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STUDENT NUMBER

Figures

Words

Letter

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VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY



**Victorian Certificate of Education
2001**

PHYSICAL EDUCATION

Written examination

Friday 9 November 2001

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>
21	21	127

Materials

- Question and answer book of 26 pages

Instructions

- Write your **student number** in the space provided on the cover of this book.
- All written responses must be in English.

Instructions
Answer **all** questions.

Question 1

Figure 1 below shows the energy output of a performer in a team sport during a **continuous** 10 minute period.

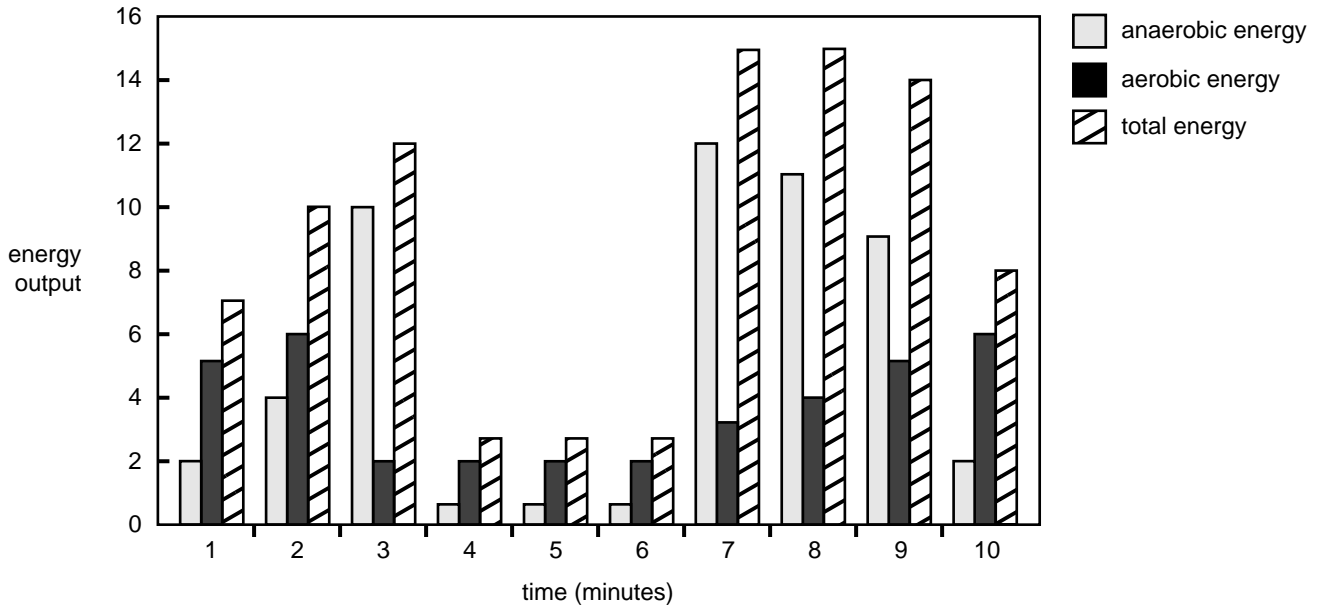


Figure 1

a. What happens to the performer’s energy output during minute 7 compared to minute 6?

_____ 1 mark

b. Which of the two anaerobic systems provided the most energy during minute 8?

_____ 1 mark

c. Justify your answer to part b.

 _____ 2 marks

d. Identify **one** major component of fitness required for performing in this team sport and explain why it is important.

component _____

explanation _____

3 marks

Total 7 marks

Question 2

Lauren Hewitt is a member of the Australian Track and Field team. She is the current Australian champion in the 100 m and 200 m sprint.

- a. State the fibre type you would expect to be predominant in Lauren's quadricep muscles.

1 mark

- b. State how the cross-sectional area of each of the main fibre type in Lauren's quadriceps would compare with that of the main fibre type in the quadriceps of 1500 m specialist Georgie Clarke.

1 mark

Figure 2 below shows one functional unit of a muscle fibre.

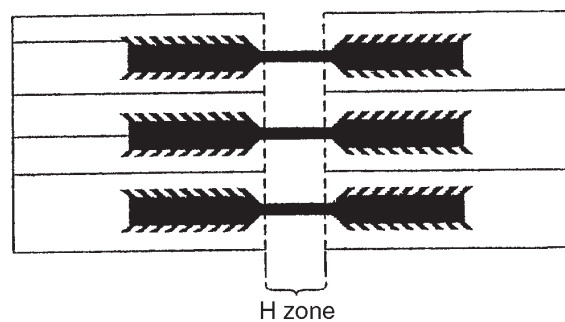


Figure 2

- c. State what happens to the H zone during a muscle contraction.

1 mark

A biomechanical analysis of Lauren shows that, in each stride, her quadricep muscle group lengthens slightly before contracting.

- d. Name the type of contraction in which the muscle lengthens under tension.

1 mark

- e. Name the most appropriate training method Lauren could use to improve the ability of her quadriceps to use this contraction type, as described in part d.

1 mark

Total 5 marks

TURN OVER

Question 3

The following extract is taken from the Australian Sports Commission web site.

Women in Coaching

Coaches are very significant people in the lives of those who participate in physical activity at any level or any age. They are our motivators, our mentors, our educators and our leaders — and in many Australian cases, they are male.

Statistics show that in 1996, 79% of high performance coaches across Australia were male. 75% of coaching director positions with national sports organisations were held by men.

Evidence suggests that there is an untapped pool of women around the country who have excellent coaching and administrative skills to offer.

- a. What is the likely impact on female participation rates if more elite women athletes were to become coaches and administrators after retiring from competing?

1 mark

- b. Explain why this would be likely to occur.

2 marks

Total 3 marks

Question 4

Earlier this year Ian Thorpe, in his first race over 800 m, set a new world record of 7 minutes 41.6 seconds.

Grant Hackett came second in the same race and also broke the previous world record. The two swimmers were close together for most of the race with Thorpe pulling away in the last 200 m.

Figure 3 below shows Thorpe's times for each 100 m split.

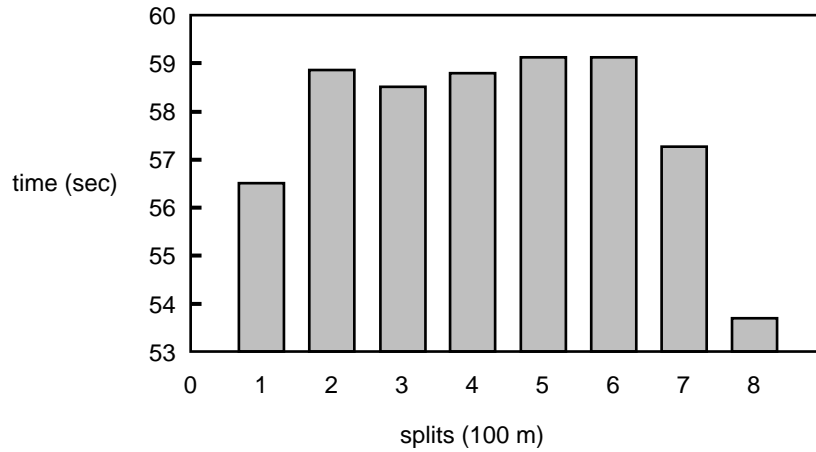


Figure 3

- a. State the likely overall percentage contribution of the aerobic energy system in Thorpe's performance.

_____ %

1 mark

- b. State which **energy system** is making the major contribution to Thorpe's energy output during these stages of the race.

i. first 10 metres _____

ii. split 4 _____

iii. split 8 _____

3 marks

- c. Name the **main** fuel used to provide energy during splits 4 and 5.

_____ 1 mark

d. Assume Hackett and Thorpe have similar VO_2max levels.

Name one biological and one physiological factor which may have been responsible for Thorpe's victory.

i. biological factor

ii. physiological factor

2 marks

e. Identify a method of training Hackett could use in the two months before the world championships to improve his performance in the physiological factor you have identified in part **d.ii.** (above).

1 mark

Total 8 marks

Question 5

Australian tennis player Mark Philippoussis served a tennis ball at 227.2 km/h in a tournament in Scottsdale USA in 1997. This currently stands as the fastest recorded serve in tournament play.

- a. Identify **one** specific development in equipment or technique and explain how it has helped make serves of this speed possible.

- i. specific development

- ii. explanation

1 + 2 = 3 marks

- b. Tennis racquet technology may increase or prolong participation in tennis. Explain how this can occur.

2 marks

- c. Philippoussis has a number of professionals who assist in his training and also assist during tournaments. These include

- a nutritionist/dietician
- a sports psychologist
- a physiotherapist

Describe the **specific** role of **two** of these professionals in Mark's preparation for a major tournament.

- i.

- ii.

4 marks

Total 9 marks

TURN OVER

Question 6

The picture below shows Li Cunxin, former principal dancer with the Australian Ballet, performing a high split leap during a performance.



- a. Identify the component of fitness likely to be **most important** during performance of the skill shown in the photograph.

1 mark

- b. Identify the type of stretch taking place.

1 mark

- c. The dancer steps onto the stage and dances a high intensity piece lasting three minutes. Identify from Figure 4 below which graph, A, B or C, is most likely to represent this dancer's heart rate during this three minute period.

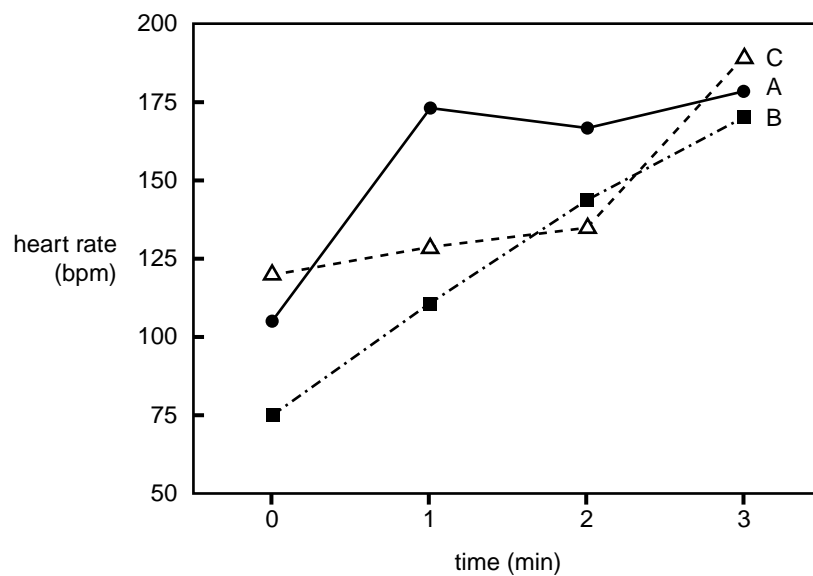


Figure 4

1 mark
Total 3 marks

Question 7

Caffeine is a stimulant. Excess caffeine levels are illegal for an athlete. This is tested for by urine sampling. More than twelve micrograms per millilitre in the urine constitutes a positive result.

- a. Name one other illegal stimulant.

_____ 1 mark

- b. Briefly describe the physiological effect that stimulants have on the human body.

- c. Briefly describe how a stimulant can lead to improved performance in an athlete.

- d. Identify two possible **negative** side effects of stimulants.

i. _____

ii. _____

2 marks

- e. Identify a common type of medication in which a stimulant is found.

_____ 1 mark

Total 6 marks

TURN OVER

Question 8

An exercise physiologist advised the coaching panel of a state level athletics team on how to construct training programs for specific running events. The advice is shown in Table 1 below.

Each running event requires different proportions of the physiological capacities listed in the first column.

Table 1

Physiological capacity targeted for improvement	Lactate during training	HR as a % of max	Duration of training intervals	No of reps	Rest between intervals	Training intensity as a % of VO ₂ max
Anaerobic capacity	20 mM	100%	2 min	2	10 min	120%
Lactic acid tolerance	12 mM	95%	1 min	8	3 min	140%
VO ₂ max	8–11 mM	100%	3 min	4	5 min	100%
Anaerobic threshold	4–5 mM	90%	3 min	8	1 min	85%
Aerobic capacity	< 3 mM	80%	Long	1	N/R	70%

- a. Explain why the recommended rest time is 10 minutes for improving anaerobic capacity and 1 minute for improving anaerobic threshold.

2 marks

- b. A group of athletes is training to improve their lactic acid tolerance. What running event might they be training for?

1 mark

- c. Training programs produce chronic (long-term) training effects.

In the table below state one cardiovascular adaptation and one muscular adaptation which will occur as a result of each type of training listed.

Training focused on improving	Cardiovascular adaptation	Muscular adaptation
Anaerobic capacity		
Aerobic capacity		

4 marks

- d. State the muscle fibre type likely to benefit most from training focused on improving lactic acid tolerance.

1 mark

Total 8 marks

Question 9

Table 2 below shows projected worldwide record times for both men and women in the one mile (1.6 km) running event.

Table 2

Sex	Year		
	2000	2028	2040
Men	3:41.96	3:33.29	3:29.84
Women	4:10.79	4:00.83	3:59.82

- a. Identify one trend in performance shown in Table 2.

1 mark

- b. Identify three physiological differences that may explain the difference between men’s and women’s projected times shown in Table 2.

i. _____

ii. _____

iii. _____

3 marks

Total 4 marks

TURN OVER

Question 10

- a. Identify one physiological factor, other than depletion of muscle glycogen stores, which might lead to exhaustion when running a marathon.

1 mark

After exhaustive exercise, such as running a marathon, glycogen stores must be replenished.

- b. Identify a food which could be eaten to ensure quick replenishment of muscle glycogen stores.

1 mark

- c. State the approximate time taken to completely replenish muscle glycogen after exhaustive exercise such as running a marathon.

1 mark

- d. Identify two physiological benefits the runners would receive from a massage during their recovery from a marathon.

i. _____

ii. _____

2 marks

Figure 5 below shows muscle glycogen levels during a treadmill test run at 70% VO₂max.

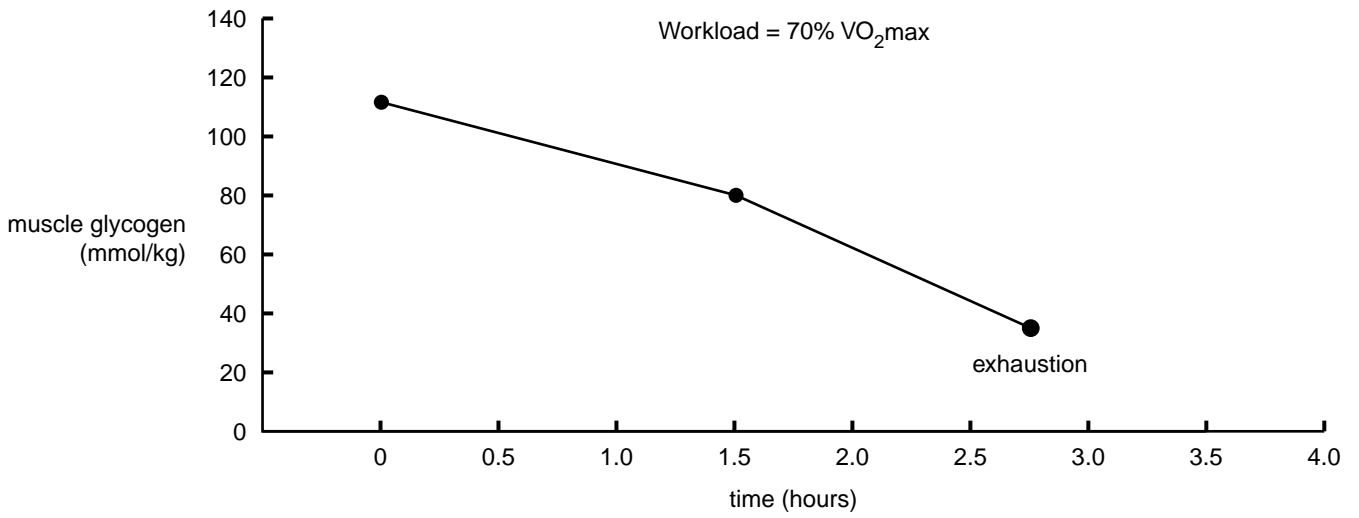


Figure 5

e. A marathon runner underwent a treadmill test at 70% VO₂max until exhaustion. Outline **two** major differences you would expect in the graph showing muscle glycogen levels if the runner had undertaken a carbohydrate loading regime for the three days prior to being tested.

- i. _____

- ii. _____

2 marks
Total 7 marks

Question 11

A trained athlete performs a cycle ergometer test which gradually increases in intensity up to maximal effort. During the test the athlete passes their anaerobic threshold. Blood tests and gas analysis equipment are used to test the following.

- minute ventilation (l/min)
- blood lactic acid (mmol/litre)
- oxygen uptake (l/min)

Figure 6 below shows the graphs of the subject with respect to each parameter.

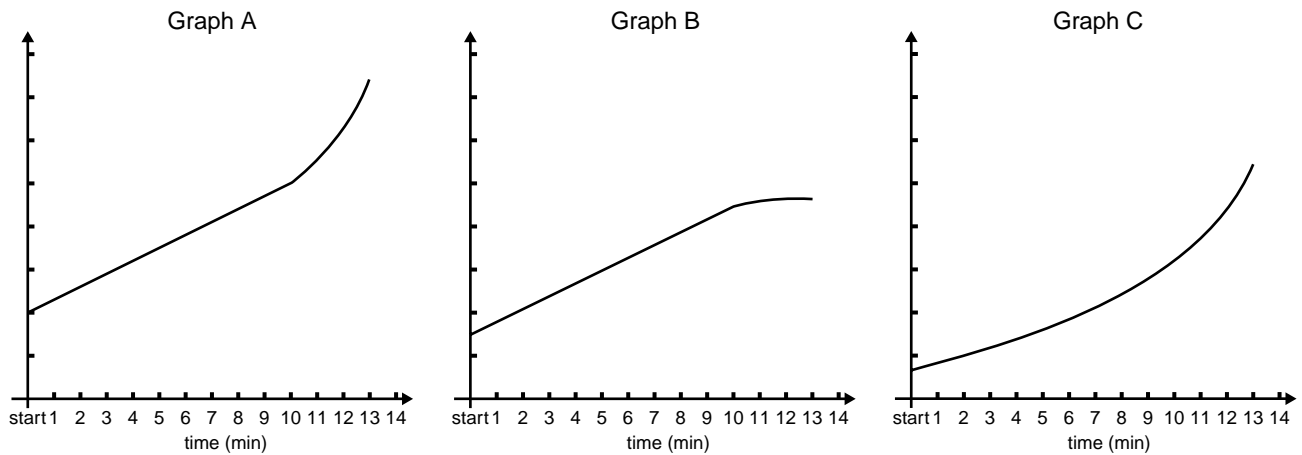


Figure 6

a. Which of the graphs, A, B or C, represents the subject's ventilation?

1 mark

b. State the reasons for your choice in part a.

2 marks

c. On one of the graphs, A, B or C above, label with an **X** the point at which the subject reaches anaerobic threshold.

1 mark

Total 4 marks

Question 12

Part of the 'Active Australia' national initiative is to encourage more Australians to be involved in sport and physical activity.

The 'Active Australia' vision is to have all Australians actively involved in sport, community recreation, fitness, outdoor recreation or other physical activities.

Outline two potential benefits of the 'Active Australia' campaign for each of the following groups.

i. the individual

ii. the government

iii. the local community

6 marks

TURN OVER

Question 13

Figure 7 below shows the normal decreases that occur with ageing in VO_2 max, muscle strength and maximal heart rate.

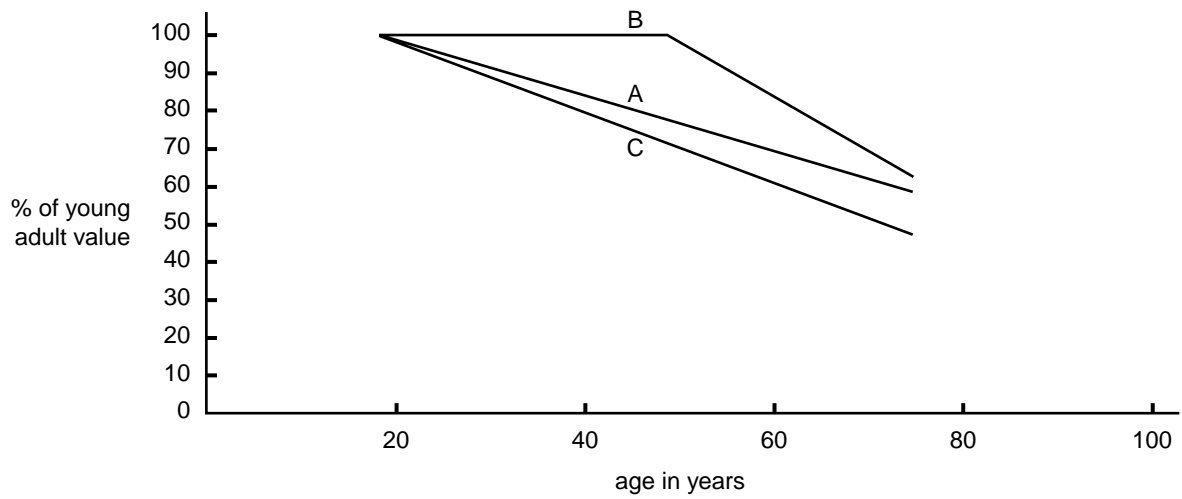


Figure 7

a. Which line, A, B or C, in Figure 7, represents strength?

1 mark

b. i. State one physiological reason for the decrease in strength with increasing age.

ii. Explain why this would occur.

1 + 2 = 3 marks

c. Outline two reasons why VO_2 max decreases with age.

i.

ii.

2 marks

Total 6 marks

Question 14

In a survey conducted by the Australian Institute of Sport, girls were asked to list the factors that discouraged them from playing sport. They were able to select more than one factor.

Figure 8 below provides evidence about the strong influence of the coach on whether or not girls continue to play sport.

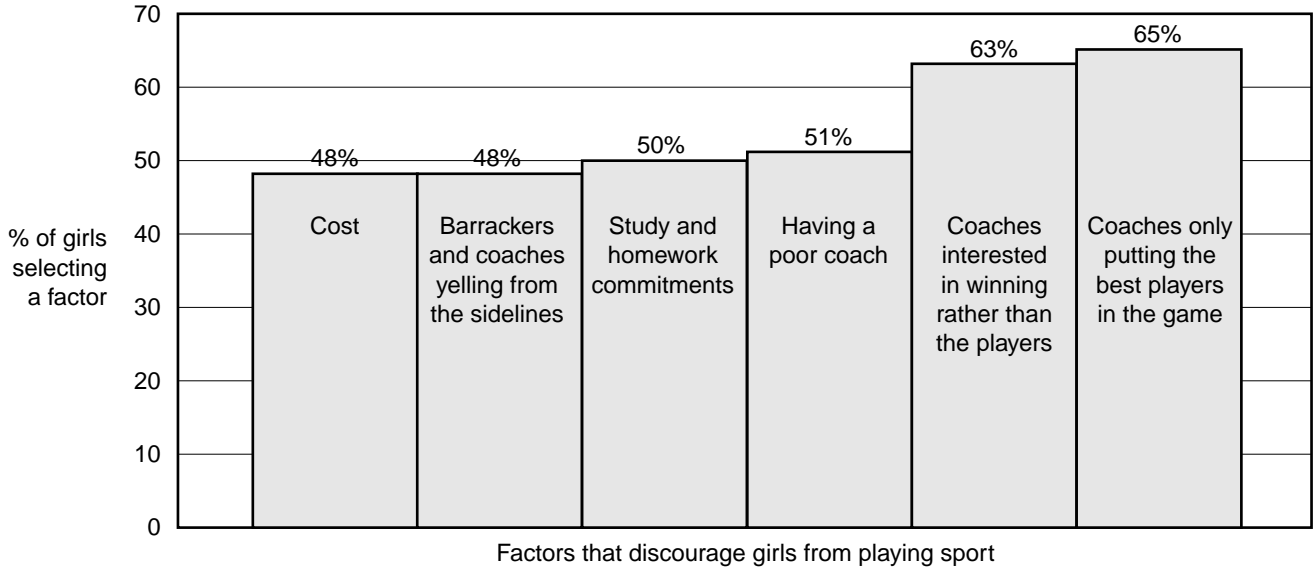


Figure 8

Outline four coaching characteristics or skills which might encourage a girl to continue playing for a **junior girls** basketball team. Use evidence from Figure 8 in your answer.

- i. _____

- ii. _____

- iii. _____

- iv. _____

4 marks

Question 15

The role of the coach, especially those coaching junior sporting teams, is very complex. An area often overlooked is that of injury prevention.

a. Outline four ways in which a coach can help reduce or prevent sporting injuries.

i. _____

ii. _____

iii. _____

iv. _____

4 marks

b. Select one of the responses above.

Explain how the coach's action would prevent injury and the type of injury prevented or reduced.

Selected response **i.** **ii.** **iii.** **iv.** (Circle the appropriate response)

i. Type of injury _____

ii. Explanation _____

1 + 2 = 3 marks

Total 7 marks

Question 16

At the Australian Open Tennis Championships this year Patrick Rafter suffered from heat exhaustion in his semifinal match against Andre Agassi.

a. Identify two of the **symptoms** Patrick may have experienced as a result of heat exhaustion.

i. _____

ii. _____

2 marks

b. Outline the recommended treatment for heat exhaustion.

2 marks

c. Discuss whether it would be advisable to give salt tablets to treat heat exhaustion.

2 marks

d. Suggest two strategies Patrick Rafter should put into place **before and during** his matches to reduce the risk of heat exhaustion.

i. _____

ii. _____

2 marks

Total 8 marks

TURN OVER

Question 17

A VCE Physical Education student surveyed a group of 40 golfers who played golf every Wednesday morning at the local golf club. The student was investigating factors that influence initial and continued participation in the sport.

Figures 9 and 10 show the results of the survey.

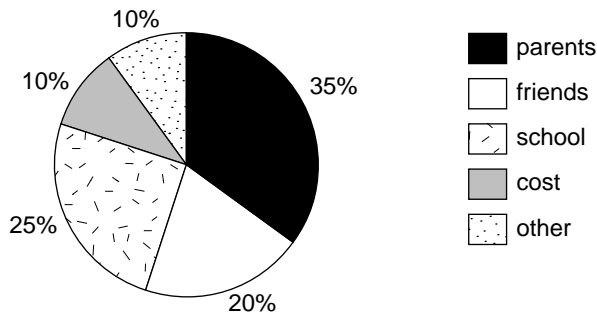


Figure 9. Reasons for initial participation in golf

a. Discuss two strategies the marketing manager of the club might use to provide opportunities for more people to participate in the game of golf, in the hope that they will join the golf club.

i. _____

ii. _____

4 marks

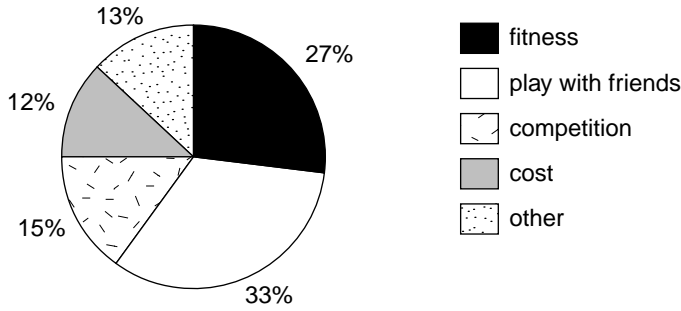


Figure 10. Reasons for continued participation in golf

b. Discuss two strategies the marketing manager might use to ensure that members of this survey group continue to participate.

i. _____

ii. _____

4 marks

Total 8 marks

Question 18

Between 1991 and 2001 the number of children participating in the Victorian Little Athletics program rose from 19 000 to 26 000. The Sydney Olympic Games was a significant event that may have contributed to this increase in numbers.

Explain two ways in which the Olympics may have led to this increase in participation in Little Athletics.

i. _____

ii. _____

2 marks

Question 19

The following are three sample advertisements for the fitness industry. Each is an example of the promotion of participation in physical activity as a consumer product.

Each of these approaches may be attractive to different types of people within the community wishing to improve their health and fitness.

Advertisement A

**PERSONAL
TRAINING
Gets results**

You **can** get results from 2 hours of exercise a week.

Let us show you how!

Come in for your free health and posture assessment.

Get-to-it fitness studio
14 Black's Road Prahran
9904 5555

Advertisement B

Malvern
**ADRENALIN
HEALTH CLUB**

- Specialised weight loss program for women
- Reactivate your health program
- We guarantee results

The most qualified staff in Melbourne helping everyday people like you.

Membership from \$35 per month
9904 5555

Advertisement C

Cheltenham
XRe-Creation
- Press

6 am to 10 pm 7 days
Fast • Affordable • Friendly • Fitness
We love our Club and you will too!

• Gymnasium	• Spa and Sauna
• Personal programs	• Circuit
• Qualified instructors	• Cardio theatre
• Fitness classes	• Pump
• Clean friendly atmosphere	

1122 Nepean Highway, Mentone
9904 5555

- a. Select one advertisement, A, B or C and identify a characteristic of the people likely to be attracted by that particular advertisement.

advertisement _____

target group _____

_____ 1 mark

- b. Select one advertisement, A, B or C and discuss how this approach to the provision of health and fitness services attempts to meet consumers' needs.

advertisement _____

explanation _____

_____ 2 marks

- c. For the approach you have selected in part b. (above) identify and explain

- i. one factor that could have a **positive** effect on participation.

positive effect _____

explanation _____

- ii. one factor that could have a **negative** effect on participation.

negative effect _____

explanation _____

_____ 4 marks

Total 7 marks

TURN OVER

Question 20

Figure 11 below shows the response of two male subjects during a 6 minute submaximal test on a cycle ergometer. Both subjects worked at identical workload throughout the test.

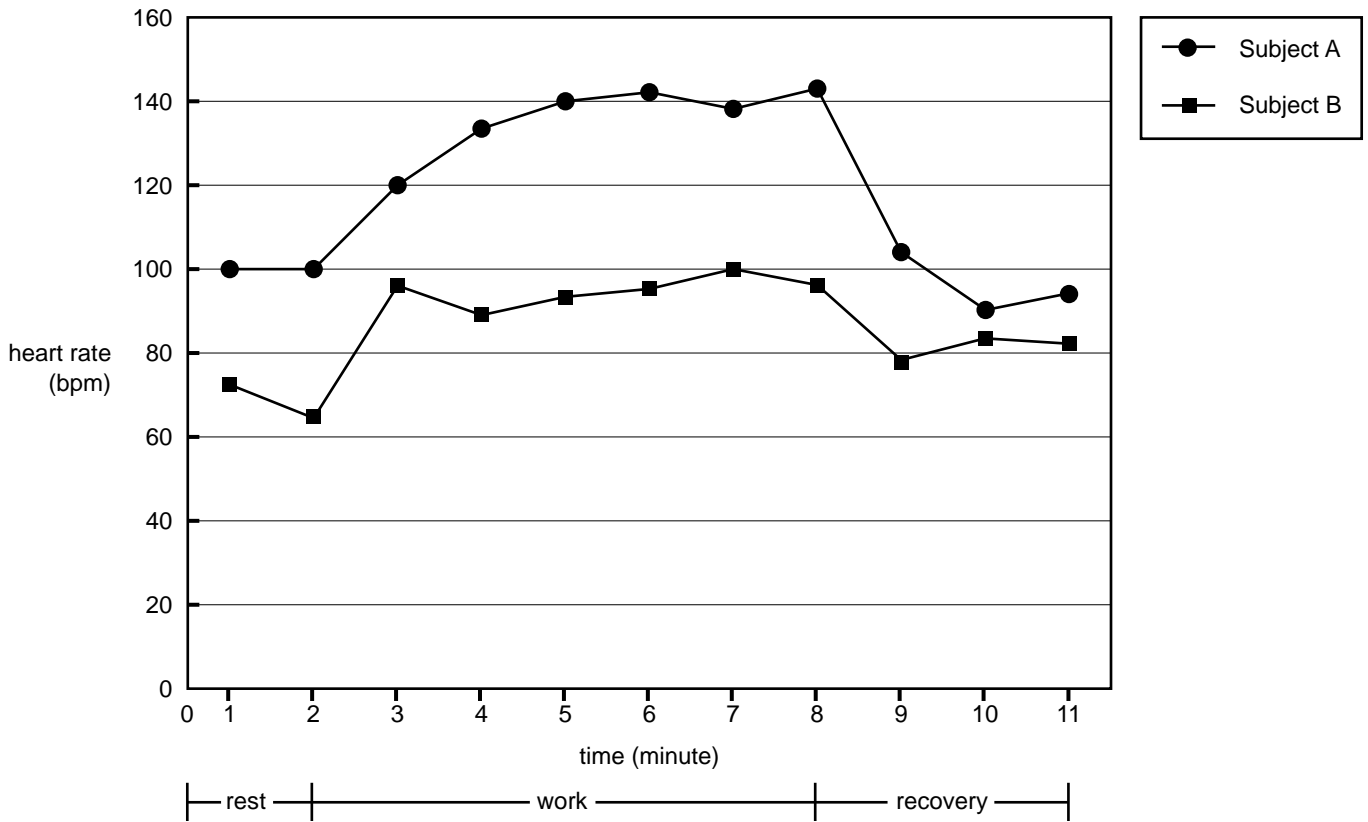


Figure 11

a. State which subject, A or B, is the **least** aerobically fit.

1 mark

b. State two factors clearly evident in Figure 11 that support your answer to part a.

i. _____

ii. _____

2 marks

c. State one biological factor and one physiological factor that might explain these test results.

i. biological factor _____

ii. physiological factor _____

2 marks

During the same test **blood pressure** was monitored and recorded for both subjects.

- d.** Indicate which subject, A or B, will have the higher systolic blood pressure at the end of the work time.

1 mark

- e.** Explain why you would expect this to occur.

1 mark

- f.** What would you expect to happen to subject A's diastolic blood pressure during the duration of the work period?

1 mark

Total 8 marks

CONTINUED OVER PAGE

TURN OVER

Question 21

The table below outlines typical actions, appropriate fitness tests and specific training activities for the components of fitness used in field hockey.

Complete the table by filling in the missing information in each unshaded space labelled **i.–vii.**

Component of fitness	Typical actions using this component	Appropriate/recognised fitness test	Sports specific training activity
Muscular strength (arms)	Hitting ball	Grip strength dynamometer	Long hits
Muscular endurance (legs)	Repeat sprints	i.	ii.
Flexibility	Reaching for the ball	Sit and reach	Warm up stretches; 3 × 15 mins each week
Power (leg)	Start of sprint	iii.	iv.
Agility	Changing direction quickly	v.	Running with rapid direction changes
Speed (leg)	Sprint (running start)	40 m sprint	vi.
Cardiovascular endurance	Running	Shuttle run	vii.

7 marks