

Victorian Certificate of Education
2017

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER

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PHYSICAL EDUCATION

Written examination

Thursday 9 November 2017

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

Section	Number of questions	Number of questions to be answered	Number of marks
A	15	15	15
B	16	16	105
			Total 120

- 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 correction fluid/tape.
- No calculator is allowed in this examination.

Materials supplied

- Question and answer book of 23 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 use of self-report logs to measure physical activity levels often results in participants recording higher levels of physical activity than actually completed.

This is an example of

- A. reactivity.
- B. social desirability.
- C. reciprocal causation.
- D. cognitive limitations.

Question 2

An improvement in the lactate inflection point (LIP) of an endurance athlete can be attributed to

- A. insufficient oxygen supply.
- B. an increase in lactate tolerance.
- C. lactate production exceeding lactate removal.
- D. an increase in the ability of the muscle fibres to oxidise fats and carbohydrates.

Question 3

What causes the accumulation of blood lactate during exercise?

- A. lactate production exceeding lactate removal
- B. the anaerobic energy systems becoming dominant
- C. insufficient oxygen being delivered to the working muscles
- D. a decrease in the athlete's ability to tolerate the accumulated lactate

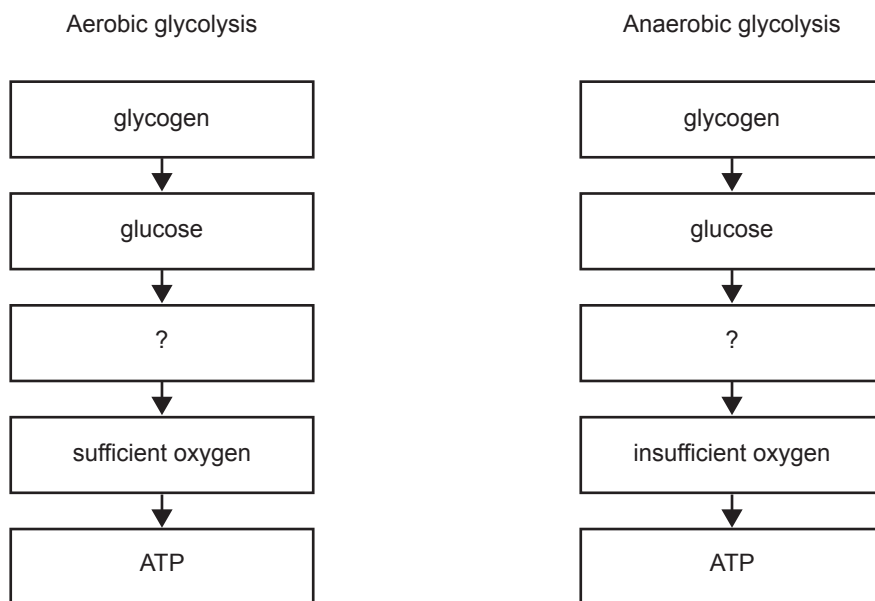
Question 4

Which of the following is a by-product(s) of aerobic respiration?

- A. carbon dioxide, water and heat
- B. lactate and hydrogen ions
- C. inorganic phosphates
- D. lactic acid

Question 5

The diagrams below show the process of aerobic and anaerobic glycolysis.



Which one of the following is the common term missing from both diagrams?

- A. carbon dioxide
- B. pyruvic acid
- C. lactic acid
- D. hydrogen

Question 6

Sleep is an important recovery strategy for athletes.

Lack of sleep can be detrimental to performance in team sports due to

- A. improved reaction times.
- B. decreased recovery times.
- C. increased speed and agility.
- D. decreased decision-making performance.

Question 7

The following data was collected during an activity analysis of an under-16 soccer game.

Work period			Rest period	
Sprint	Run	Jog	Walk	Stand

Based on the data, the correct work-to-rest ratio (W:R) and the dominant energy system for this game are

- A. 1:5 and ATP-CP system.
- B. 1:3 and anaerobic glycolysis.
- C. 3:1 and aerobic energy system.
- D. 5:1 and aerobic energy system.

Question 8

An untrained individual increases their aerobic capacity by 25% in the first three months of training. However, a further increase of only 15% is reported in the next nine months.

This is an example of

- A. diminishing returns.
- B. overtraining.
- C. detraining.
- D. duration.

Question 9

Field tests, such as a 20 m shuttle run, are generally preferred over laboratory tests because they are more

- A. valid.
- B. ethical.
- C. reliable.
- D. accurate.

Question 10

Which of the following best represents each energy system's contribution to rowing a 2 km race (approximately six minutes)?

	ATP-CP	Anaerobic glycolysis	Aerobic glycolysis
A.	20%	30%	50%
B.	60%	20%	20%
C.	40%	30%	30%
D.	5%	15%	80%

Question 11

Researchers used direct observation to measure the physical activity levels of schoolchildren. They found that the physical activity levels recorded in the first session were higher than in subsequent sessions.

Which one of the following is a possible explanation for the change in the children's behaviour?

- A. intensity
- B. reactivity
- C. reliability
- D. social desirability

Use the following information to answer Questions 12 and 13.

Sporting Schools is a school-based sports participation initiative of the Australian Sports Commission (ASC). It is designed to help primary schools increase children's participation in sport at school, and to connect children with community sporting opportunities. The Sporting Schools website has information for schools, sporting organisations, coaches, parents and guardians.

Question 12

The Sporting Schools initiative aims to develop the movement confidence of primary school children in order to support participation in physical activity.

Which level of the social-ecological model does the Sporting Schools initiative target?

- A. policy
- B. individual
- C. social environment
- D. physical environment

Question 13

Which level of the social-ecological model does connecting children with community sporting opportunities target?

- A. policy
- B. individual
- C. social environment
- D. physical environment

Question 14

A soccer player who shifts their concentration from surveying the field for passing options to concentrating on the ball in order to pass it effectively, has shifted their concentration from

- A. broad-external to broad-internal.
- B. broad-internal to broad-external.
- C. broad-external to narrow-external.
- D. narrow-external to narrow-internal.

Question 15

At the time of the 2017 Australian Open, tennis player Novak Djokovic spoke of the benefits of hyperbaric chambers. He stated: 'Under pressurised conditions you breathe in 100 per cent oxygen, again, which of course does many different beneficial things for your body, cells, muscles.'

Source: Leo Schlink, 'Novak Djokovic set to use controversial hyperbaric chamber treatment despite safety warnings', *Herald Sun*, 12 January 2017

What are the perceived physiological benefits Djokovic may gain from using a hyperbaric chamber for recovery?

- A. decreased red blood cells
- B. increased glycogen levels
- C. decreased localised swelling
- D. increased phosphocreatine levels

SECTION B**Instructions for Section B**

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

Question 1 (7 marks)

Government schools in Victoria are mandated to deliver physical and sport education. Government guidelines for physical education and sport state that schools are to provide students with:

- 20–30 minutes a day of physical education for children in prep to Year 3
- three hours per week of physical education and sport with a minimum provision of 50% for physical education for children in Years 4–6
- 100 minutes per week of physical education and 100 minutes per week of sport for children in Years 7–10.

- a. Which component of the social-ecological model is directly targeted by the provision to schools of guidelines on the amount of time required for physical education and sport?

1 mark

- b. Apply the social-ecological model to determine the likely effectiveness of providing guidelines for physical education and sport in schools to influence the physical activity and sedentary behaviour of students.

2 marks

- c. Discuss whether a Year 9 student who has only completed the required physical education and sport at school would meet Australia's Physical Activity Guidelines for young people (13–17 years).

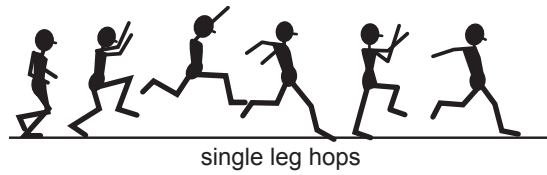
2 marks

- d. Identify one individual factor and one physical environment factor that schools could target to try to encourage students to be more active at school.

2 marks

Individual factor _____

Physical environment factor _____

Question 2 (6 marks)

- a. Name the type of training shown in the image above. 1 mark

- b. Other than strength, state **one** fitness component this type of training will develop. 1 mark

- c. Describe the stretch-shortening cycle that occurs in this type of training. 2 marks

- d. List **two** safety considerations an athlete or a coach may need to keep in mind before undertaking this type of training. 2 marks

Question 3 (3 marks)

At the Kooyong Classic tennis tournament, players were seen drinking from two different bottles during the change of ends. One bottle contained water, the other a sports drink.

Discuss **three** reasons why a player might use a combination of water and sports drinks during a game of tennis.

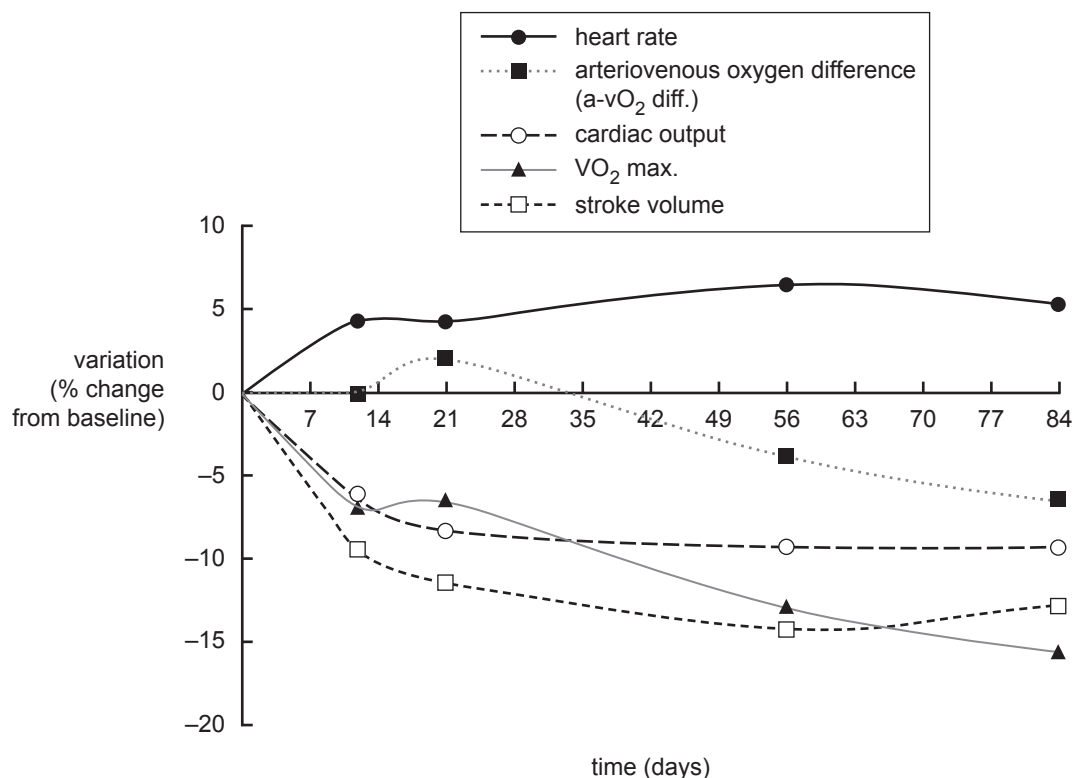
Question 4 (9 marks)

As a result of aerobic training, an individual is likely to see an increase in left ventricle volume and stroke volume. These changes are accompanied by a decrease in resting heart rate and a decrease in heart rate at sub-maximal exercise intensities.

- a. Discuss the relationship between left ventricle volume, stroke volume and heart rate, and their effect on cardiac output at rest and during sub-maximal exercise.

4 marks

The graph below shows the physiological changes the human body goes through after training has stopped for a period of time.



Source: L Bosquet and I Mujika, in I Mujika (ed.), *Endurance Training: Science and Practice*, Chapter 10, Figure 10.1, Iñigo Mujika, Vitoria-Gasteiz, 2012, p. 102

- b. State the training principle shown in the graph above. 1 mark

- c. Define 'arteriovenous oxygen difference (a-vO₂ diff.)'. 1 mark

- d. Use the data in the graph to explain the relationship between VO₂ max., cardiac output and a-vO₂ diff., and their effect on aerobic capacity. 3 marks

Question 5 (9 marks)

The image below shows an athlete undergoing the 30-second Wingate cycling test. The test begins with an athlete pedalling as fast as possible on a cycle ergometer without any resistance. Within three seconds, a fixed resistance is applied to the wheel of the cycle ergometer and the athlete continues to sprint for 30 seconds.



Source: McAuslanPerform, <www.youtube.com/watch?v=JlAstE4pj3U>

- a. Which component of fitness does the 30-second Wingate cycling test measure?

1 mark

The table below shows the relative contribution of each of the three energy systems to the total work done in three different cycle ergometer exercise tests.

	ATP-CP	Anaerobic glycolysis	Aerobic
10-second test	52%	46%	2%
30-second test	25%	45%	30%
90-second test	12%	42%	46%

- b. Using the data provided in the table, discuss the reasons for the differences between the 10-second, 30-second and 90-second tests.

3 marks

- c.** Emily and Corey are discussing performances in the 30-second Wingate cycling test. Emily says the ability to buffer metabolic by-products would be beneficial. Corey suggests that having a higher lactate inflection point (LIP) would be more beneficial.

i. Who is correct – Emily or Corey?

1 mark

ii. Use data from the table on page 10 to justify your response to **part c.i.**

3 marks

- d.** Other than training, name a legal substance or method that will increase work capacity in high-intensity anaerobic exercise.

1 mark

Question 6 (5 marks)

Source: Rock Up Netball, <<https://rockupnetball.com.au>>

Rock Up Netball is an initiative to encourage participation in physical activity and is designed to appeal to women aged 15 years and over. Participation is flexible; participants pay as they play and choose from different programs to meet their needs. The programs include:

- TRAIN – for those who are new or returning to netball to develop basic skills
- PLAY – where participants can attend ('rock up') at an allocated time to play a game in a flexible, non-competitive environment
- NETACISE – for everyone to participate in group fitness
- SOCIAL COMPETITION – provides a more structured, traditional, competitive netball experience.

- a. Apply the social-ecological model to critique the use of Rock Up Netball as a way of increasing the physical activity of women aged 15 years and over.

4 marks

- b. Provide **one** example of a strategy at the physical environment level that could be used to support the Rock Up Netball initiative for women aged 15 years and over in non-traditional netball activities.

1 mark

Question 7 (6 marks)

Rugby sevens is a version of rugby played with seven players on each team. The players are usually very mobile, as speed and agility are key fitness components of the game.

The Australian Institute of Sport implemented a talent identification program to identify athletes from other sports who could play rugby sevens. The program was so successful that the Australian women's rugby sevens team won a gold medal at the 2016 Olympic Games in Rio.

- a. Before the fitness testing session, what documentation would the organisers need to obtain from participating athletes?

1 mark

- b. The table below presents data collected from a fitness testing battery.

- i. Fill in the missing fitness components in the table.

2 marks

Fitness test	Fitness component	Ranee	Lisa	Thalia
20 m sprint	speed	2.82 s	2.97 s	3.21 s
Illinois agility	agility	17.22 s	17.13 s	17.99 s
20 m shuttle run	aerobic capacity	level 11.4	level 12.2	level 12.2
vertical jump		62 cm	62 cm	57 cm
phosphate recovery		17% decrement	8% decrement	8% decrement

- ii. Analyse the data in the table to determine which athlete has the best attributes for rugby sevens.

3 marks

Question 8 (4 marks)

Body composition can be determined using a number of different methods, including:

- body mass index (BMI)
- skinfold measurements.

a. Identify the most accurate of the two given methods of determining body composition. 1 mark

b. Select **one** of the two given methods and critique the suitability of that method for use with a group of amateur athletes. 3 marks

Question 9 (3 marks)

Discuss the role of fats in energy production at rest and during exercise.

Question 10 (6 marks)

Australia's Physical Activity and Sedentary Behaviour Guidelines for Adults provide advice for the health and wellbeing of adults aged between 18 and 64 years. The guidelines encourage adults to move more and sit less.

Cindie is 42 years old and has been exercising consistently for 12 months. A typical week from her physical activity diary is shown below.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	30-minute brisk walk	30-minute continuous swim (moderate intensity)	30-minute run session		30-minute brisk walk	60-minute game of social tennis (moderate intensity)

- a. From the data recorded in the physical activity diary, identify which aspects of the physical activity guidelines Cindie is meeting.

3 marks

- b. Suggest an addition to the physical activity Cindie is already undertaking to help her meet the physical activity recommendations for her age group.

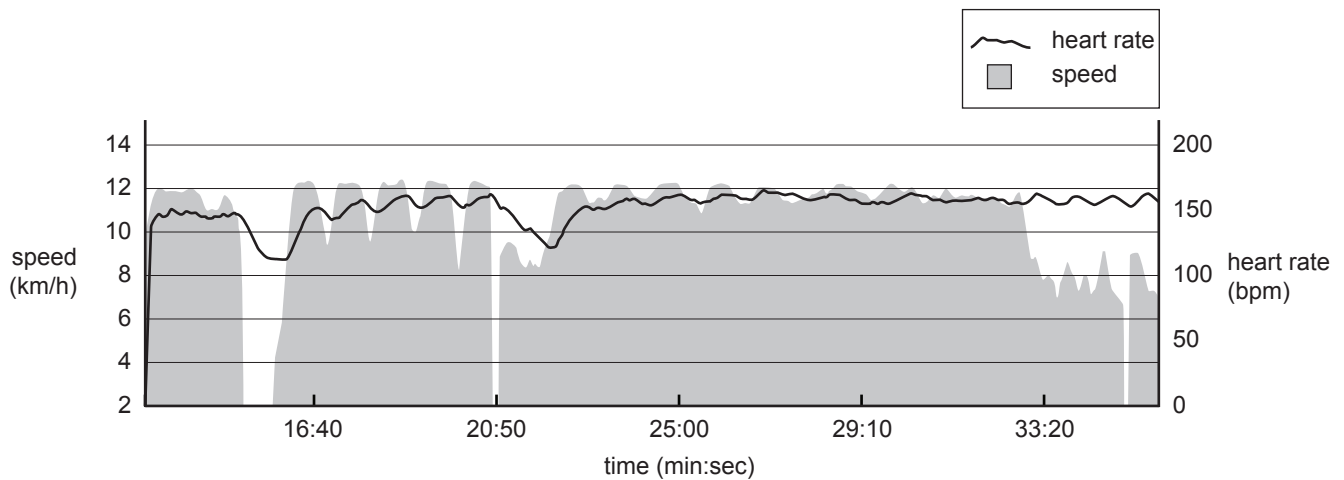
1 mark

- c. Outline **one** advantage and **one** limitation of using a physical activity diary for assessing physical activity and sedentary behaviour.

2 marks

Question 11 (10 marks)

Personal fitness trackers have become popular as exercise prompts for individuals aiming to monitor adherence to Australia's Physical Activity and Sedentary Behaviour Guidelines. The graph below shows heart rate data collected on a personal fitness tracker for a 31-year-old completing a run session. A warm-up was completed before the data collection started.



- a. Estimate the individual's maximum heart rate.

1 mark

- b. Describe the acute physiological responses that occur at the beginning of exercise.

2 marks

- c. Identify **two** possible training methods undertaken in this session. Justify your response with reference to the data in the graph. 4 marks

- d. Suggest a suitable overload for this run session. 1 mark

- e. List **two** chronic muscular adaptations that may result from the type of training undertaken. 2 marks

Question 12 (3 marks)

Bike share initiatives are becoming popular in many cities around the world. Designed to increase physical activity (and reduce traffic congestion), bikes are available for hire for short trips around the city.

Using the social-ecological model, discuss **three** factors (other than weather) at the physical environment level that may increase or decrease the likelihood of the initiative being successful.

Question 13 (8 marks)

The Australian Football League (AFL) carries out a series of fitness tests at its annual draft camp to help clubs determine who is the best young talent. The Brisbane Lions selected Jarrod Berry after he performed very well at the draft camp. His results were as follows:

- 4th overall in the 6 × 30 m sprint test – 24.99 s
- 1st overall in the 20 m shuttle run – level 15.1
- 1st overall in the 3 km time trial – 9.46 min

Data: AFL news, 'Top-10 results from 2016 NAB AFL Draft Combine',
9 October 2016, <www.afl.com.au>

- a.** Name the health-related fitness component assessed in each test above. 3 marks

Sprint test _____

20 m shuttle run _____

3 km time trial _____

The six 30 m sprints are run at 20 s intervals. The sprints are started at 0 s, 20 s, 40 s, 1 min, 1 min 20 s and 1 min 40 s.

- b.** What is the advantage for Berry of having a high aerobic capacity in the 6 × 30 m sprint test? 2 marks

- c.** Which energy system is predominant in the 6 × 30 m sprint test? 1 mark

- d.** What is the likely cause of fatigue in the 6 × 30 m sprint test? 1 mark

- e.** What type of recovery would be most beneficial between each of the sprints in the 6 × 30 m sprint test? 1 mark

- b.** Bryant has spoken publicly about how he used meditation and imagery in his life to help his basketball.

State **one** other psychological strategy he may have used during his last game and explain how this strategy may have aided his concentration when shooting free throws.

2 marks

- c.** Explain a fatigue mechanism that could have had an impact on Bryant's performance towards the end of the game.

2 marks

- d.** List one nutritional strategy and one physiological strategy that Bryant could have used to aid his recovery after the game.

2 marks

Nutritional strategy _____

Physiological strategy _____

- e.** Other than tidal volume, state two chronic respiratory adaptations that would have aided Bryant's performance.

2 marks

1. _____

2. _____

Question 15 (6 marks)

- a.** Of the three substances/methods listed below, which one is a triathlete most likely to benefit from? Circle the correct answer. 1 mark

anabolic steroids beta blockers blood doping

- b.** Masking agents have not been shown to improve performance; however, they are banned under the World Anti-Doping Agency (WADA) code.

- i.** Name a masking agent. 1 mark

- ii.** Why would WADA ban masking agents? 2 marks

- iii.** List one possible benefit and one potential harm associated with taking a masking agent. 2 marks

Benefit _____

Harm _____

Question 16 (6 marks)

The modern pentathlon is an Olympic sport that comprises five different events:

- fencing
- 200 m freestyle swimming
- showjumping
- combined pistol shooting and a 3200 m cross-country run

All events are completed on the same day.

Chloe Esposito won a gold medal for Australia in the modern pentathlon at the 2016 Olympic Games in Rio. Esposito's results are shown in the table below.

Athlete	Swimming time (pts)	Fencing victories (pts)	Riding time (pts)	Combined 3200 m and pistol shooting time (pts)	Total
Chloe Esposito	2:12.38 minutes (303)	19 (215)	77.60 seconds (284)	12:10.19 minutes (570)	1372

Source: Australian Olympic Committee, <<http://corporate.olympics.com.au>>

- a. According to the governing body for the modern pentathlon, the decision to complete all events on the same day has made the modern pentathlon a drug-free sport.

Discuss how the combination of the above five events on one day aids in ensuring the modern pentathlon is drug free. Refer to specific events in your response.

3 marks

- b. If the combined event was staged on different days, what prohibited substance would improve performance in the pistol shooting? Justify your response.

2 marks

- c. Name a legal method that could be used to enhance performance instead of the prohibited substance named in **part b**.

1 mark
