 2006, temperatures exceeded 40°C and players were susceptible to dehydration.

Which of the following may result from a player becoming dehydrated?

- A. vasodilation of peripheral blood vessels
- B. increased electrolyte levels and heat stress
- C. reduced blood volume and increase in core body temperature
- D. increased blood volume and increase in core body temperature

**Question 4**

Identify the **subjective** methods of measuring physical activity from the options listed.

- A. direct observation and recall instruments
- B. physical activity logs and recall instruments
- C. direct observation and physical activity logs
- D. pedometers and recall instruments

**Question 5**

Identify the correct order of the following plyometric exercises from low stress to high stress.

Plyometric exercise	
Single-leg hops (for distance)	<b>A</b>
Depth jumps (short contact time)	<b>B</b>
Jump rope (two foot contact)	<b>C</b>
Stair jumps (up stairs)	<b>D</b>

- A. C D A B
- B. D C A B
- C. A D C B
- D. B C D A

**Question 6**

Below is a sample of a short-interval training program.

Sets	Repetitions	Distance (m)	Time (s)	Rest interval (s)
3	12	20	2.2	10

In the table below, which of the following alternatives does **not** demonstrate the correct application of the progressive **overload principle** to the program shown above?

	Sets	Repetitions	Distance (m)	Time (s)	Rest interval (s)
<b>A.</b>	3	13	20	2.2	10
<b>B.</b>	3	12	22	2.2	10
<b>C.</b>	4	12	20	2.2	10
<b>D.</b>	3	12	20	2.2	9

**Question 7**

Other than depletion of muscle glycogen stores, what are the **main** causes of fatigue for endurance athletes?

- A. PC depletion and lactic acid accumulation
- B. dehydration and elevated body temperature
- C. pyruvic acid accumulation and dehydration
- D. increased levels of ADP and hydrogen ions

**Question 8**

Charlotte has been going to the gym three days a week and walking every other day for 30 minutes for over 12 months. During the cold winter months, Charlotte relapsed and was no longer meeting the National Physical Activity Guidelines.

Which stage of motivational readiness is Charlotte most likely to have **relapsed** to?

- A. action stage
- B. preparation stage
- C. contemplation stage
- D. pre-contemplation stage

**Question 9**

Which of the following correctly shows the chemical breakdown of ATP to produce energy?

- A.  $ADP + PC \rightarrow ATP$
- B.  $ATP \rightarrow ADP + Pi + \text{energy}$
- C.  $ATP \rightarrow CO_2 + H_2O + \text{energy}$
- D.  $ATP + \text{lactic acid} \rightarrow \text{energy}$

**Question 10**

The **primary food** fuel for energy production during maximal physical activity would be

- A. PC.
- B. protein.
- C. fats.
- D. carbohydrates.

**Question 11**

For an untrained athlete, which of the following is a chronic response to the long-interval training program shown below?

% HR max.	Interval time	Work:rest
90%	50 seconds	1:2

- A. increased maximum heart rate
- B. improved fatty acid oxidation
- C. increased slow-twitch fibre size
- D. increased fast-twitch 'a' fibre size

**Question 12**

The rate of ATP production and the amount of ATP produced by each of the three energy systems is different. Which of the following is true for the ATP-CP system?

- A. fast rate, high yield
- B. slow rate, low yield
- C. fast rate, low yield
- D. slow rate, high yield

**Question 13**

A method of assessment is said to be reactive if it results in the subject changing their behaviour.

A researcher wants to assess levels of activity among children in Year 3.

Which method of assessment is likely to be associated with the highest level of reactivity among children in Year 3?

- A. direct observation
- B. pedometers
- C. accelerometers
- D. self report

**Question 14**

Jasmine, a 35-year-old female, does not do any regular physical activity and has no intention of becoming active in the next six months.

Which strategy would assist Jasmine in moving to the next stage?

- A. encouraging her to be active with a friend
- B. teach her to reward herself for being active
- C. increase her awareness of the risks associated with inactivity
- D. encourage her to set up reminders to be active

**Question 15**

Which two of the following physiological characteristics are increased by creatine supplementation?

- A. increased phosphocreatine stores and increased capability to resynthesise ATP
- B. increased haemoglobin concentration in the blood and increased muscle glycogen
- C. increased ability to oxidise lactic acid and increased capability to resynthesise ATP
- D. increased phosphocreatine stores and increased cardiac output

**SECTION B – Short answer questions****Instructions for Section B**

Answer **all** questions in the spaces provided.

**Question 1****Children urged to get active**

TV commercials will be used to encourage kids to get off the couch and exercise for an hour a day in a new campaign against childhood obesity.

The ads, showing a red couch bouncing children into a swimming pool, will air from tomorrow.

'For every image of someone wolfing down some KFC, there will now be an image of someone getting off the couch and being active,' Federal Health Minister Tony Abbott.

*The Age*, 4 February 2006

'Get Moving' is an example of a mass media campaign promoting children to be more active at the population level.

A key role of the mass media in the promotion of physical activity participation is providing information about the health benefits associated with regular physical activity.

Identify **three** other roles of mass media.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

3 marks

**Question 2**

- a. Outline the **component** of the National Physical Activity Guidelines for children (5–12 years) that relates **directly** to the cartoon shown above.

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1 mark

- b. Which energy system would these ‘little couch potatoes’ be using to supply **most** of their ATP while sitting on the couch?

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1 mark

- c. What is the proportion of carbohydrates and fats as fuels for ATP production under resting conditions?

Carbohydrates \_\_\_\_\_

Fats \_\_\_\_\_

2 marks

Total 4 marks

**Question 3**

Martina Hingis returned to Grand Slam tennis this year after a three-year enforced retirement with ankle and foot injuries. During preparation for the 2006 Australian Open, she aimed to develop her capacity to play an attacking style of tennis through concentrating on the development of her muscular strength, power, agility and speed.

Due to copyright restriction,  
this material is not supplied.

- a. i. Which training method would most likely lead to improvements in her court speed and anaerobic capacity?

\_\_\_\_\_

- ii. For each of the variables listed below, provide a suitable example that shows the correct application of this training method to **improve** Martina's court speed and anaerobic capacity.

Work to rest ratio \_\_\_\_\_

Intensity \_\_\_\_\_

Frequency \_\_\_\_\_

1 + 3 = 4 marks

- b. Discuss the effect of manipulating the duration of the rest intervals on the intended aim of this training method.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2 marks

- c. State one chronic adaptation, other than an increase in the cross-sectional area in Martina's skeletal muscle, and explain how it may have contributed toward improvement in her anaerobic power.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

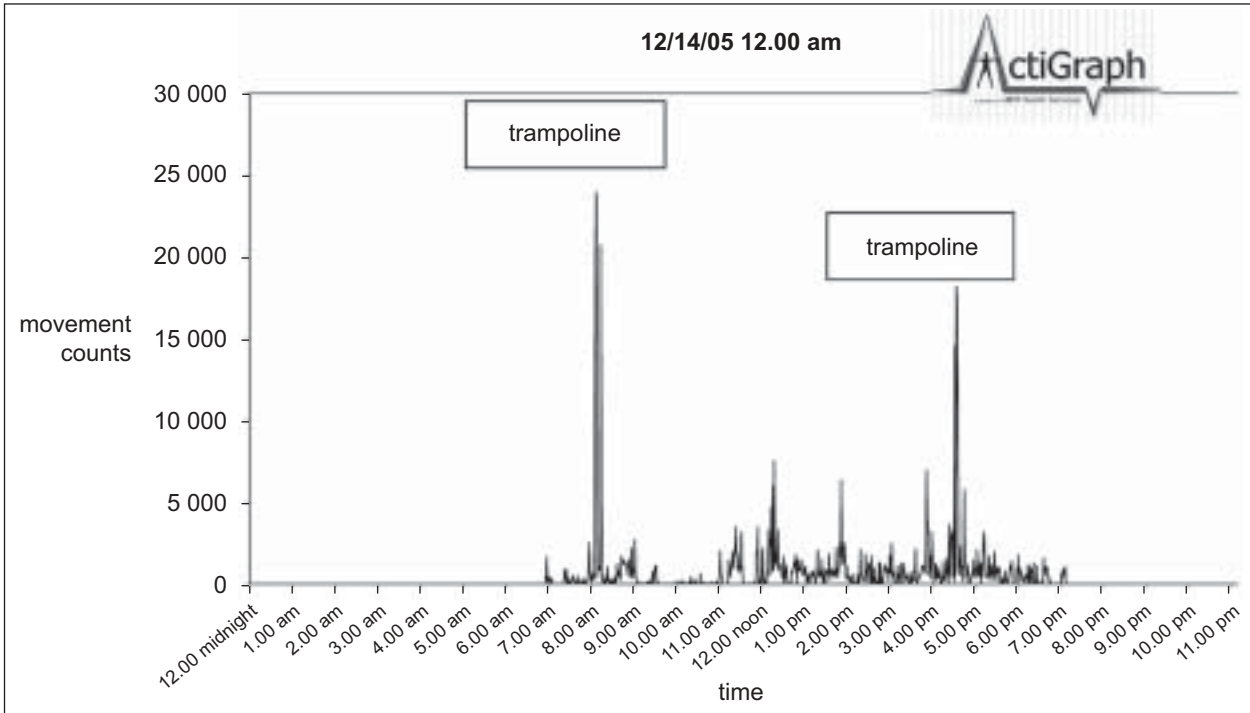
2 marks

Total 8 marks

**SECTION B** – continued



**Question 4**



Xavier is a six-year-old boy who is in prep. He wore an accelerometer on a typical school day and the accelerometer data that was collected over a 12-hour period is shown in the graph above.

- a. Explain the differences shown in the data between 10.00 am and 11.00 am and 12.00 noon and 1.00 pm.

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2 marks

Accelerometry is a useful tool for measuring physical activity; however, it can be quite costly.

- b. List **two other** disadvantages associated with the use of accelerometry.

1. \_\_\_\_\_

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2. \_\_\_\_\_

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2 marks

- c. Explain the relationship that exists for the various physical activity measurement options between practicality and accuracy. Use an example to support your answer.

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3 marks

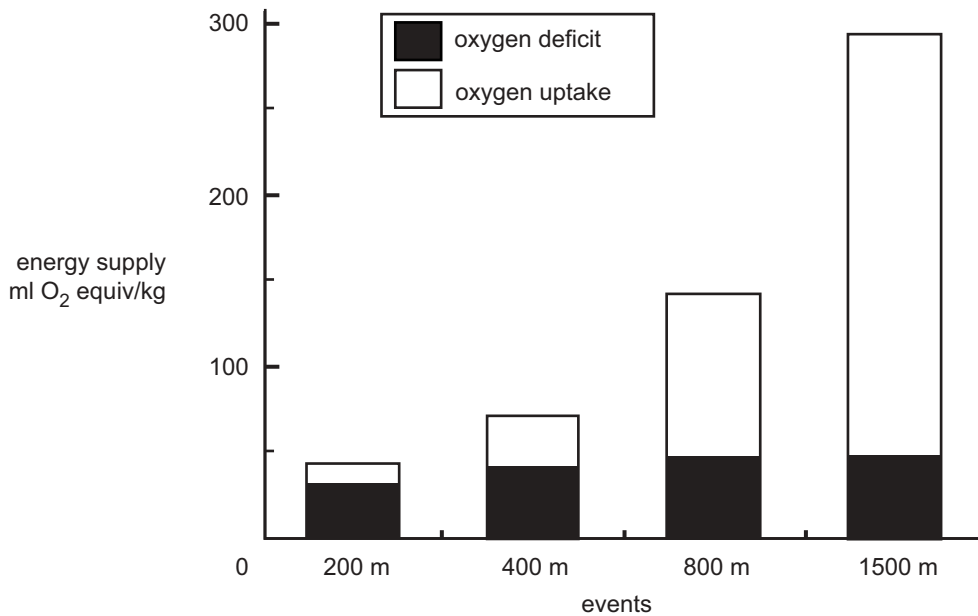
**Question 5**

John Steffensen won the 400 m event for men at the Commonwealth Games in a time of 44.73 seconds, while the 1500 m was completed in 3:38.49.

- a. At the 20-second mark of a 400 m sprint, which energy system is producing energy at the fastest rate?

1 mark

The graph below shows the energy contributions in track athletes during simulated running events on a treadmill.



- b. Explain why the anaerobic contribution in the 400 m, 800 m and 1500 m events depicted in the graph is relatively constant.

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2 marks

- c. Explain how an athlete generates a higher **average** speed in the 400 m event compared to the 1500 m event.

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2 marks

Total 5 marks

**Question 6**

At the Commonwealth Games, a VCE Physical Education student noticed that the long jumpers sat down and rested in between their jumps but the 200 m sprinters did an active recovery of stretching and light exercise after their heat.

Evaluate the physiological benefits of these two types of recoveries to the athletes.

**i. Rest recovery**

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**ii. Active recovery**

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2 + 2 = 4 marks

**Question 7**

According to the National Health and Medical Research Council (NHMRC) over half of the adult population is either overweight or obese.

- a. How many days per week should an **obese** adult be physically active?

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1 mark

- b. On the days this individual should be active, what is the minimum number of minutes of activity that are recommended?

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1 mark

- c. Assume this individual lost weight and was now within their healthy weight range. How many minutes are recommended per day to avoid weight regain?

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1 mark

Total 3 marks

**Question 8**

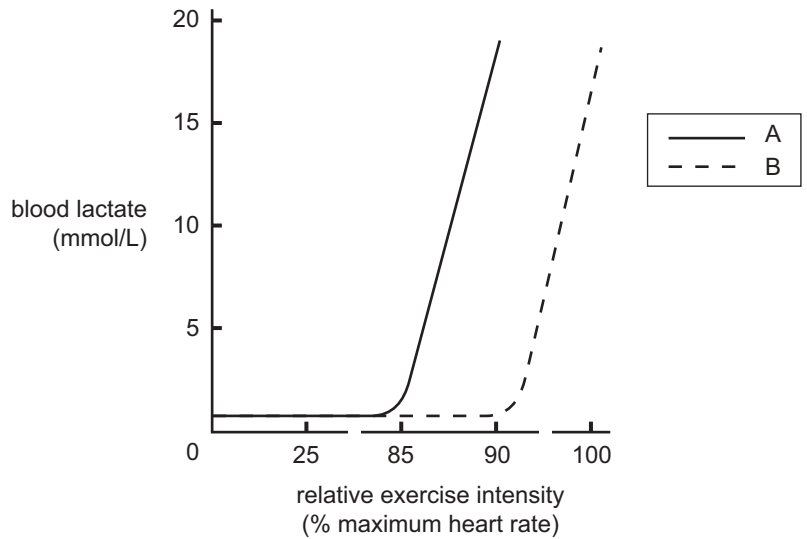
At rest there is a small amount of lactic acid present in the blood (10 mg/100 ml blood).

a. Discuss **two** reasons that would explain the presence of lactate in the blood during rest.

1. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
2. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

4 marks

Lactic acid accumulation in endurance trained and untrained athletes



b. Which line, A or B, represents the trained athlete?

\_\_\_\_\_

1 mark

c. A physiological adaptation that may account for the difference shown in the graph is an increase in lactate threshold. Explain **one other** physiological adaptation that has occurred in the endurance trained athlete to account for the difference shown in the graph.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2 marks

Total 7 marks

**Question 9**

The workplace, school and community settings are all important settings for the promotion of physical activity.

**Workplace settings**

The management team of a company of 250 employees decided they wanted to encourage increased use of the stairs within their building.

a. Other than the improvements in physiological outcomes, outline **three** benefits to employers of promoting physical activity in workplace settings.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

3. \_\_\_\_\_

\_\_\_\_\_

3 marks

**School settings**

b. Describe **one** potential intervention strategy within the following areas that a school could introduce to promote physical activity within a school setting.

Physical environment	
Social environment	
Policy/curriculum	

3 marks

**Community settings**

The 10000 Steps Rockhampton Project is a large community-based physical activity promotion project. The participants use pedometers to measure the number of steps they take each day.

- c. How could the Stages of Change model be used to critique the effectiveness of a 12-month community-based walking intervention program?

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2 marks

- d. Describe what happens to self-efficacy as you move through the stages of change.

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1 mark

Total 9 marks

**Question 10**

Monica is a 24-year-old landscape gardener who works full time and drives to work. During her leisure time Monica plays tennis twice a week and walks her dog once a week. Monica averages around 14 250 steps per day on her pedometer.

Her 27-year-old sister, Natalie, is a receptionist. She works full time and each day rides her bike 15 minutes to and from work. Natalie swims four days a week (90 min per session) in her leisure time in a swimming squad. Natalie does all of her household chores herself and averages around 7 450 steps per day on her pedometer.



Refer to the graph above displaying the number of steps per day for each sister within various domains as measured by a **pedometer**.

a. Which of the sisters, Monica or Natalie, is represented on the graph as sister X?

\_\_\_\_\_ 1 mark

b. i. Does Natalie meet the National Physical Activity Guidelines for adults?

\_\_\_\_\_

ii. Provide evidence to support your answer.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

1 + 2 = 3 marks

Total 4 marks

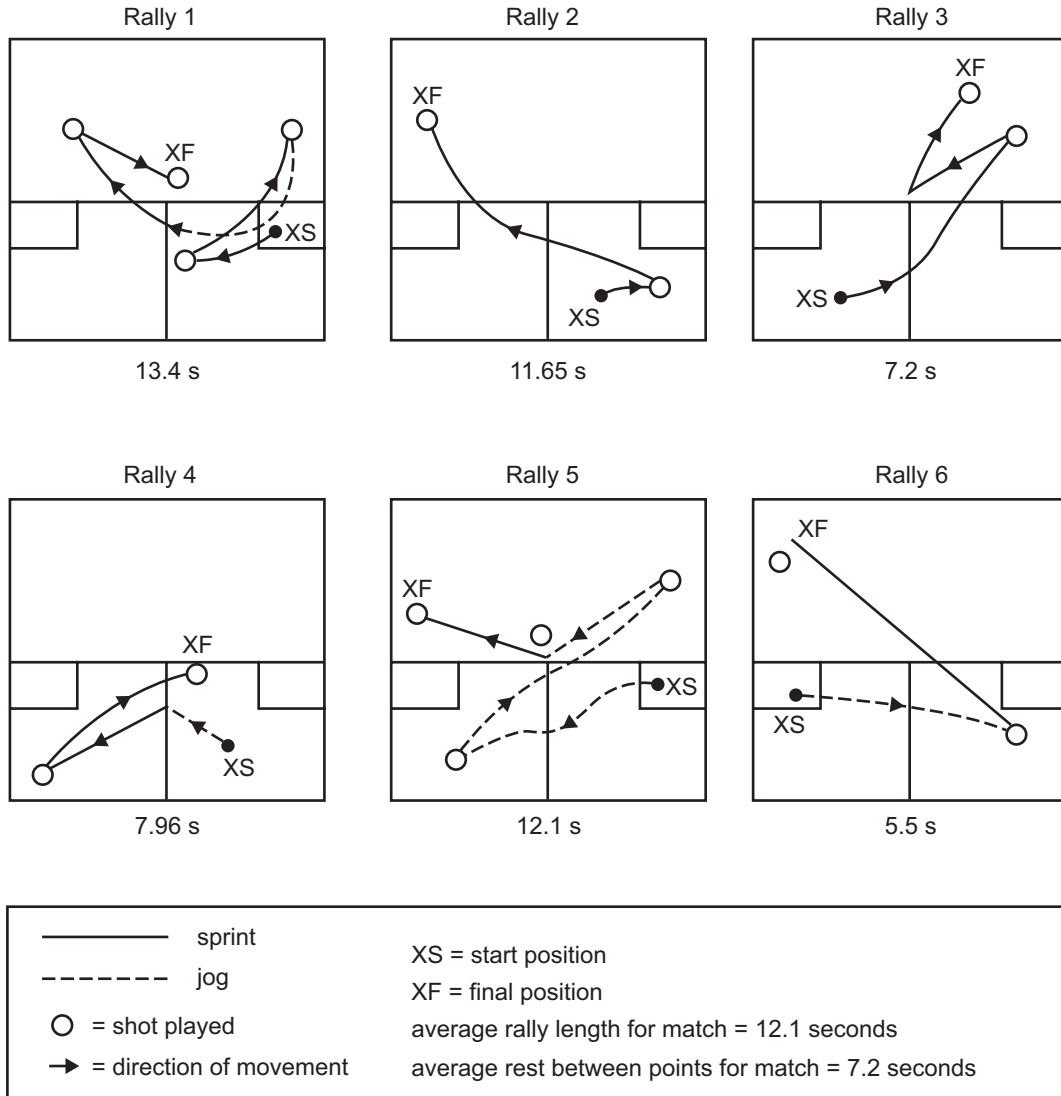


**Question 11**

A Year 12 Physical Education class used the observation and statistical recording method to collect data for an elite squash player in order to complete a games analysis.

The data collected included movement patterns, repetitions of movements, heart rate data, number of shots played and times of rallies and rest periods.

This data is shown in Figures 1–6.



**Figure 1.** Movement patterns

	Distance (metres)			Total number
	<5	5–10	>10	
sprint	219	56	0	275
jog	195	31	2	228
walk	53	3	0	56
Total	467	90	2	559

**Figure 2.** Number of sprints, jogs, walks

	Direction			Total for match
	Forwards	Backwards	Sideways	
Total for match	170	116	228	514

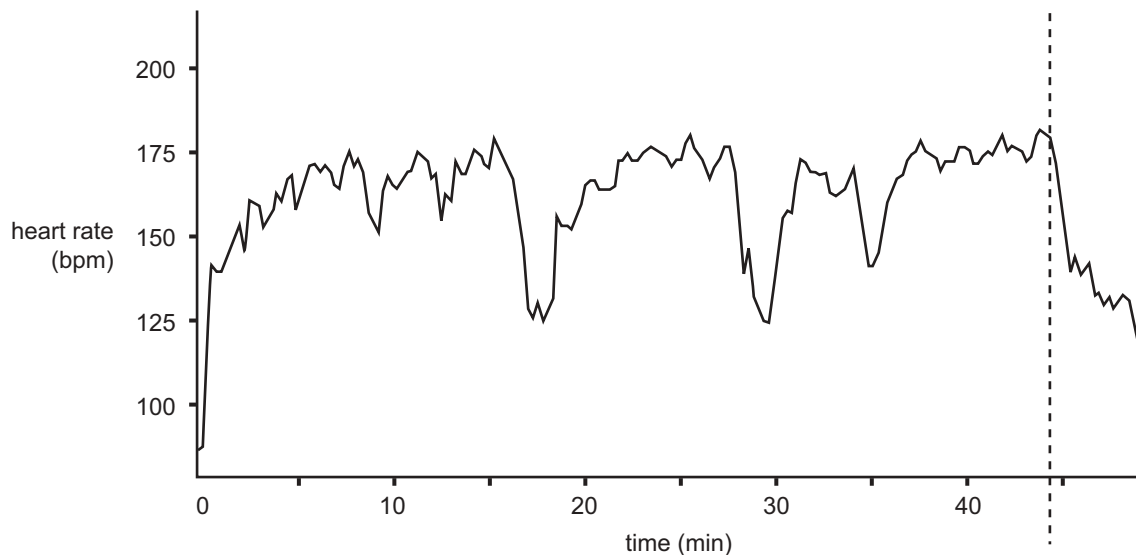
**Figure 3.** Number of times player ran forwards, backwards and sideways

	Direction of stretch				Total number of stretches
	Forehand side	Backhand side	Lunge	Reach	
Total	75	91	67	21	254

**Figure 4.** Number of times the player stretched/lunged for the ball in different directions

	Type of shot played			Total number of shots	
	Serve	Forehand	Backhand		Volley
	56	152	190	64	462

**Figure 5.** Number of shots played



**Figure 6.** Heart rate of squash player during the 43-minute match

a. Discuss the relationship between the fitness components and the energy systems (listed below) used for squash. You must provide examples from the data to support your answer.

i. ATP-PC system

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ii. Lactic acid system

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iii. Aerobic system

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3 + 3 + 3 = 9 marks

**SECTION B – Question 11 – continued**

**TURN OVER**

The data in Figure 4 (page 18) shows that the squash player lunged for the ball 67 times.



- b. i.** Name the major fitness component being demonstrated in the photograph above.

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- ii.** List and explain the impact of **one** of the factors affecting this fitness component.

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- iii.** Which **two** muscle groups are responsible for the extension of the squash player's left hip?

1. 

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2. 

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1 + 2 + 2 = 5 marks

Total 14 marks

**Question 12**

The coach of a senior school cross country team and the coach of an elite cross country runner want to test the aerobic capacity of their athletes.

There are many different tests that can be used to assess the aerobic capacity of an athlete.

The test selected by each of these coaches is shown below.

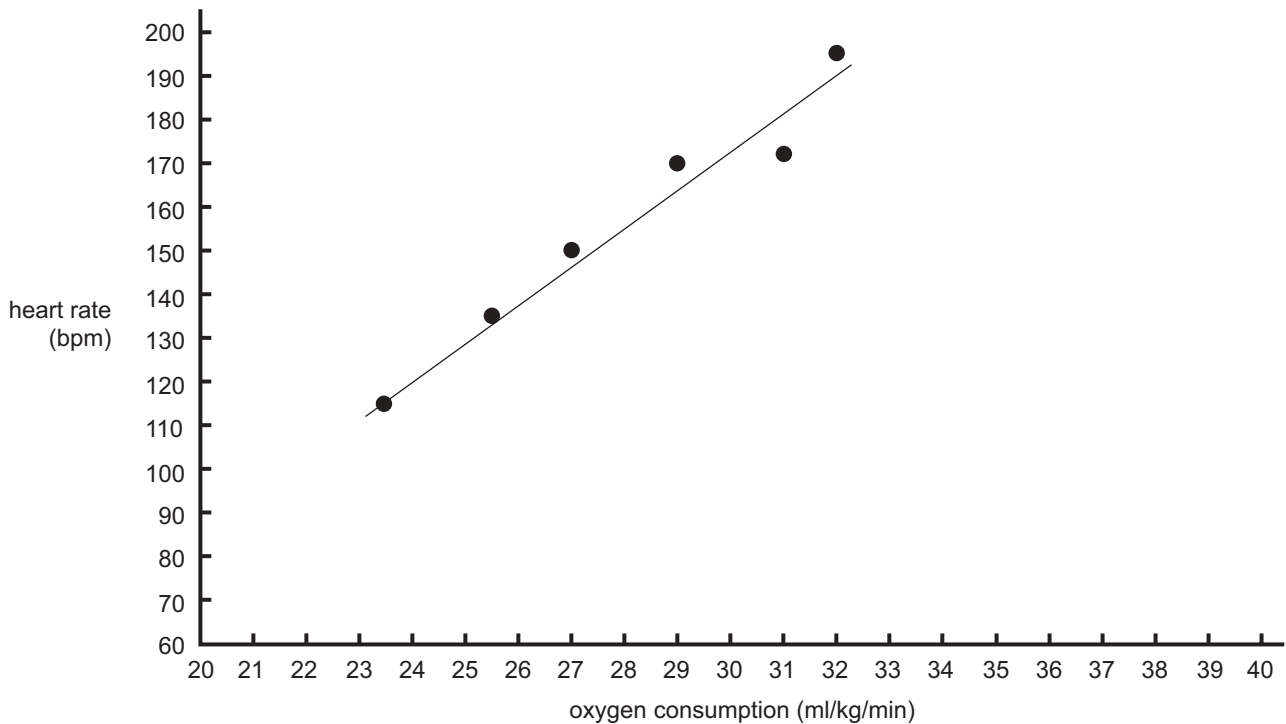
Give **two** reasons for their selections.

Athlete	Test	Reasons for the selection of test
Senior school cross country team	20 m shuttle-run test	1.  2.
Elite cross country runner	Laboratory test to determine $\text{VO}_2$ max on a treadmill	1.  2.

4 marks

**Question 13**

The following graph illustrates a 20-year-old untrained female’s heart rate and rate of oxygen consumption **prior** to commencing a 12-week aerobic training program.



a. Draw a line on the graph to show the expected results of the 12-week aerobic training program. 2 marks

b. At what intensity (% HR max.) should this athlete train in order to improve her cardiovascular fitness?  
 \_\_\_\_\_  
1 mark

Fartlek training is a training method that can be used to improve cardiorespiratory endurance.

c. How could you apply the principle of overload to a fartlek training session?  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
1 mark

d. Other than changes in heart rate and oxygen consumption, list **two** chronic cardiovascular adaptations that result from aerobic training.  
 1. \_\_\_\_\_  
 2. \_\_\_\_\_

2 marks  
 Total 6 marks

**Question 14**

In Australia, 89 per cent of adult and 59 per cent of child soccer injuries occur during organised competition and practice.

(Smartplay – facts and safety tips for soccer)

- a. Injury risk during games tends to be 3–4 times higher than risk during practice.

Explain why this trend may exist.

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1 mark

Ankle and knee strains are the most common soccer injuries treated in hospital emergency departments.

- b. Outline **one** risk management strategy, in each of the following areas, that a coach may implement to reduce the incidence of acute **ankle** injuries in soccer players.

- i. Training

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- ii. Environmental

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- iii. Equipment

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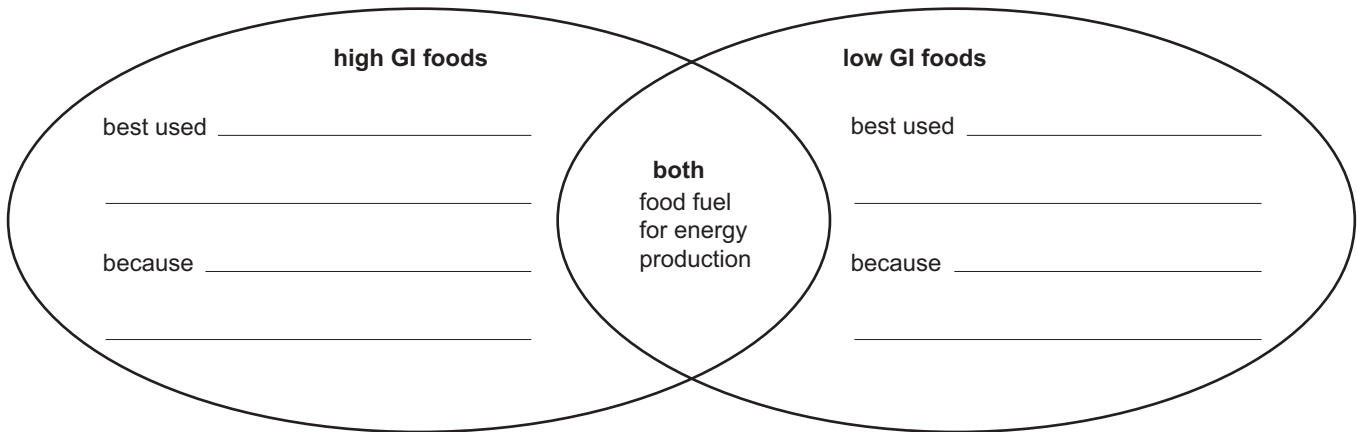
1 + 1 + 1 = 3 marks

Total 4 marks

**Question 15**

The labelling of food with its Glycemic Index (GI) has become a popular trend in recent years. Athletes can use the information to assist in the manipulation of their diet to enhance both their performance and recovery.

Use the diagram below to state when high GI and low GI foods should be used and give **one** reason.



4 marks

**Question 16**

Some athletes will consider anything to enhance their performance. On 1 January 2005, the World Anti-Doping Agency (WADA) prohibited the use of diuretics in all sports.

Excluding reference to the physiological effects of diuretic use, outline **two** positive and **two** negative **ethical** considerations an athlete may address when choosing whether or not to use diuretics to enhance their performance.

Positive ethical considerations

1. \_\_\_\_\_  
 \_\_\_\_\_

2. \_\_\_\_\_  
 \_\_\_\_\_

Negative ethical considerations

1. \_\_\_\_\_  
 \_\_\_\_\_

2. \_\_\_\_\_  
 \_\_\_\_\_

4 marks



**Question 17**

Leanne Guinea is a 21-year-old slalom kayaker with the Victorian Institute of Sport. She was placed 2nd in the 2006 National Championships for under 22 year olds.

Slalom kayaking requires athletes to paddle through a course of 18 gates as quickly as they can. Race times are around 120 seconds.

Leanne's training consists of weight training in the gym, running and paddling work. Below is a typical day during the conditioning phase of her training.

6.30 am          Gym – 90 minute session

3 sets × 6 repetitions

Work:rest 1:6

1.00 pm          Run session – 35 minutes

6 km

80% HR max.

5.15 pm          Paddling session – 75 minutes

1. Warm up – 10 minutes stroke kinetics (practise stroke technique)

2. 8 reps × 10-second sprints (Work:rest 1:5)

3. 3 sets of 5 repetitions × 40-second sprints (Work:rest 1:1) and 5 minutes rest between each set

4. 7 minute cool down paddling at low intensity (on moving water)

Leanne’s training incorporates both aerobic and anaerobic work.

a. Give **one** example, justifying your choice, of an activity in Leanne’s training that is

i. aerobic \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ii. anaerobic \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 + 2 = 4 marks

b. State **two** benefits for the endurance athlete of incorporating some anaerobic training into their program.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 marks

Leanne and her coach may use both physiological and psychological strategies to enhance her recovery from the 75-minute paddling session. Two commonly used strategies are massage and meditation.

c. Explain **one** benefit of each strategy and state how it may enhance Leanne’s recovery.

i. Massage  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ii. Meditation  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2 + 2 = 4 marks

Both Leanne and her coach are responsible for monitoring her training to ensure that overtraining does not occur.

**d.** List **one** strategy the coach could implement to prevent overtraining occurring and **one** strategy the athlete could use to prevent overtraining occurring.

**i.** Coach

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**ii.** Athlete

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1 + 1 = 2 marks

Protein is an important dietary consideration for slalom kayakers.

**e.** Outline the function of protein in enhancing the performance of a slalom kayaker undertaking the above training regime.

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1 mark

Total 13 marks