VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Victorian Certificate of Education 2023

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER | | | | | | | | | Letter |

PHYSICAL EDUCATION

Written examination

Thursday 26 October 2023

Reading time: 11.45 am to 12.00 noon (15 minutes)
Writing time: 12.00 noon to 2.00 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	11	11	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 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

Which one of the following is an example of a discrete skill?

A. handball in Australian Rules football (AFL)

B. gymnastics routine

C. triple jump

D. cycling

Question 2

Which one of the following is an acute muscular response experienced by a soccer player completing several high-intensity efforts?

A. increased intramuscular substrates

B. decreased motor unit recruitment

C. increased lactate production

D. increased venous return

Question 3

Extending the arm to a full range of motion when hitting a tennis serve will influence performance by

A. increasing the force arm length.

B. increasing the resistance arm length.

C. increasing the mechanical advantage.

D. maintaining the mechanical advantage.

Question 4

At the start of a 100 m sprint race, an athlete starts to have feelings of anxiety, including sweaty palms and butterflies in their stomach.

Select the most appropriate psychological strategy that this athlete can use to enhance their performance in this race.

A. meditation

B. controlled breathing

C. stress inoculation training

D. listening to calming music

DO NOT WRITE IN THIS AREA

Use the following information to answer Questions 5 and 6.

Below is a sample of data collected from an activity analysis.

Activity	Speed of movement (km/hr)	Total distance covered (m)	Percentage of time in activity (%)
standing	0	0	32
walking	≤ 6	1720	31
jogging	6.1–12	1870	5.6
running	12.1–18	928	4.5
striding	18.1–24	406	2.4
sprinting	> 24	763	2.8

Source: adapted from C Catagna et al., 'Activity profile and physiological requirements of junior elite basketball players in relation to aerobic-anaerobic fitness', *The Journal of Strength and Conditioning Research*, September 2010

Question 5

What type of data is represented in the table above?

A. heart rates
B. skill frequencies
C. work-to-rest ratios
D. movement patterns

Question 6

Based on the total distance covered and percentage of time spent completing each activity, which fitness component is the most important?

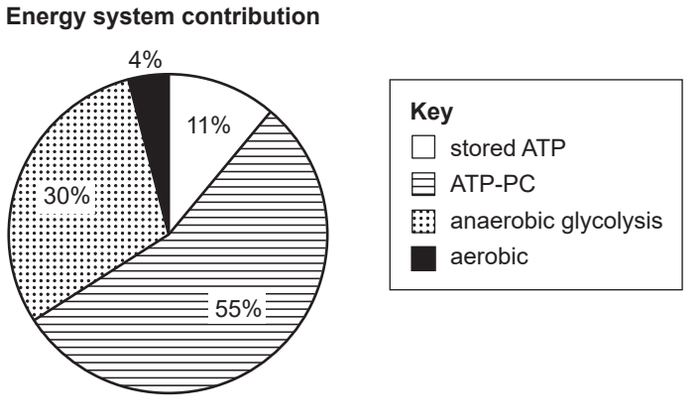
A. anaerobic capacity
B. muscular power
C. aerobic power
D. agility

Question 7

Which fuel produces the greatest amount of energy per molecule?

A. liver glycogen
B. triglycerides
C. stored phosphocreatine (PC)
D. muscle glycogen

Question 8



Which event most effectively represents the contribution of energy systems demonstrated in the graph above?

A. 100 m sprint
B. 400 m sprint
C. 1500 m run
D. 3000 m run

Question 9

A basketball will travel further than a medicine ball when thrown with the same force because

A. the basketball has a greater mass.
B. the medicine ball has a smaller inertia.
C. the medicine ball has a greater velocity.
D. the basketball has a greater acceleration.

Question 10

An athlete completes a resistance training exercise with the following variables.

Sets: 3 Reps: 20 Load: 50–60% 1RM

What fitness component is this exercise targeting?

A. muscular power
B. muscular strength
C. anaerobic capacity
D. muscular endurance

Question 11

Which one of the following adaptations is an example of a vascular chronic adaptation?

A. an increase in alveoli surface area
B. an increase in oxidative enzymes
C. an increase in red blood cells
D. an increase in stroke volume

DO NOT WRITE IN THIS AREA

Question 12

The most likely cause of fatigue for an athlete who completed the 400 m hurdles event in 50.68 seconds is

A. accumulation of metabolic by-products.

B. glycogen depletion.

C. PC depletion.

D. dehydration.

Question 13

When the noise level in a stadium influences performance, this would be classified as

A. a task constraint.

B. a direct constraint.

C. an individual constraint.

D. an environmental constraint.

Question 14

Which stage of qualitative analysis involves identifying the strengths and weaknesses of skill execution?

A. evaluation

B. preparation

C. observation

D. error correction

Question 15

A 400 m runner undertakes an intermediate interval training program.

Identify the most likely chronic adaptation that will result from this training.

A. increased mitochondria

B. increased stroke volume

C. increased lactate tolerance

D. increased lactate inflection point

END OF SECTION A
TURN OVER

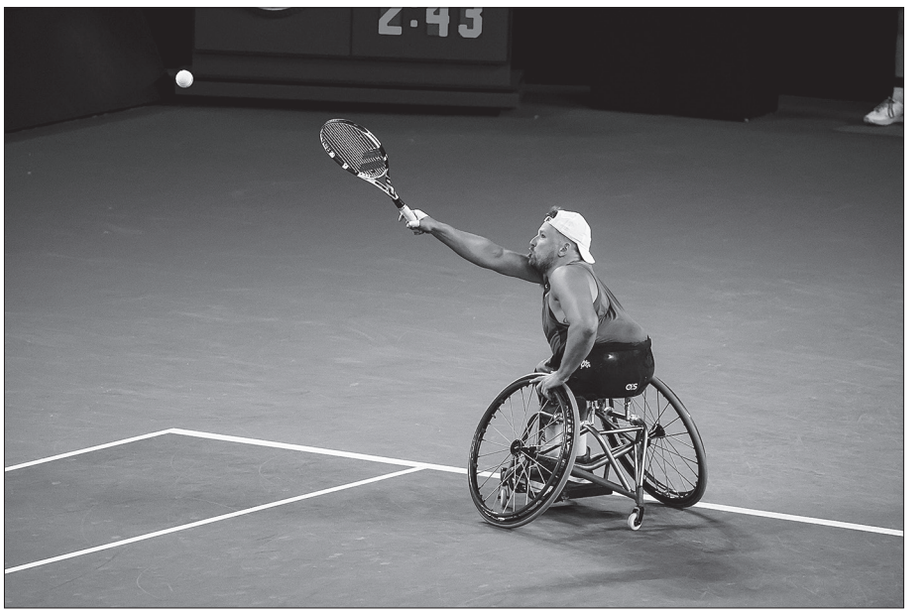
SECTION B

Instructions for Section B

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

Question 1 (7 marks)

Dylan Alcott is a retired wheelchair tennis champion who won 15 Grand Slam singles titles and two Paralympic gold medals during his career.



Source: FiledIMAGE/Shutterstock.com

a. Describe **one** sociocultural factor that could have influenced Alcott's participation in wheelchair tennis. 2 marks

DO NOT WRITE IN THIS AREA

b. In wheelchair tennis, the ball is permitted to bounce twice, whereas in able-bodied tennis, it is only allowed to bounce once.

i. Explain the relationship between individual and task constraints that led to this rule modification in wheelchair tennis and the impact this has on performance. 3 marks

ii. Discuss how this modification to the rules of wheelchair tennis could influence the motor skill development and participation of wheelchair tennis players. 2 marks

Question 2 (11 marks)

Jai Hindley is a road cyclist who was the first Australian to win the Giro d'Italia bicycle race, in 2022. The riders complete 21 stages over a three-week period, with the total distance of the stages being approximately 3500 km. Each stage varies in distance and duration, with the average stage taking around four hours to complete.

Source: Andrea Soresina/Shutterstock.com

a. The VO_2 maximum cycle ergometer test is a common fitness test performed by professional cyclists.

i. State the fitness component tested using the VO_2 maximum cycle ergometer test. 1 mark

ii. Justify the selection of the VO_2 maximum cycle ergometer test from a physiological, psychological and sociocultural perspective for Jai Hindley. 3 marks

DO NOT WRITE IN THIS AREA

b. Elite road cyclists can have a VO_2 maximum score of over 80 ml/kg/min. This is considered a relative oxygen consumption value.

Explain why a relative oxygen consumption value is more relevant for an elite cyclist compared with absolute oxygen consumption value. 2 marks

c. An elite cyclist would have a much higher VO_2 maximum compared with an untrained athlete.

Identify and describe **one** chronic adaptation of the cardiovascular system to training and explain how this would lead to a higher VO_2 maximum. 3 marks

Chronic cardiovascular adaptation

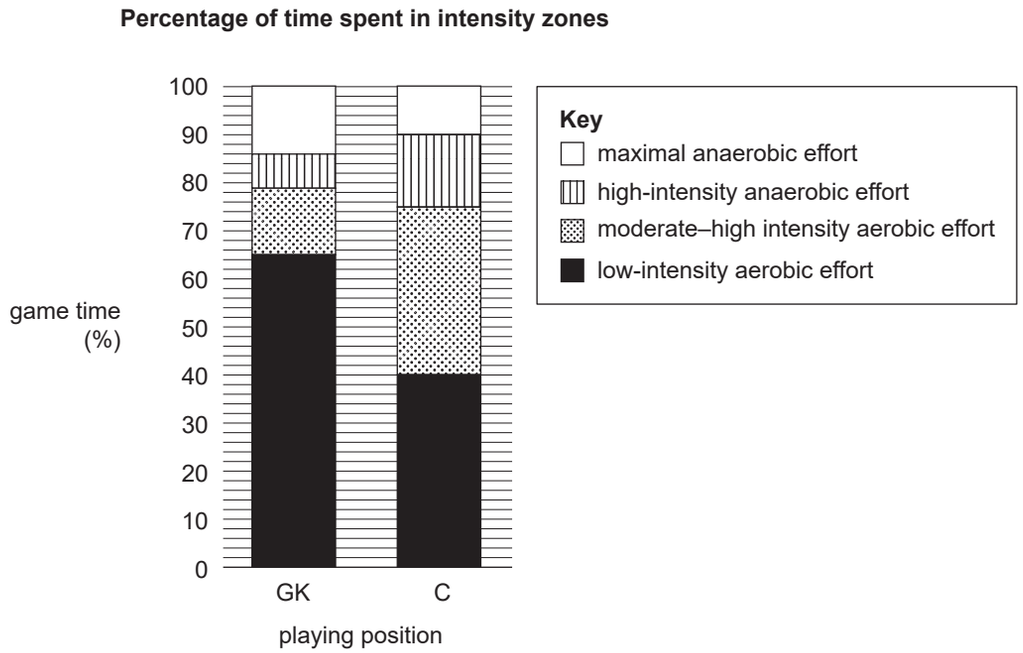
d. Immediately after each stage of the bicycle race, cyclists will often drink chocolate milk. The chocolate milk is a good source of both carbohydrates and protein.

Explain the benefit of consuming protein and carbohydrates together for a cyclist's recovery. 2 marks

Question 3 (12 marks)

Asher is an active 13-year-old boy who has started playing netball. He rotates between goalkeeper (GK) and centre (C) positions.

The graph below shows the percentage of game time Asher spent in each intensity zone.



Source: adapted from CM Young, PB Gastin, N Sanders, L Mackey and DB Dwyer, 'Player load in elite netball: Match, training and positional comparisons', *International Journal of Sports Physiology and Performance*, vol. 11, no. 8, 2016, p. 1076

a. **i.** Other than increased respiratory rate, list **two** acute respiratory responses experienced by Asher when playing centre. 2 marks

ii. Select **one** of the acute respiratory responses from **part a.i.** and describe how it would assist Asher's performance in the centre position. 2 marks

DO NOT WRITE IN THIS AREA

b. Using the information provided in the graph on page 10, explain **two** differences in the aerobic requirements for Asher when he plays GK and C. 4 marks

c. Speed is an important fitness component for netballers, especially in the GK position.

Explain the importance of speed for Asher when he plays GK. 2 marks

d. Identify a suitable standardised fitness test that could be used to test Asher's speed and describe how to complete it. 2 marks

Fitness test

Question 4 (8 marks)

The following photograph shows a young cricketer performing a front foot drive shot.

Source: Jaco van Rensburg/Shutterstock.com

a. Classify the front foot drive shot in cricket as a gross or fine motor skill. 1 mark

b. Predict what would happen to the cricketer's stability if their back foot was raised in the air and explain the effect this would have on performance by referring to **one** factor that influences stability. You may include a labelled diagram in your response. 4 marks

c. Provide **one** example of intrinsic feedback and explain how the cricketer could use it to improve their performance. 3 marks

Question 5 (12 marks)

The long jump requires an athlete to run up and apply an explosive force to propel themselves into the air.

a. State the most important fitness component for a long jumper in the jumping phase. 1 mark

b. A long jumper decides to complete plyometric training.

List **two** safety protocols that must be adhered to when completing plyometric training. 2 marks

c. As a part of their training, the long jumper completes the following plyometrics training session.

Exercise	Sets and repetitions	Speed of contraction	% 1RM
jump squats	3 × 8	fast	not required
bicep curls	3 × 8	fast	30% 1RM
plyo box jumps	3 × 6	slow	not required
weighted lunges	3 × 25	slow	85% 1RM
drop jumps	3 × 6	fast	not required

Critique the effectiveness of the training session to improve the performance of the long jumper. 4 marks

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d. Identify and describe **one** chronic adaptation of the muscular system that you would expect the long jumper to experience from completing plyometric training, and explain how that adaptation would lead to an improved performance. 3 marks

Chronic muscular adaptation _____

_____

_____

_____

_____

e. At the start of their run-up, a long jumper performs mental imagery.

Describe how to complete mental imagery and how it could improve the long jumper's performance. 2 marks

_____

_____

_____

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Question 6 (6 marks)

a. Swimming coaches often use a direct approach when coaching beginner swimmers.

Describe why this approach could be successful for beginner swimmers. 2 marks

b. Evaluate the type of practice variability (blocked or random) recommended for beginner swimmers, taking into consideration the skill classification of swimming in a pool (open or closed). 4 marks

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Question 7 (9 marks)

Rebecca, a state-level basketball player, played 30 minutes of a 40-minute game. The match had four 10-minute quarters with a 5-minute half-time break and a 2-minute break at quarter and three-quarter time. Rebecca had several repeated high-intensity efforts on the defensive end that saw her shuffling, lunging and rebounding for periods of time ranging between 22–36 seconds. She was involved in multiple short sprints as well as explosive jumps for her eight rebounds, one steal and one blocked shot. Rebecca finished the game with 28 points, helping to lead her team to victory.

a. Using specific examples from the information provided above, explain the energy system interplay of Rebecca in her basketball game. 6 marks

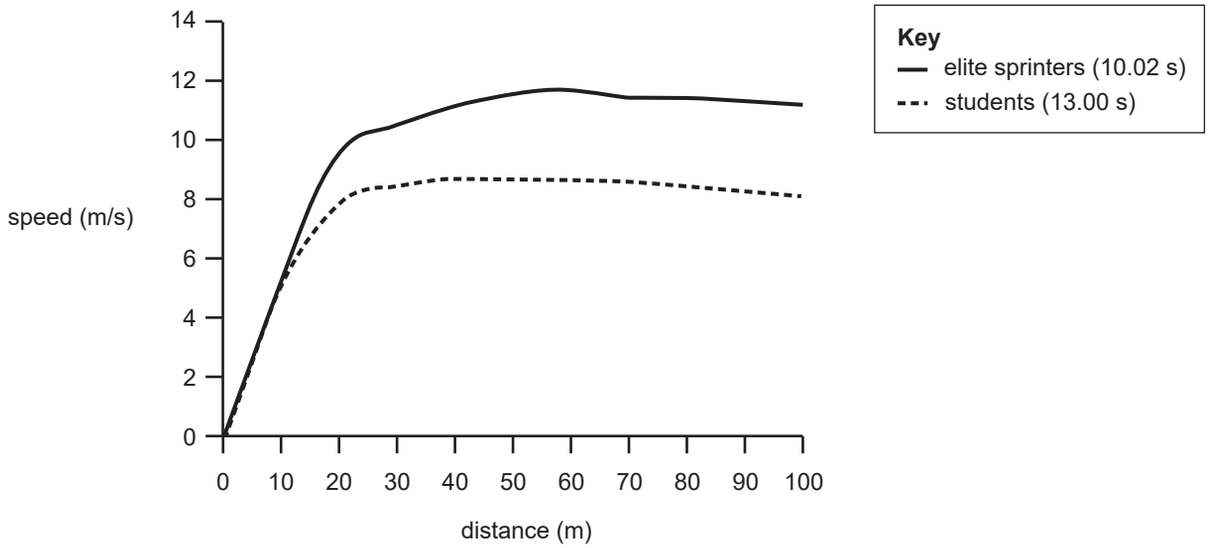
DO NOT WRITE IN THIS AREA

b. Explain the purpose of conducting an activity analysis for a basketball team. 2 marks

c. Identify the training program principle addressed through completing an activity analysis. 1 mark

Question 8 (11 marks)

The following graph displays the average speed of elite sprinters and students over a distance of 100 m. The elite sprinters and students completed their 100 m sprint using starting blocks.



Source: V Babić, M Čoh, D Dizdar, 'Differences in kinematic parameters of athletes of different running quality', *Biol. Sport* 28, 2001, pp. 115–121

a. Describe how Newton's first law of motion applies to the start of a 100 m sprint. 2 marks

b. With reference to the graph above, outline why elite sprinters were able to complete the 100 m sprint faster than the students. 2 marks

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c. The 100 m elite sprinters decided to complete a short interval training program.

Justify the selection of this training method for 100 m elite sprinters. 2 marks

d. Design a short interval training session for the elite sprinters using the following table. 4 marks

Repetition time	Work-to-rest ratio	Intensity	Type of recovery

e. On the table below, identify with an **X** the days you would recommend the 100 m sprinters complete their short interval training program to improve their speed. 1 mark

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

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Question 9 (13 marks)

Emily is a well-trained recreational runner who is training to complete the 10 km run at the Melbourne Marathon Festival. She hopes to complete the run in 35 minutes. To prepare for the run, she has completed a 12-week training program. Below is an example of a typical training session that Emily would complete.

Running around the athletics track for 6 × 4-minute repetitions with 2 minutes' rest between repetitions at 75–85% HR max.

a. Name the training method Emily used. 1 mark

_____

b. Provide **one** example of how Emily could apply progression to her training session. 1 mark

_____

_____

c. Outline how Emily could apply variety to her training session. 1 mark

_____

_____

d. Using a different aerobic training method to the one identified in **part a.**, design the conditioning phase of an alternative training method Emily could complete in preparation for the 10 km run. 3 marks

Training method _____

Conditioning phase

e. Identify **one** strategy that Emily could use to monitor her training. 1 mark

_____

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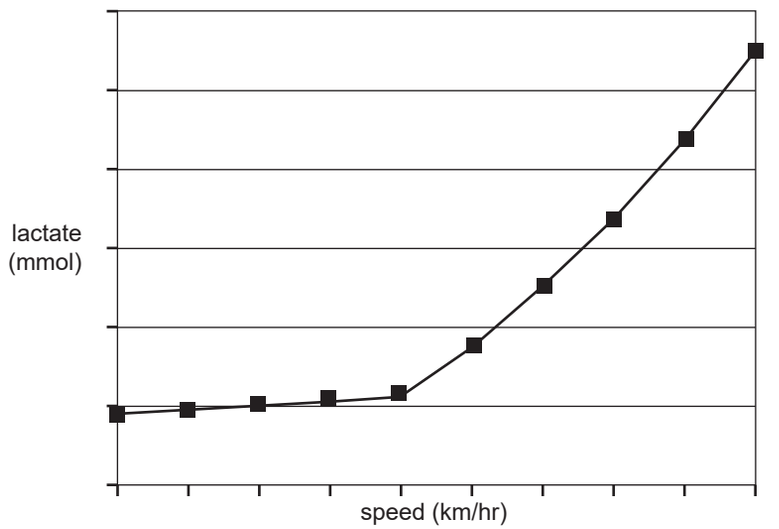
f. Explain how using the strategy identified in **part e.** could prevent overtraining. 2 marks

The graph below illustrates Emily's lactate levels measured throughout one of her training sessions in week 1.



g. Draw on the graph the expected change to Emily's lactate concentration for the same training session completed in week 12. 1 mark

h. Discuss **one** adaptation of the muscular system to aerobic training that could improve Emily's lactate inflection point and explain how this would enhance her performance in the 10 km Melbourne Marathon Festival run. 3 marks

Question 10 (8 marks)

During a preseason training program, players from a local Australian Rules football club's under-18 side ran a 2 km time trial. Annie finished first, with a time of eight minutes and one second.

In the table below, Annie's heart rate (bpm) has been recorded at rest, during the 2 km time trial and for six minutes after completing the trial.

Time	Heart rate (bpm)
rest	60
exercise 1 min	150
exercise 2 min	160
exercise 3 min	167
exercise 4 min	172
exercise 5 min	176
exercise 6 min	180
exercise 7 min	185
exercise 8 min	190
recovery 1 min	170
recovery 2 min	160
recovery 3 min	135
recovery 4 min	110
recovery 5 min	85
recovery 6 min	60

a. **i**. Analyse whether Annie reached a steady state by making reference to the data in the table. 2 marks

ii. Between 'recovery 1 min' and 'recovery 6 min' Annie's heart rate dropped from 170 bpm to 60 bpm.

Identify this stage. 1 mark

iii. List **two** examples of what occurs physiologically in the stage identified in **part a.ii**. 2 marks

b. Annie is unsure whether to complete a passive or an active recovery after the 2 km time trial.

Evaluate the most effective recovery for Annie to complete after the 2 km time trial. 3 marks

Question 11 (8 marks)

The canoe slalom involves athletes paddling their canoes through downstream and upstream gates on river rapids. While the aim is to try to paddle as fast as possible, athletes do need to slow down as they paddle their canoes through the gate to avoid making contact and incurring a time penalty. Jessica Fox won the gold medal at the 2020 Tokyo Olympic Games in a time of 105.04 seconds.

Explain how the interrelationship between the following factors would contribute to Jessica Fox's successful performance in the canoe slalom:

- Newton's laws of motion
- fuel usage
- fitness components

Source: Kirsty Wigglesworth/AP Photo

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END OF QUESTION AND ANSWER BOOK


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