

Victorian Certificate of Education

2004



STUDENT NUMBER

								Letter
Figures								
Words								

PHYSICAL EDUCATION

Written examination

Friday 5 November 2004

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>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
28	28	133

- 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 25 pages.
- Instructions**
- Write your **student number** in the space provided above on this page.
 - All written responses must be in English.

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

Question 1

Acute responses to **aerobic** exercise occur in the muscular, cardiovascular and respiratory systems.

a. List **one** acute response occurring in each of these systems.

i. Muscular system

ii. Cardiovascular system

iii. Respiratory system

3 marks

b. List one **chronic** respiratory training effect resulting from a long-term aerobic training program.

1 mark

Total 4 marks

Question 2

The Australian Bureau of Statistics recently released data showing that over 367 000 Australians reported having a recent sports injury resulting from participation in organised sport.

The data also showed

- two-thirds of those reporting injuries were male
- participants exercising at high to moderate levels had a higher rate of injury than those who exercise at lower levels
- the two most common types of injuries were sprains and strains.

a. Provide **two** strategies, **other than warm up**, which could be used immediately prior to competition to prevent sprains or strains occurring.

i. _____

ii. _____

2 marks

b. State **one** reason why the total number of Australian males suffering injuries is greater than the total number of Australian females suffering injuries.

1 mark

Males also suffer more injuries per 1000 participants than females.

c. Suggest a likely reason for this. (Your answer must be different to part b.)

1 mark

Total 4 marks

Question 3

SALTAPS, RICER, DRABC and NOHARM are all acronyms used to detail the actions which should be taken following an injury occurring in a sporting situation.

- a. Which of these actions should be applied **first** if a player is **unconscious**?

1 mark

- b. Which action should be applied **first** if the player is **conscious**?

1 mark

The 'I' in RICER stands for 'ice'.

- c. What are three intended short-term outcomes of applying ice as part of a first-aid procedure?

3 marks

Total 5 marks

Question 4

The following table outlines a **Fixed Load Circuit Training Program** for a 17-year-old female state-level field hockey player who plays on the **wing**.

When undertaking this circuit the player performs three sets of each exercise using the half score from the initial test. Her aim is to reduce the time taken to complete the three sets from 20 minutes to 17 minutes. Each time she performs a training session she records her working heart rate and the time and date of the training session.

Stations	Score for 1 minute	Half score
Sit-ups	60 reps	30
Agility run	10 reps	5
Push-ups	40 reps	20
Shuttle sprints	12 reps	6
Medicine ball throw	20 reps	10
Initial time (3 sets)		20 minutes
Target time		17 minutes

- a. How can the training principle of **frequency** be applied to this training method if this player is to improve?

2 marks

- b. How does the medicine ball throw fulfil the principle of **specificity** for this athlete?

1 mark

- c. Outline two advantages of circuit training.

Advantage 1 _____

Advantage 2 _____

2 marks

Total 5 marks

Question 5

Jana Pitman won a gold medal in the 400 m hurdles at the 2003 World Athletics championships.

- a. i.** List **one** factor that may have influenced **Jana** to **initially** participate in athletics.

- ii.** Explain how this factor led to Jana's initial participation in athletics.

1 + 2 = 3 marks

- b. i.** List **one** factor **different from the one in part a.** that may have influenced Jana to **continue** participation in athletics.

- ii.** Explain how this factor led to Jana's continued participation in athletics.

1 + 2 = 3 marks

Total 6 marks

TURN OVER

Question 6

The following table compares the difference in level of structured physical activity for a girl at age 8 and then, the **same girl**, six years later when she is 14.

Female aged 8	Female aged 14
Saturday – Little Athletics	Saturday – No activity
Tuesday – Basketball	Tuesday – Netball
Thursday – Netball	Thursday – No activity

- a. Outline two factors that may have influenced **this girl** to reduce the amount of physical activity she does over the years.

Factor 1 _____

Factor 2 _____

2 marks

- b. Name a state or national program and explain how it aims to increase the level of participation in physical activity in **teenage girls**.

Name a state or national program _____

Explanation _____

1 + 2 = 3 marks

Total 5 marks

Question 7

Lauren Jackson is one of Australia's leading female basketball players. She was named 'Most Valuable Player' in 2003 in the Womens American Basketball Association (WABA). The figure below shows her performing a jump shot.



In performing a jump shot Lauren predominantly uses the ATP-PC energy system and her predominant fitness component is muscular power in the legs.

- a. What muscle fibre type is predominantly used by the leg muscles when performing the jump shot?

1 mark

- b. Name one appropriate standard fitness test for assessing muscular power in the legs.

1 mark

- c. What is the most effective training method that can be used to improve muscular power in the legs?

1 mark

- d. Describe one possible effect on young Australian females who **currently** play basketball, as a result of Lauren being named WABA Most Valuable Player in 2003.

1 mark

Total 4 marks

TURN OVER

Question 8

Many sporting bodies have developed a 'Code of Behaviour' for spectators, similar to that shown below. The code provides guidelines on appropriate behaviour for spectators.

Spectators Code of Behaviour

- Remember that young people participate in sport for their enjoyment and benefit, not yours.
- Applaud good performance and efforts from all individuals and teams. Congratulate all participants on their performance regardless of the game's outcome.
- Respect the decisions of officials and teach young people to do the same.
- Never ridicule or scold a young player for making a mistake. Positive comments are motivational.
- Condemn the use of violence in any form, whether it is by spectators, coaches, officials or players.
- Show respect for your team's opponents. Without them there would be no game.
- Encourage players to follow the rules and the officials' decisions.
- Do not use foul language, sledge or harass players, coaches or officials.
- Respect the rights, dignity and worth of every young person regardless of their gender, ability, cultural background or religion.

Explain how implementation of such a code of behaviour will encourage a child to **continue** participation in their chosen sport.

2 marks

Question 9

In recent years the number of people employing a **personal trainer** in order to improve their level of fitness has dramatically increased.

- a. i. Outline **two advantages** of using a personal trainer.

Advantage 1 _____

Advantage 2 _____

- ii. Outline **one disadvantage** of using a personal trainer.

2 + 1 = 3 marks

Many people prefer to exercise in the privacy of their home, using equipment such as treadmills and exercise bikes, rather than go to a gym.

- b. Outline two reasons for this trend.

Reason 1 _____

Reason 2 _____

2 marks

Advertisements in magazines, newspapers and television often promote programs that guarantee to result in weight loss from a specific body area; for example, the abdomen.

The result guaranteed in these programs is called 'spot reduction' and does not work.

- c. i. Explain why this is the case.

- ii. Outline a more **suitable** form of exercise that could reduce the amount of abdominal fat.

2 + 2 = 4 marks

Total 9 marks

TURN OVER

Question 10

In 2003 Layne Beachley received a great deal of media coverage for winning a record of six women’s world surfing titles in succession from 1998 to 2003.

- a. State one possible benefit of Layne’s achievements on surfing in Australia.

1 mark

- b. Name two sociocultural factors that may be more likely to discourage **girls** than boys from taking up the sport of surfing.

Factor 1 _____

Factor 2 _____

2 marks

Total 3 marks

Question 11

Melbourne will host the 20th **Deaflympics** (an international sporting competition for the hearing impaired) in 2005 and over 3500 athletes from 83 countries are expected to compete in a variety of sports. The sports are not modified except to replace sound commands with visual signals. For example, swimming and running events will start with a green light rather than the sound of a starting pistol.

- a. Name one other sporting or recreational program that caters for people with a disability.

1 mark

- b. Outline how the program you have named in part **a.** may increase the level of participation in physical activity for people with a disability.

1 mark

Total 2 marks

Question 12

Bicycle Victoria has the slogan, ‘more people riding more often’. Programs such as Ride to Work, Around the Bay in a Day and the Great Victorian Bike Ride attract people of all ages to participate in cycling.

- a. Outline one strategy that Bicycle Victoria could use to increase the number of **primary school aged** children riding their bikes to school.

1 mark

One of the reasons for children not riding their bikes to school is the risk associated with traffic on the roads.

- b. Explain how each of the groups listed below could make it safer for children to ride to school. You **must** state what the group could do (strategy) **and** explain how it may lead to higher levels of participation in cycling by children.

Group	Strategy	Explanation of impact on participation
City/Shire council (Local government)	<hr/> <hr/> <hr/> <hr/>	<hr/> <hr/> <hr/> <hr/>
School administration	<hr/> <hr/> <hr/> <hr/>	<hr/> <hr/> <hr/> <hr/>

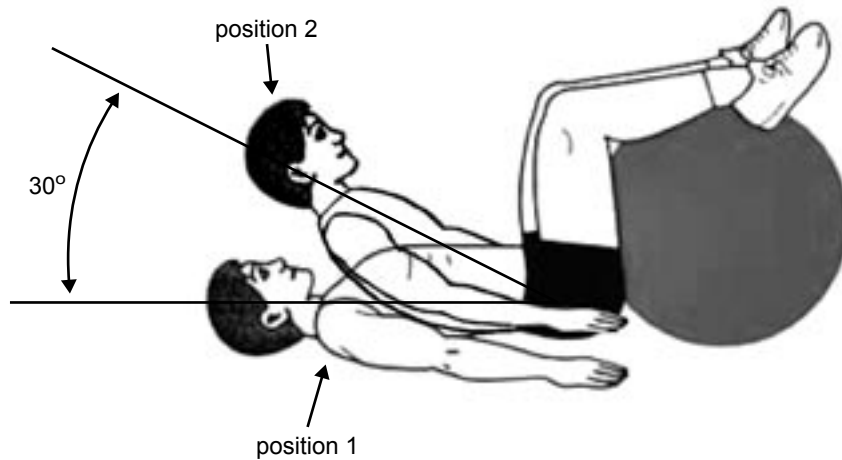
4 marks

Total 5 marks

TURN OVER

Question 13

In the diagram below, the athlete is using an exercise ball to perform a type of sit-up.



- a. What term is used to describe the **action** of the trunk in the exercise shown in the diagram above as the athlete moves from position 1 to position 2?

1 mark

- b. What is the main **muscle group** responsible for moving the body from position 1 to position 2, as shown in the diagram?

1 mark

- c. What **type of contraction** is occurring in the muscle group named in part b. during the **downward** phase of the exercise (from position 2 back to position 1)?

1 mark

- d. Explain why the athlete's feet are placed on the exercise ball to create the hip position shown in the diagram.

2 marks

Total 5 marks

Question 14

The gymnast in the picture below is performing a 'crucifix' on the Roman Rings. The deltoid muscle is primarily responsible for abduction of the shoulder.

Due to copyright restriction,
this material is not supplied.

- a. What type of contraction is occurring in the deltoid muscle when the crucifix position is held for five seconds?

1 mark

The arrangement of the muscle fibres within a muscle partly determines the function of the muscle.

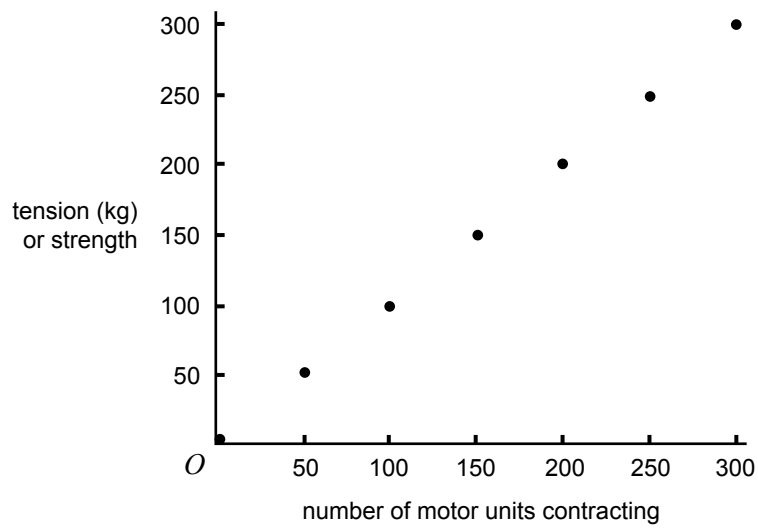
- b. What fibre arrangement is found in the deltoid muscle?

1 mark

- c. What **somatotype** would be most beneficial for elite male gymnasts?

1 mark

The graph below shows the relationship between the number of motor units contracting and the total tension developed in a muscle.



d. Describe the effect of increasing the number of motor units contracting on muscle tension.

1 mark

A motor unit consists of a motor neuron and the muscle fibres it stimulates.

Motor units respond to stimuli according to the ‘all or none law’.

e. What is meant by the **all or none law**?

2 marks

Total 6 marks

Question 15

The incidence of childhood obesity in Australia has increased in recent years. Currently 30% of children are either overweight or obese. One factor contributing to this trend is the declining number of children participating in regular physical activity.

- a. List **two** reasons why physical activity levels may have dropped in primary school aged children.

Reason 1 _____

Reason 2 _____

2 marks

- b. List one state or national initiative, **other than modified sports**, that aims to increase the participation of **primary school aged children** in regular physical activity.

1 mark

- c. Discuss how the program named in part **b.** may lead to increased participation in physical activity for the target group.

2 marks

Total 5 marks

Question 16

African-American sprinters have had reasonable success in the 100 m track event at the Olympic Games in recent times.

State and explain one **musculo-skeletal factor**, often found in African-Americans, that assists athletes to be successful in sprint events.

Factor _____

Explanation _____

1 + 2 = 3 marks

TURN OVER

Question 17

Elite athletes often find that the combination of physical ability, body type and training are not enough to achieve success. Overcoming their psychological limits is also a challenge that athletes face and many use sports psychologists to assist in this area.

Outline **one** method a sports psychologist may use to assist an athlete with their preparation for a major event.

2 marks

Question 18

‘Smartplay’ is a safety and sports injury initiative of Sports Medicine Australia that aims to reduce the incidence of sports injuries in Australian sporting clubs. Its motto is *Warm up, Drink up, Gear up*. These three pieces of advice are aimed at reminding people who play sport to prepare their body for exercise in order to prevent injury.

State one **specific** way in which each of these pieces of advice may assist in preventing injury.

‘Warm up’	<hr/> <hr/>
‘Drink up’	<hr/> <hr/>
‘Gear up’	<hr/> <hr/>

3 marks

Question 19

This question refers to a variety of individual athletes, sports, training methods and physiological factors.

- a. A female runner has a personal best time in the 400 m event of 54.60 seconds.
- i. What is the predominant **anaerobic** energy system used during this event?

- ii. What is the predominant fitness component being used during this event?

2 marks

The sports of shot put and power lifting both rely heavily upon the ATP-PC energy system but have different predominant fitness components.

In shot put the athlete is required to throw a ball weighing approximately 7 kg as far as possible.

In power lifting the athlete is required to lift the heaviest weight possible in a variety of ways including the bench press.

- b. Indicate which fitness component is predominant in each event.

- i. Shot put

- ii. Power lifting

2 marks

One of the reasons that older athletes competing in the Masters Games run slower times than younger athletes is their decreased capacity to form lactate.

- c. **Explain** why this difference will result in reduced performance levels in the 200 m track event.

2 marks

An elite triathlete suffers fatigue late in an event. The athlete has eaten and drunk correctly before and during the event and has a high lactate tolerance and aerobic capacity. The likely source of fatigue is the central nervous system.

- d. i. Explain how the central nervous system can contribute to fatigue in an endurance event.

- ii. Suggest one way in which the athlete could avoid or delay this source of fatigue.

2 + 1 = 3 marks

A promising 16-year-old tennis player is told by his coach that he needs to improve his ability to perform repeated sprints. In order to meet this objective, the coach prescribes an aerobic training program that is designed to improve the player’s aerobic capacity.

- e. Explain why aerobic training will improve the player’s ability to perform repeated sprints.

2 marks

High VO₂ maximum is not the only physiological factor that is highly associated with excellent endurance running performance.

- f. What is the other major physiological factor that is highly associated with excellent endurance running performance?

1 mark

Tennis player Martina Navratilova won a record 167 singles titles and 172 doubles titles. In 2004 she competed in events on the women’s tour at the age of 47 years.

The following two changes occur with ageing and will have decreased Martina’s aerobic capacity and performance.

- g. Explain how each of these factors will lead to a decrease in aerobic capacity.
 - i. decreased size and number of skeletal muscle mitochondria

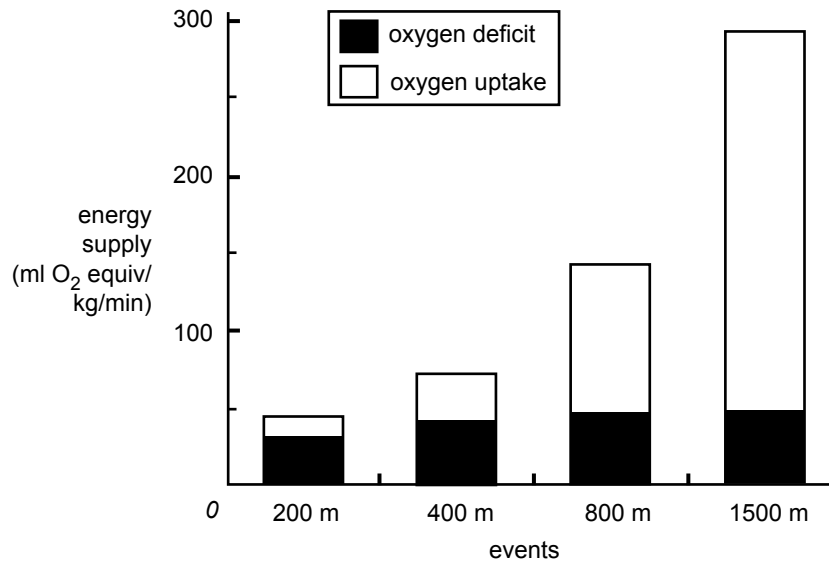
- ii. decreased heart volume

2 + 2 = 4 marks

Total 16 marks

Question 20

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



- a. Explain why the amount of oxygen deficit in the 400 m, 800 m and 1500 m events is approximately the same.

2 marks

- b. Explain how this similarity in total oxygen deficit during the 400 m, 800 m, and 1500 m running events affects the **speed** that an athlete is able to achieve in these events.

2 marks

Total 4 marks

Question 21

Exercise physiologists often measure **venous** blood lactate levels to determine what is taking place in the athlete's muscles. However **blood** lactate levels often do **not** accurately reflect **muscle** lactate production.

- a. Explain why this is the case.

2 marks

- b. What other factor related to lactate accumulation do exercise physiologists also measure in order to give a more accurate indication of muscle fatigue?

1 mark

Total 3 marks

TURN OVER

Question 22

As part of a Physical Education task at school you perform a battery of fitness tests on two male students, Alex and Sam. Both boys are approximately the same physical size and are 16 years old. Both boys are trying for a place in the school soccer team and both have similar skill levels.

Component of fitness being tested	Fitness test used	Alex's result	Sam's result
Agility	Illinois Agility Test	Excellent	Above average
Anaerobic power	Margaria Stair Test	Very good	Good
Dynamic flexibility		Excellent	Excellent
Aerobic capacity	Leger Shuttle Run Test	Average	Excellent
Leg strength		Excellent	Excellent
Speed	40 metre sprint	Above average	Above average

a. Name or describe an **appropriate** test to assess

i. Dynamic flexibility

ii. Leg strength

2 marks

b. Based on the results of these tests, **discuss** which boy would be best suited to the role of a **midfield (centre)** player in the soccer team.

2 marks

Total 4 marks

Question 23

When food containing carbohydrate is consumed, the carbohydrates are broken down and absorbed into the bloodstream as glucose. Glucose is either transported to muscles where it is used; or stored as glycogen in the muscles and liver. These reserves of glycogen can be released at a later time when they are needed to produce energy for muscular contraction.

- a. What substance is released into the bloodstream resulting in the storage of glucose as glycogen in the liver and skeletal muscle?

1 mark

Glucose is an energy rich molecule and energy is released when it is broken down. **Aerobic glycolysis** releases more energy from a glucose molecule than **anaerobic glycolysis**.

- b. Explain why this is the case.

2 marks

When glucose and glycogen levels are depleted following an event, athletes are usually instructed to consume foods with a high **glycaemic index**.

- c. Why are foods with a high glycaemic index best suited to rapid restoration of muscle glycogen levels?

2 marks

The table below shows two post-game meals.

Meal A	Meal B
Boiled white rice Watermelon Sports drink Pancakes	Baked Beans Apple Yoghurt Pasta

- d. Which of the meals, A or B, would be considered a 'high GI' meal?

1 mark
Total 6 marks

Question 24

During aerobic exercise the body uses fats and carbohydrates to provide energy. Their relative contribution depends on the intensity of the exercise.

- a. Explain the relationship between intensity of aerobic exercise and relative usage of carbohydrates and fats as fuel.

2 marks

A long-term aerobic training program has an effect on the way the body uses carbohydrates and fats to provide energy during aerobic exercise.

- b.
 - i. What is the name given to this effect?

- ii. Explain how this effect is likely to improve performance.

- iii. Outline what has occurred at a muscular level to produce this change.

1 + 2 + 2 = 5 marks

Total 7 marks

Question 25

There are a number of **illegal** substances and techniques that are used by athletes to increase red blood cell count. International sports authorities have banned these substances and techniques.

List two **illegal** substances or techniques that will increase an athlete's red blood cell count.

1. _____

2. _____

2 marks

Question 26

The Australian Sports Drug Agency web site states that the anabolic steroid 'Nandrolone' has legitimate medical uses but is prohibited under the World Anti-Doping Code 2004. In recent years a number of elite performers have tested positive for Nandrolone.

- a. Which component of fitness would **most likely** improve as a result of Nandrolone use?

1 mark

- b. List two possible side effects of using Nandrolone, other than death.

1. _____

2. _____

2 marks

Total 3 marks

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TURN OVER

Question 27

At the Australian Institute of Sport, elite rowers must undergo a **VO₂ Maximum Rowing Test** at various stages throughout the year. This fitness test uses a rowing ergometer and is conducted in a laboratory. In the test the subject is required to work to exhaustion while equipment measures their inspired and expired air.

- a. Name the predominant fitness component being tested.

_____ 1 mark

- b. Name the predominant energy system being used in this fitness test.

_____ 1 mark

If a subject suffered from an **asthma** attack during this test the VO₂ maximum measured would be reduced.

- c. Describe the change that occurs in lung structure and function to produce this reduction in VO₂ maximum.

 _____ 2 marks

- d. Explain why a coach at the Australian Institute of Sport would test a rower’s VO₂ maximum at the beginning and again at the end of a training macrocycle.

 _____ 2 marks

- e. Outline two reasons why a Physical Education class of 20 VCE students would **not** normally undertake a VO₂ maximum test using gas analysis, such as the VO₂ Maximum Rowing Test.

Reason 1 _____

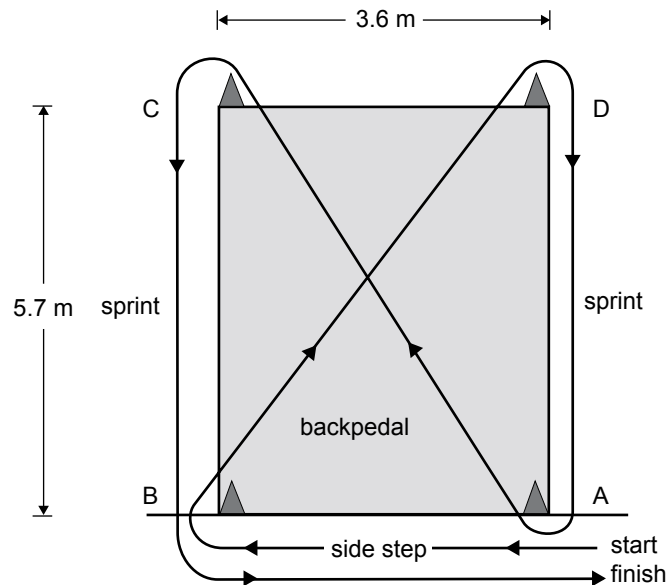
Reason 2 _____

2 marks

Total 8 marks

Question 28

The following diagram is of a fitness test that VCE Physical Education students may use as part of a fitness-testing program. The subject is required to complete the course as fast as possible.



- a. Which fitness component is most likely to be measured by this fitness test?

1 mark

- b. Explain why the coach of a tennis player may be more likely to use this fitness test rather than another common test which measures the same fitness component.

1 mark

Total 2 marks