SUPERVISOR TO ATTACH
PROCESSING LABEL HERE

Write your **student number** in the boxes above. **Letter**

Physical Education

Question and Answer Book

VCE Examination – Tuesday 11 November 2025

- Reading time is **15 minutes**: 3.00 pm to 3.15 pm
- Writing time is **2 hours**: 3.15 pm to 5.15 pm

Materials supplied

- Question and Answer Book of 32 pages
- Multiple-Choice Answer Sheet

Instructions

- Follow the instructions on your Multiple-Choice Answer Sheet.
- At the end of the examination, place your Multiple-Choice Answer Sheet inside the front cover of this book.

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

Contents

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Section A – Multiple-choice questions

Instructions

- Answer **all** questions in pencil on your Multiple-Choice Answer Sheet.
- 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.
- Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1

In the formula Q = SV × HR, Q represents

A. stroke volume.

B. heart rate.

C. blood pressure.

D. cardiac output.

Question 2

A coach who plays recorded crowd noises during practice to improve performance is implementing

A. a task constraint and simulation.

B. a task constraint and stress inoculation training.

C. an environmental constraint and stress inoculation training.

D. an environmental constraint and simulation.

Question 3

During exercise, the percentage of fats being used as an energy source

A. decreases as the exercise intensity increases.

B. decreases as the exercise intensity decreases.

C. remains constant as the exercise intensity decreases.

D. increases as the exercise intensity increases.

Question 4

Ten days before an artistic gymnastics championship, a gymnast tapers their training program for their events.

What is the most effective way for them to do this?

A. reducing training volume while increasing intensity

B. reducing training volume and maintaining intensity

C. increasing training volume while reducing intensity

D. increasing training volume and maintaining intensity

Question 5

The purpose of a pre-participation health screening is to

A. identify the strengths and weaknesses of an athlete.

B. provide motivation for an athlete.

C. identify any health risks for an athlete.

D. provide information to an athlete about how the test is performed.

Question 6

The table below shows a typical set of results from a fitness test completed by world-ranked swimmers.

Swim number	200 m (min:sec)	Lactate (mM)
1	2:26.1	2.8
2	2:20.6	2.8
3	2:16.3	3.0
4	2:12.5	3.7
5	2:07.5	5.2
6	2:02.2	7.3
7	1:53.4	13.0

Source: Adapted from D Pyne, H Lee and K Swanwick, 'Monitoring the lactate threshold in world-ranked swimmers', *Medicine & Science in Sports & Exercise,* 33(2), February 2001, p. 293, <https://doi.org/10.1097/00005768-200102000-00019>

The best explanation for the increase in swimming speed and increase in lactate levels during swim number 7 is

A. a delayed lactate inflection point (LIP).

B. an increased contribution of the anaerobic glycolysis system to overall ATP production.

C. an increased contribution of the aerobic system to overall ATP production.

D. an increased VO_2 max.

Question 7

Which of the following chronic adaptations would most likely lead to a delayed LIP?

A. increased lactate tolerance

B. increased stroke volume

C. increased size and number of mitochondria

D. increased myoglobin

Question 8

During an ice hockey match, recorded data revealed that a player covered a total distance of 7.6 km. This included playing 25% of their game time at intensities above 90% max HR between rest intervals such as sitting on the bench and game stoppages.

Based on this data, which training method would be most effective in improving the player's ice hockey performance?

A. resistance training

B. long-interval training

C. continuous training

D. high-intensity interval training

Question 9

Which one of the following sporting contexts is the best example of knowledge of performance feedback?

A. a soccer player seeing the ball go into the goal

B. a cricket player hearing the ball connect with their bat

C. a coach telling a football player to fully extend their leg when kicking for goal

D. a tennis player feeling the vibration made by the racquet in their hand when they strike the ball

Question 10

A netball team completed a fitness testing battery before and after an eight-week pre-season training program. The team completed the pre- and post-testing in the same order, at the same time of day and with the same warm-up.

This ensures the tests are

A. valid.

B. accurate.

C. reliable.

D. physiologically appropriate.

Question 11

Which one of the following is a sign of overtraining?

A. decreased resting heart rate

B. persistent fatigue and reduced performance

C. increased appetite

D. reduced rate of perceived exertion (RPE) during training

Question 12

A tennis player is practising the ball toss separately to other components of the serving skill.
Which type of practice is this an example of?

A. whole

B. part

C. distributed

D. massed

Question 13

In a physical education lesson, the teacher reduces the playing area for a game of European handball.
This is an example of

A. task constraint.

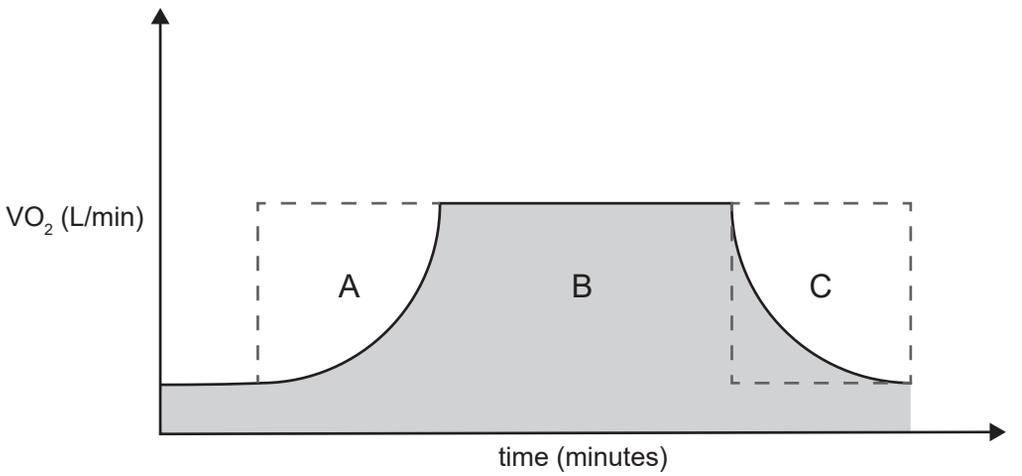
B. individual constraint.

C. environmental constraint.

D. direct coaching.

Question 14

Oxygen consumption during and after exercise

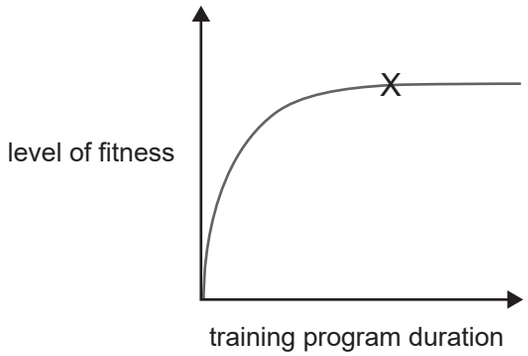


Which of the labelled sections in the graph above indicate oxygen deficit and aerobic energy production?

	Oxygen deficit	Aerobic energy production
A.	A	C
B.	A	B
C.	B	A
D.	B	C

Question 15

Fitness level over duration of the training program



Which one of the following training principles does the area marked 'X' on the graph above most likely represent?

A. progression

B. detraining

C. overtraining

D. diminishing returns

Question 16

Which one of the following fuels produces the smallest yield for ATP resynthesis?

A. creatine phosphate (CP)

B. carbohydrates

C. fats

D. protein

Question 17

When sprinters are in their starting positions, they lean forward to improve their performance by

A. lowering their centre of gravity.

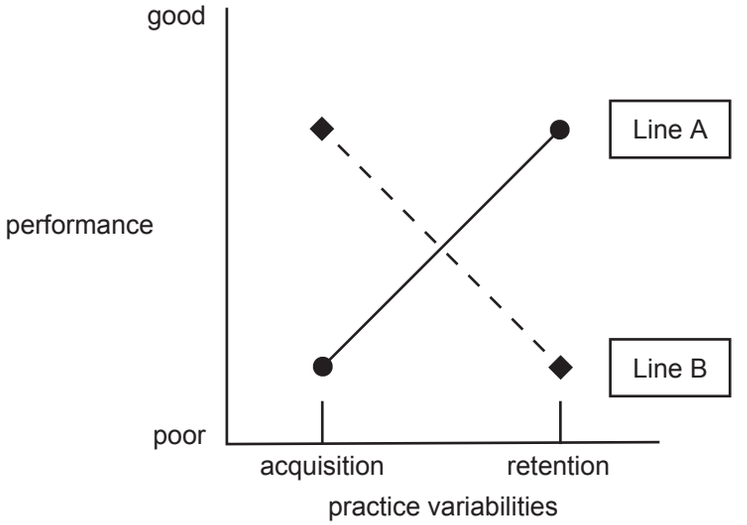
B. increasing the size of their base of support.

C. shifting their line of gravity to the front of their base of support.

D. increasing their stability.

Question 18

Likely performance outcomes associated with two different practice variabilities



Source: Adapted from WF Battig, 'The Flexibility of Human Memory', in LS Cermak & FIM Craik (eds.), *Levels of Processing in Human Memory*, Hillsdale, NJ: Lawrence Erlbaum Associates, 1979, pp 23–44, <https://firstprinciplesofmovement.com/motor-learning-skill-acquisition/>

Which practice variability is associated with performance outcomes best represented by line A?

A. blocked

B. random

C. massed

D. distributed

Question 19

From a physiological perspective, which fitness test is most appropriate to measure the anaerobic capacity of a track sprint cyclist?

A. SEMO Agility Test

B. VO_2 max test

C. 30-second Wingate test

D. vertical jump test

Question 20

To successfully complete a pass over a tall defender, a netball player will

A. decrease the angle of release and increase the height of release of the ball.

B. decrease the angle of release and decrease the height of release of the ball.

C. increase the angle of release and increase the height of release of the ball.

D. increase the angle of release and decrease the height of release of the ball.

End of Section A

Section B

Instructions

- Answer **all** questions in the spaces provided.
- Write your responses in English.
- Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1 (12 marks)

Curtis McGrath, an Australian paracanoeist, participated in the men's kayak single 200 m KL2 event at the Paris 2024 Summer Paralympic Games. He placed first with a time of 41.708 seconds.

a. At the end of the event, Curtis's heart rate and oxygen consumption would have remained elevated as part of the process of returning the body to pre-exercise level.

Name the term used to describe this process. 1 mark

b. Outline **one** activity that could be part of an appropriate cool-down for Curtis after his qualifying heat. 1 mark

c. Predict whether Curtis's oxygen consumption would have reached a steady state during his kayak event. Justify your response. 3 marks

d. Upper-body exercises as part of a resistance training program could help improve Curtis's muscular power.

Complete the following table by including resistance training protocols (repetitions, % 1RM) for one suitable exercise to improve Curtis's muscular power. 3 marks

Exercise name	Sets	Repetitions	% 1RM	Speed of contraction
	3			fast

e. An intermediate-interval training program undertaken in the lead up to the Paralympics could have improved Curtis's lactate tolerance.

Explain how an improvement in lactate tolerance could have contributed to Curtis's performance in his kayak event. 4 marks

Question 2 (12 marks)

Mick Marshall, an adaptive athlete, recently broke the world record for the fastest marathon on crutches with a time of 6:30.46 (hr:min.sec) at the 2024 Melbourne Marathon. After being a successful non-disabled ultramarathon runner, Mick transitioned to running with crutches after experiencing major trauma to both legs in a workplace accident.

'Sometimes you need a big goal to keep you chipping away when things get tough,' Mick said in an Instagram post after breaking the world record.

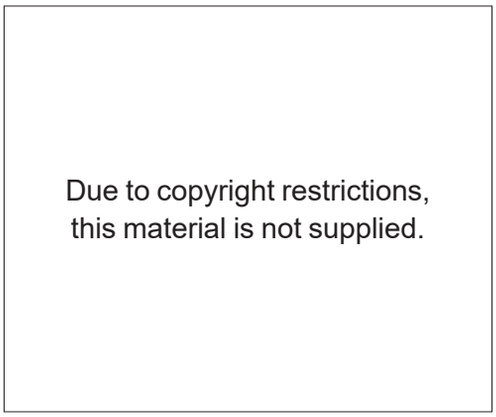


Photo: Mick Marshall/Instagram

a. **i.** Identify the stage of learning that Mick was in when he first learnt the skill of using crutches to run. 1 mark

ii. Classify the skill of running with crutches by circling the correct option below. 1 mark

discrete serial continuous

b. Evaluate the most appropriate practice distribution for Mick when he first learnt the skill of running with crutches. Refer to the stage of learning and the skill classification from **part a.i** and **part a.ii** in your response. 4 marks

c. Goal setting is a psychological strategy Mick could have used when learning to run with crutches.

Explain how the use of goal setting could have improved Mick's participation, skill development and performance in the marathon. 4 marks

Question 2 continues on the next page.

d. Describe a nutritional strategy that Mick could have used during the marathon to delay fatigue for this event. 2 marks

Question 3 (20 marks)

Fifteen male lacrosse players competing in a national championship were monitored during an 80-minute match (played in quarters) using global positioning system (GPS) monitors. The table below shows the movement patterns and average playing time by position.

Activity analysis data	Midfield	Attack	Defence
playing time (min)	36	48	59
walk (m)	127	172	194
jog (m)	1064	1149	1123
run (m)	1137	1169	967
sprint (m)	199	143	139

Data: Adapted from C Polley, S Cormack, T Gabbett and T Polglaze, 'Activity profile of high-level Australian lacrosse players', *The Journal of Strength and Conditioning Research*,<www.researchgate.net>

a. Explain the purpose of an activity analysis for a coach. 2 marks

Do not write in this area.

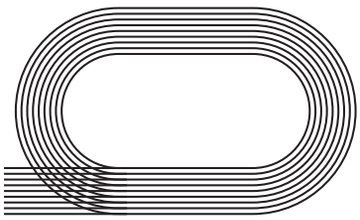
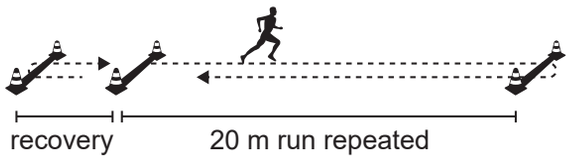
b. Identify an additional type of data, apart from that provided in the table on page 12, and outline how this could be used as part of a coach's activity analysis. 2 marks

Type of data _____

c. With reference to the data in the table on page 12, analyse the relationship between the energy systems used during activity and recovery for lacrosse midfielders and defenders. 6 marks

Question 3 continues on the next page.

d. A lacrosse coach wanted to test the players' aerobic power and considered using either the Cooper 12-minute run test or the Yo-Yo intermittent recovery test.

Cooper 12-minute run test	**Yo-Yo intermittent recovery test**
Continuously run as far as possible around a track for 12 minutes. 	

Sources: Adapted from (from left) KH Cooper, 'A means of assessing maximal oxygen intake: Correlation between field and treadmill testing', *Jama*, 203(3), 1968, pp. 201–204; J Bangsbo, FM Iaia and P Krustrup, 'The Yo-Yo intermittent recovery test: A useful tool for evaluation of physical performance in intermittent sports', *Sports Medicine*, 38(1), 2008, pp. 37–51

Evaluate the most appropriate test for the lacrosse players from a physiological perspective. 4 marks

Do not write in this area.

e. Based on the results of the fitness test, the coach identified a need to increase the VO_2 max of the lacrosse players.

Explain how an increased VO_2 max would improve performance of the lacrosse players. 3 marks

f. Explain how **one** respiratory adaptation could contribute to an increased VO_2 max. 3 marks

Question 4 (16 marks)

Aryna Sabalenka has one of the fastest forehand speeds in tennis.

Source: Leonard Zhukovsky/Shutterstock.com

a. Aryna can use resistance training to improve her muscular strength. As a result, Aryna's motor unit recruitment could be enhanced.

Explain how increased motor unit recruitment could improve Aryna's performance. 2 marks

b. Explain how an increase in her muscular strength could increase Aryna's muscular power. 2 marks

c. Explain how the type of muscle fibre influences the production of speed as a fitness component. 2 marks

Do not write in this area.

d. During the Australian Open in January 2025, Aryna is likely to have used a training diary to monitor and record training data.

Name **one** psychological factor that Aryna could have included in her training diary and explain how it might have benefited her during the competition. 2 marks

e. Coaches should frequently adjust training programs to prevent boredom and keep the training enjoyable.

State the training principle a coach is applying when they adjust a training program. 1 mark

Question 4 continues on the next page.

f. The following is an excerpt of the conditioning phase of a short-interval training program designed to improve Aryna's speed across the court.

Note: Intensity is measured by rate of perceived exertion (RPE).

Activity	Sets	Repetitions	Work time and intensity	Rest period	Work-to-rest ratio
running	3	4	3 seconds RPE 7	15 seconds	1:5+
running	3	5	5 seconds RPE 7	15 seconds	1:3

i. Critique the effectiveness of this conditioning phase for improving Aryna's speed. 4 marks

ii. Reducing rest periods is one way of applying progression across Aryna's short-interval training program.

Discuss the suitability of reducing rest periods as a form of progression. 3 marks

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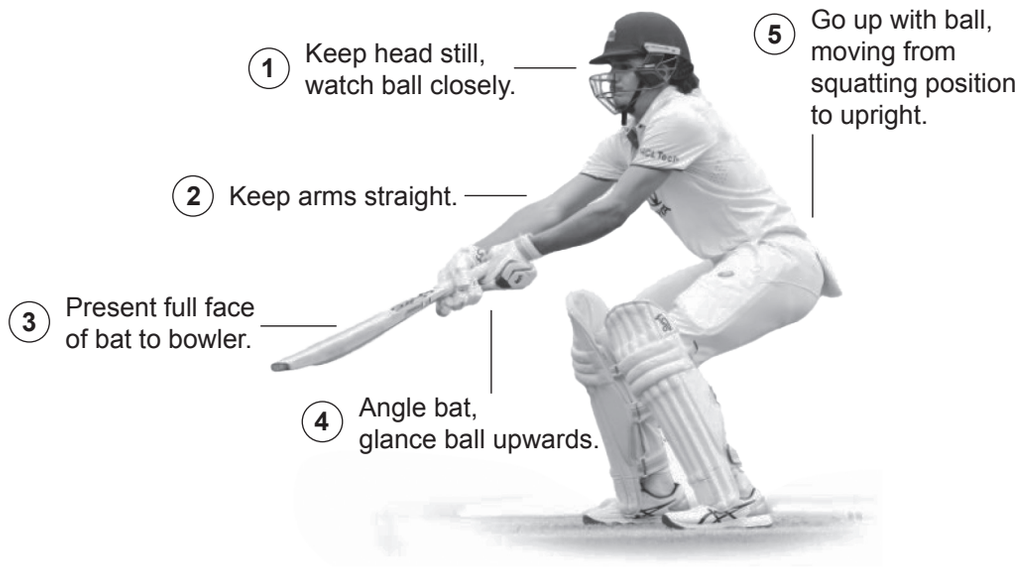
Examination continues on the next page.

Question 5 (7 marks)

A ramp shot is an innovative cricket shot where a player uses the momentum of the ball to deflect the ball over the top of the fielders behind them.

How to play a ramp shot



Source: Adapted from G Grant, 'How to play the ramp shot at home (Hot tip: Wear a helmet)', *The Age*, 27 December 2024; photo Quinn Rooney/© Getty Images Sport, reproduced with permission

a. **i.** The diagram above shows the characteristics of a ramp shot in cricket.

List the stage of a qualitative movement analysis (QMA) at which a coach should identify the characteristics of a skill. 1 mark

ii. Describe how a coach could use the other stages of a QMA to improve the performance of a ramp shot performed by an athlete. 3 marks

Do not write in this area.

b. Explain why the ramp shot could be more successfully performed against faster bowlers by referring to **one** relevant biomechanical principle. 3 marks

Question 6 (6 marks)

The table below shows the women's marathon race times for different locations with different average temperatures.

Year	Date	Start time	Location	Winner	Time (hr:min. sec)	Average temperature (°C) during the race
2022	18 July	6.15 am	Eugene, USA	Gotytom Gebreslase	2:18.11	16
2019	27 September	12.00 midnight	Doha, Qatar	Ruth Chepng'etich	2:32.43	32

Data: World Athletics <https://worldathletics.org/>

a. In the spaces below, state whether the acute response for blood volume and body temperature will **increase**, **decrease** or **stay the same** during the Doha marathon. 2 marks

Blood volume _____

Body temperature _____

b. Explain the most likely reason for the difference in the marathon race time of the winners of the Eugene and Doha marathons by referring to the relationship of this reason to the related fatigue mechanisms. 4 marks

_____

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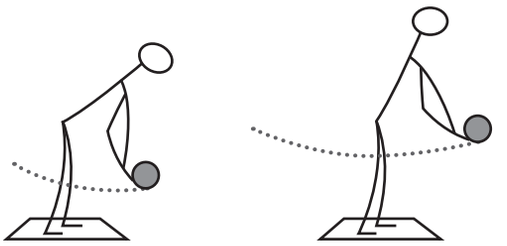
Question 7 (7 marks)

The diagrams below show the side angles of two lawn bowlers, holding a bowl, at the start of the arm swing.



Bowler A Bowler B

Source: Adapted from R Judson, *Biomechanics of the lawn bowl delivery movement*, 2002, downloaded from <https://clearwaterlawnbowlingclub.org>

A lawn bowler can vary the length of their arm swing to enable them to vary the distance travelled by the bowl while applying the same amount of force.

a. Compare how bowler A and bowler B use the biomechanical principle of impulse to vary the distance their bowl travels. 4 marks

Question 7 continues on the next page.

b. Bowler B decides to change to a lighter set of bowls. However, on using the same arm swing, bowler B finds that their bowl is travelling too far.

Use Newton's second law of motion to explain why this is occurring. 3 marks

Question 8 (10 marks)

The modern pentathlon is a one-day event consisting of five disciplines: fencing, 200 m freestyle swim, equestrian showjumping, shooting and running. The shooting and running disciplines are combined to create the laser run event.

At senior level, the laser run alternates between five high-intensity 600 m runs and four precise shooting rounds, requiring athletes to manage both physical exertion and mental focus under fatigue. Unlike a single-event athlete, such as a 3000 m running specialist, modern pentathlon athletes must compete in multiple events across a single day, including the final event, the laser run.

Example of elite athlete times for each run and shooting round during the laser run

Segment	Activity	Time (min:sec)
lap 1 – 600 m	running	1:52.33
shoot 1	shooting	8.20
lap 2 – 600 m	running	2:06.60
shoot 2	shooting	13.00
lap 3 – 600 m	running	2:15.36
shoot 3	shooting	10.50
lap 4 – 600 m	running	2:16.35
shoot 4	shooting	8.40
lap 5 – 600 m	running	2:16.04
	Total	11:26.78

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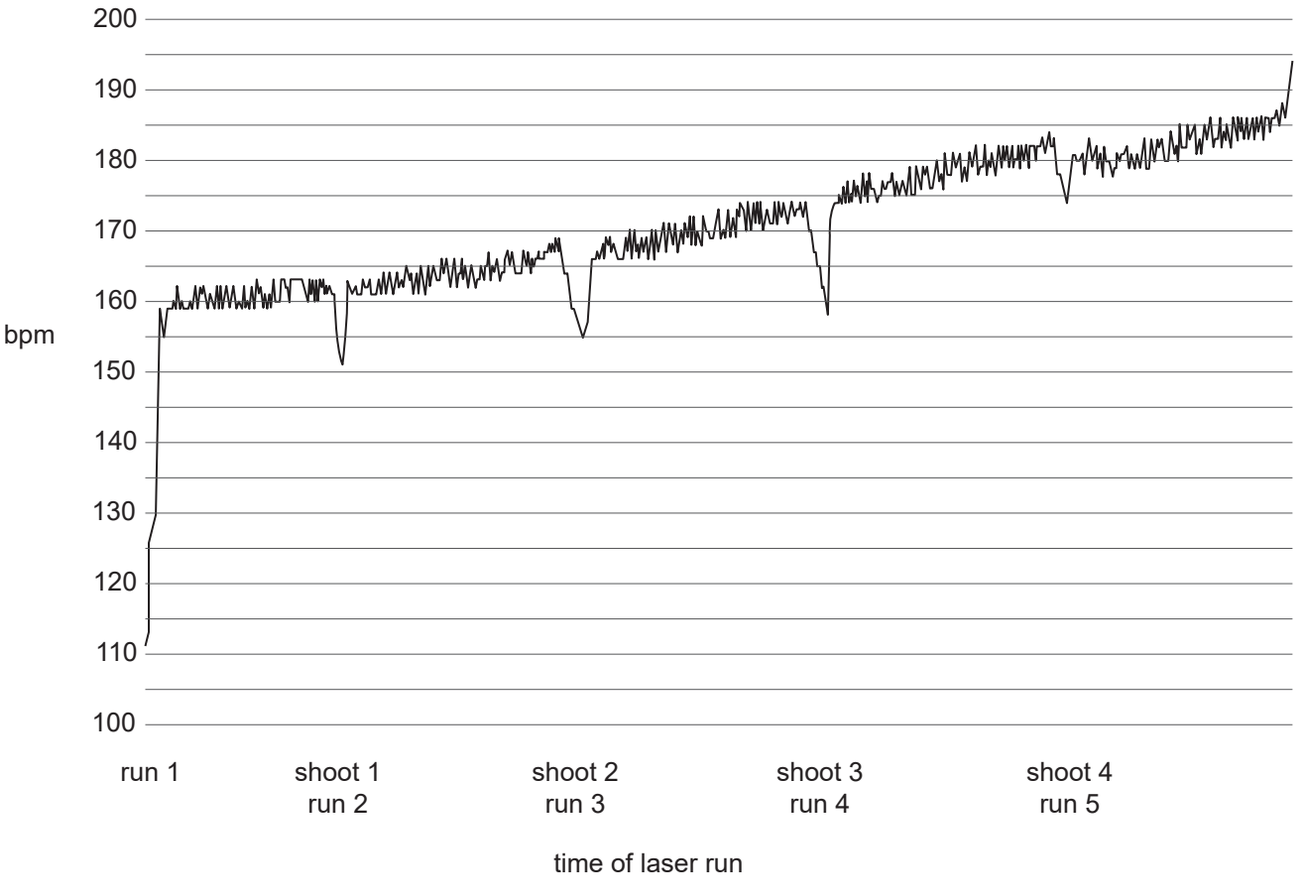
Typical heart rate data (bpm) of an elite athlete during the laser run



Discuss how the following concepts interrelate to produce a successful performance in the laser run for an elite athlete:

- psychological strategies during the race
- energy system requirements
- acute responses to exercise and oxygen consumption
- training methods and principles

Question 8 continues on the next page.

End of examination questions

Extra space for responses

Clearly **number** all responses in this space.

If you use any additional Question and Answer Books to complete your responses, write your **student number** on the front cover. At the end of the examination, place the additional Question and Answer Books inside the front cover of the first Question and Answer Book.

Assessment criteria for Section B

The 10-mark extended-response question in Section B will assess the interdisciplinary approach featured within Unit 4 Area of Study 3. For this question, students will be expected to show their understanding of key knowledge from across Units 3 and 4, and will be assessed based on the following criteria:

- analyse relevant interrelationships between skill acquisition, biomechanics, energy production and/or training
- analyse the impact on performance of relevant interrelationships between skill acquisition, biomechanics, energy production and/or training
- synthesise, analyse and interpret relevant sources/data to draw conclusions

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