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YEAR 12 *Trial Exam Paper*

2019

PHYSICAL EDUCATION

Written examination

STUDENT NAME:

Reading time: 15 minutes
Writing time: 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.
- Calculators are NOT permitted in this examination.

Materials supplied

- Question and answer book of 27 pages
- Answer sheet for multiple-choice questions

Instructions

- Write your **name** in the box provided on this page and on the multiple-choice answer sheet.
- You must answer the questions in English.

At the end of the examination

- Place the multiple-choice answer sheet inside the front cover of this question and answer book.

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

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 energy fuel produces the most amount of energy per molecule?

A. triglycerides

B. blood glucose

C. muscle glycogen

D. stored ATP and phosphocreatine

Question 2

A physiological record made during an athlete's training session could be

A. the weather conditions.

B. athlete arousal and stress ratings.

C. who was present at the training session.

D. the amount of sleep the athlete had the night before.

Question 3

Manuel begins a resistance training program. He feels a notable improvement in his strength and feels he can lift heavier weights after completing three training sessions per week for two weeks.

This is due to

A. increased myofibrils in the muscles.

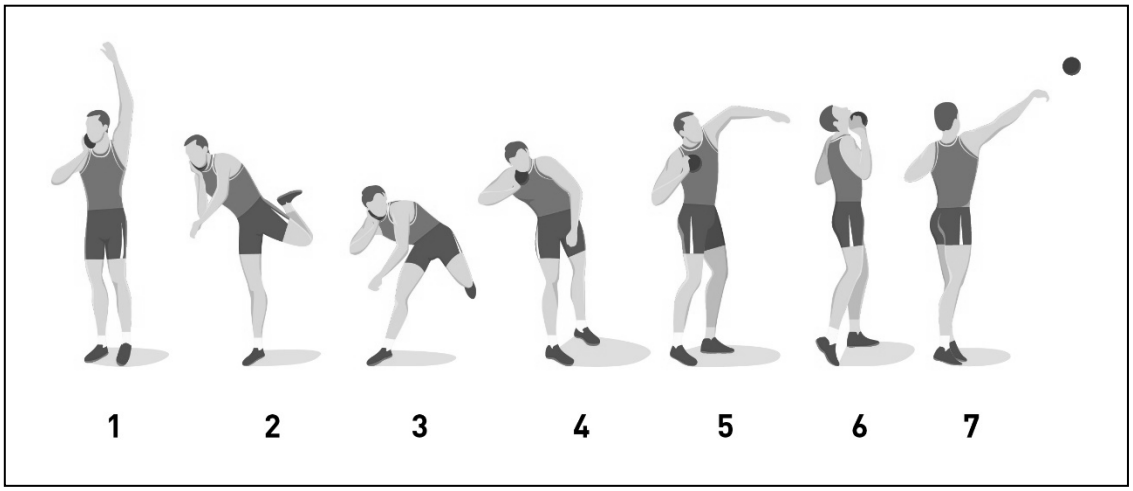
B. muscle hypertrophy.

C. improvement in motor unit synchronisation and firing rate.

D. increased actin and myosin in the muscle fibres.

Use the following information to answer Questions 4–6.

The diagram below depicts the stages of executing a shot put throw.



Question 4

The athlete is the least stable in

A. position 1.

B. position 2.

C. position 3.

D. position 4.

Question 5

In moving from position 1 through to position 7 to release the shot put, the athlete uses the biomechanical principle of

A. impulse.

B. angular momentum.

C. mechanical advantage.

D. inertia.

Question 6

Which one of the following fitness components below is most relevant for executing a shot put throw?

A. muscular power

B. muscular endurance

C. aerobic power

D. body composition

Question 7

Which one of the following is the correct sequence of steps for a quantitative movement analysis?

A. observation, error correction, evaluation, preparation

B. preparation, observation, error correction, evaluation

C. observation, evaluation, preparation, error correction

D. preparation, observation, evaluation, error correction

Question 8

To put themselves into an optimal zone before competing in a weightlifting event, an athlete is likely to use the psychological strategy of

A. meditation.

B. progressive muscle relaxation.

C. controlled breathing.

D. energetic actions.

Question 9

Which one of the following does not influence the trajectory of a projectile?

A. height of release

B. angle of release

C. mass of the person releasing the projectile

D. speed of release

Question 10

An athlete wishing to improve their muscular power will likely participate in which one of the following training methods?

A. long interval training

B. fartlek training

C. plyometrics training

D. flexibility training

Question 11

At approximately 40–60% of an athlete's VO_2 max., there is a peak in

A. heart rate.

B. cardiac output.

C. blood pressure.

D. stroke volume.

Question 12

An athlete underwent an extensive period of anaerobic running training of varying distances no longer than 400 m.

Which one of the following chronic adaptations would be least likely to occur?

A. increase in glycolytic enzymes

B. increased tolerance of metabolic by-products

C. increase in ATP-PC stores.

D. increase in oxidative enzymes

Question 13

Sacha convinced her sister Padma to start swimming laps with her at the local pool. Sacha normally swims 1 km in 18:06 minutes. On Padma's first attempt she took 20:45 minutes to swim 1 km. After training with Sacha for three weeks, Padma's 1 km time improved to 19:30 minutes, but Sacha could only reduce her time by 10 seconds.

This highlights the training principle of

A. specificity.

B. intensity.

C. diminishing returns.

D. detraining.

Question 14

The correct order of skills from most open to most closed is

A. surfing, tackling a player in rugby, bowling a cricket ball, cuing a ball in snooker.

B. cuing a ball in snooker, surfing, bowling a cricket ball, tackling a player in rugby.

C. surfing, bowling a cricket ball, cuing a ball in snooker, tackling a player in rugby.

D. bowling a cricket ball, surfing, tackling a player in rugby, cuing a ball in snooker.

Question 15

After completing a shot on goal during the second quarter of an AFL finals game, Ben immediately knew that it was not a good kick. He could sense that he was unbalanced when he kicked and that he did not properly follow-through.

This is an example of what kind of feedback when executing motor skills?

A. knowledge of results

B. knowledge of performance

C. intrinsic

D. augmented

END OF SECTION A
TURN OVER

SECTION B

Instructions for Section B

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

Question 1 (4 marks)

High jump as a skill consists of a run-up, take-off, rotation and landing. The image below depicts a high jumper in the rotation phase, during which they are required to arch their body and rotate quickly over the bar.

a. High jump is an example of which movement skill? Circle the correct answer below.

1 mark

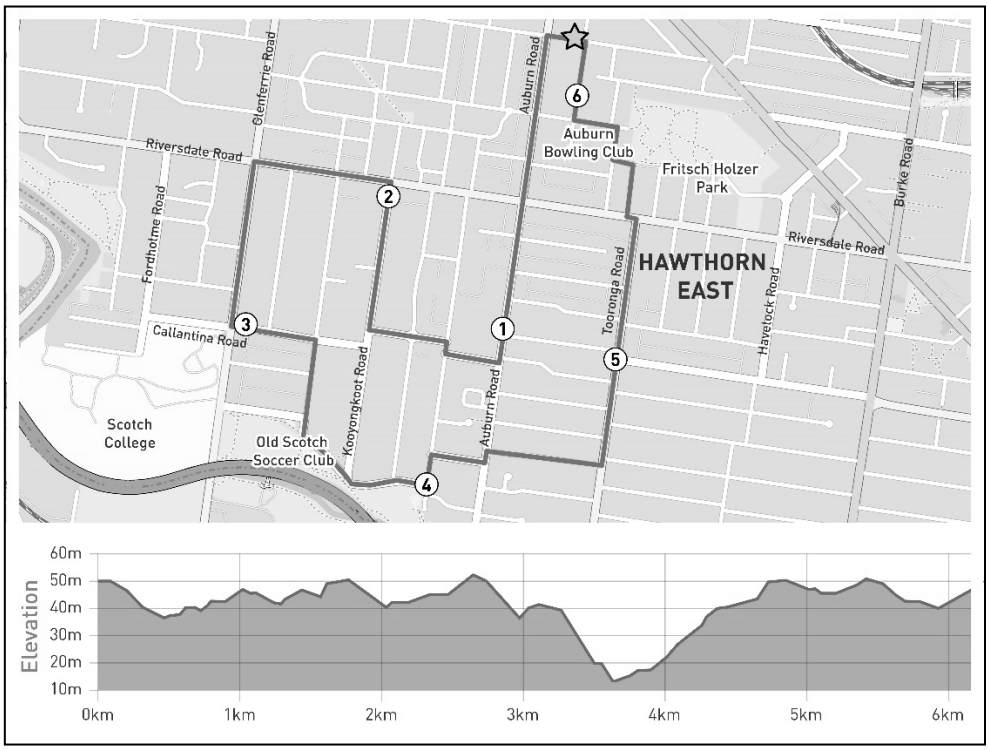
discrete serial continuous

b. Using the biomechanical principle of conservation of angular momentum, explain how the high jumper has manipulated her body to rotate successfully around the bar.

3 marks

Question 2 (10 marks)

As part of her regular training, Daniela went for a 6.23 km run that she tracked using a wearable activity tracker. The data from her run was downloaded to her smartphone and is shown below. The star symbol represents Daniela's start and finish point.



a. Outline **two** advantages of using an activity tracker and smartphone app like those Daniela used for her training.

2 marks

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_____

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_____

b. When discussing the run with her sister, Beatriz, Daniela stated that while her total distance was 6.23 km, her displacement was in fact 0 km.

Explain what Daniela meant by this statement.

2 marks

c. The following table shows Daniela's heart rate, stroke volume and cardiac output at rest and at maximal intensity, as she sprinted the final 250 m of her run.

	Heart rate (bpm)	**Stroke volume (mL)**	**Cardiac output (L/min)**
Rest	60	80	5
Maximal intensity	200	135	27

i. Define 'stroke volume'.

1 mark

ii. Use the data in the table to explain the difference between cardiac output at rest and at maximal intensity.

2 marks

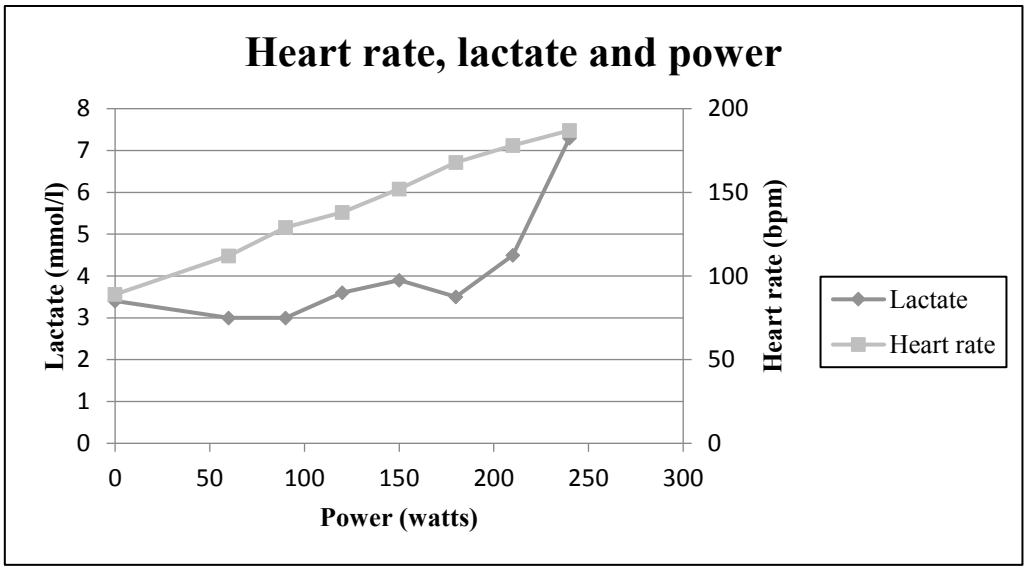
d. Describe the interplay of energy systems for Daniela throughout her run. Refer to steady state in your response.

3 marks

Question 3 (14 marks)

As part of their final year of study, a Year 12 PE class had qualified experts come to their school to undertake lab fitness tests with the class. The first student to volunteer completed an incremental VO_2 max. test on a bike. As the test continued over a 22-minute period, the resistance on the bike increased and forced her to work harder.

The graph below shows the student's heart rate and blood lactate data recorded throughout the test.



a. Critique the use of a VO_2 max. test in a school setting from a physiological, sociocultural and psychological perspective.

4 marks

b. Using the lactate data in the graph, describe what is occurring physiologically for the participant beyond 180 watts.

3 marks

Another student in the class completed the 30-second Wingate cycling test, where her peak power output was measured on the same stationary bike by requiring her to pedal as hard and fast as possible over a 30-second period.

c. Identify the fitness component that each of the tests is measuring.

2 marks

VO_2 max. test

30-second Wingate cycling test

d. By discussing the rate of ATP production of energy systems and the interplay between them, explain why the student completing the 30-second Wingate cycling test was able to produce a higher peak power output (545 watts) than the student who completed the VO_2 max. test.

4 marks

e. Identify **one** factor that would lead to fatigue during the 30-second Wingate cycling test.

1 mark

Question 4 (14 marks)

Zhang Wei is a champion men's table tennis player, who, at 21 years old, is one of the youngest men's champions to date. He grew up in China, where table tennis is the national sport, and joined the Chinese national team at a very young age.

a. With reference to the stages of learning, discuss the differences in Zhang Wei's motor skill execution from when he first began playing table tennis to the present day.

4 marks

b. Outline how **two** sociocultural factors may have affected the development of Zhang Wei's table tennis skills.

2 marks

One of Zhang Wei's early training strategies involved serving to markers that were taped onto the table. His coach said he needed to hit one marker 80 times in a row before moving on to aiming at the next marker.

c. Explain whether this is an example of blocked or random practice.

2 marks

_____

_____

_____

_____

_____

d. Identify the type of constraint the coach has manipulated for this training activity.

1 mark

_____

When interviewed after his most recent win, Zhang Wei said that he felt a growing sense of pressure when playing due to being the highest ranked representative for his country.

e. Explain how this pressure may affect his performance during a match.

3 marks

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f. Describe **one** psychological strategy that Zhang Wei could use during a match break to overcome his sense of pressure.

2 marks

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Question 5 (10 marks)

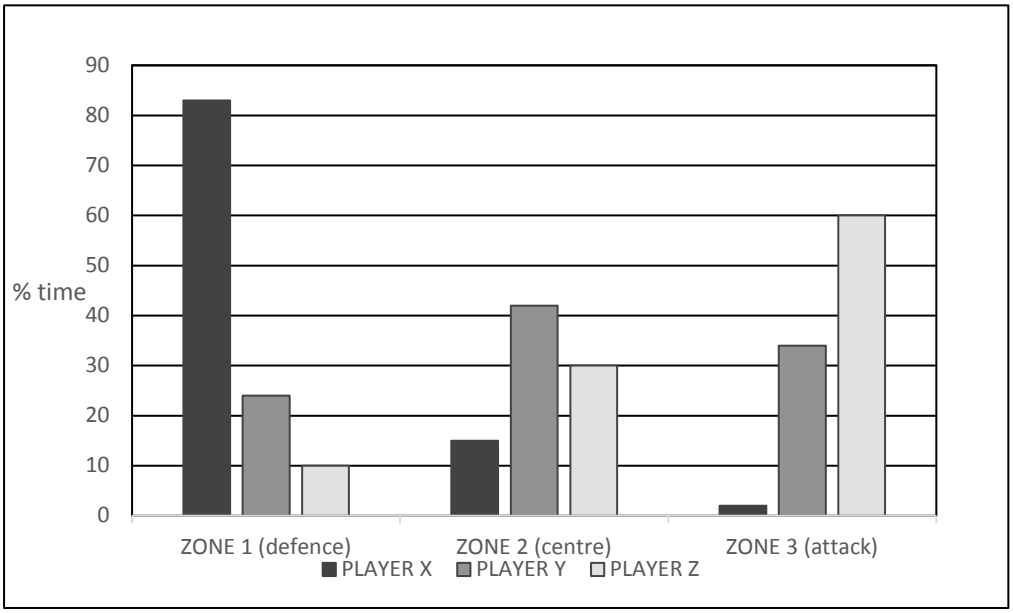
The coaches of an U17 Victorian representative hockey team collected data during an intra-squad practice match. The coaches set up video recorders at four points around the field and used an aerial drone to record video. All of the players wore GPS monitors.

Key data from the match for three of the players is summarised in the tables and figure below.

Skill frequency

	Player X	Player Y	Player Z
Maximum heart rate (bpm)	193	191	193
Total short passes (<6 m)	16	38	20
Total hits (>6 m)	15	7	6
Total distance (km)	6.8	10.1	7.5
Work-to-rest ratio	1:3	2:1	1:4
Tackles	24	16	11

Percentage of time in Zones 1, 2 and 3



Movement pattern analysis

	Player X	Player Y	Player Z
Fast running	6	5	7
Sprinting at top speed	6	4	7
Continuous jogging	7	18	4
Sideways running	6	5	2
Backward running	2	2	1

a. Outline **one** reason why the coaches would complete an activity analysis.

1 mark

_____

_____

_____

b. Identify an advantage of **one** of the analysis methods chosen by the coaches.

1 mark

_____

_____

c. Identify the predominant energy system for each player based on their work-to-rest ratios.

3 marks

Player X _____

Player Y _____

Player Z _____

d. Use the data provided to identify which player is likely to have played in a midfield position.

3 marks

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_____

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e. Use the data provided to identify and justify **one** relevant fitness test that the coaches could include in a fitness test battery.

2 marks

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Question 6 (12 marks)

Scott is 35 years old. He recently joined his local 24-hour gym, where he was taken through a fitness test battery by a trainer and given a six-week program (three sessions per week) based on his fitness goals and test results. Scott's fitness test battery and training session are outlined below.

Scott's fitness test battery

1RM leg press
12-minute Cooper's run test
Skinfold test
60 second push-up test

Scott's training session outline

Warm-up	8 minutes walking on treadmill @5 RPE or 8 minutes rowing on ergometer @5 RPE		
Aerobic conditioning	25 minutes jogging on treadmill @ 7 RPE		
Strength conditioning		**Sets**	**Repetitions**
	Leg press @75% RM	3	10
	Dead lift @75% RM	3	10
	Bicep curl 7 kg	3	10
	Weighted squats @75% RM	3	10
	Push-ups	3	10
	Burpees	3	10
Cool-down	5 minutes on exercise bike @3 RPE OR rowing on ergometer @3 RPE Static stretching		

a. Describe the difference between the fitness components of muscular strength and muscular power.

1 mark

_____

_____

_____

b. State **one** suitable progressive overload suggestion for strength conditioning in week three of the program.

1 mark

_____

_____

c. As seen in the first table, one of the fitness tests Scott completes is the 1RM leg press.

Identify **one** other test that measures the same fitness component.

1 mark

_____

d. Identify **three** chronic aerobic cardiac adaptations that Scott is likely to gain after six weeks of the program.

3 marks

_____

_____

_____

e. Discuss the purpose of the cool-down component of Scott's training session.

2 marks

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_____

f. The training program refers to Scott completing exercises at a certain RPE (rating of perceived exertion).

Which training principle is this addressing?

1 mark

_____

g. Scott wishes to complete an extra aerobic training session outside the gym each week.

Identify an appropriate method of training and design a suitable session that Scott could complete.

3 marks

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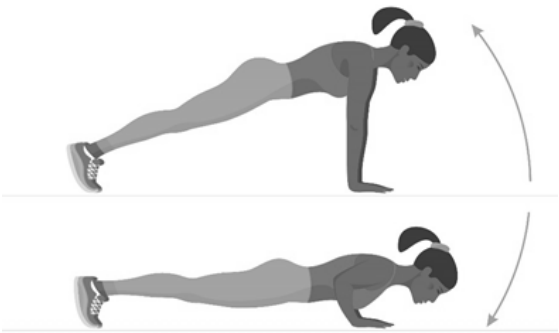
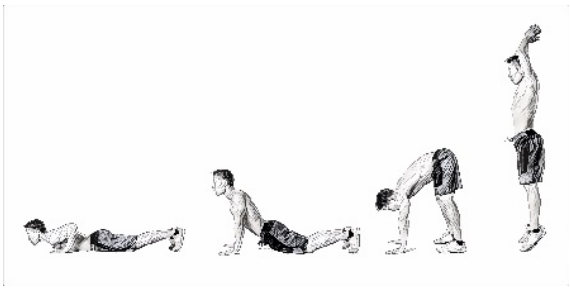
Question 7 (8 marks)

Maia has started a new resistance training program. Two exercises prescribed for her training are push-ups and burpees. Both of these are shown in the images below.

Push-up



Burpee



a. The push-up is an example of a second-class lever in the body.

On the push-up diagram, label the three components of the lever.

3 marks

A section of Maia's training diary is shown in the table below.

	Notes
Week 1	Started push-ups on my knees, but after today my trainer and I agreed that this is too easy. Will progress to toe push-ups.
Week 3	Have been completing toe push-ups since session two. This is going well so I have added a few reps.
Week 5	My trainer placed a 5 kg flat weight on my back for the push-ups today. This made it a lot harder.

b. Referring to Newton's first law, explain Maia's notes in her training diary about the changes to the push-up exercise over the five weeks.

3 marks

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_____

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_____

c. Discuss how Newton's second law applies to completing a burpee.

2 marks

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Question 8 (14 marks)

At a 2018 inter-school rowing event, the winning Division 1 eight crew finished their 2000 m race in 5 minutes and 49.5 seconds. The 500 m split times are shown in the table below.

Lane	500 m	1000 m	1500 m	2000 m
4	1:23:21	2:49:76	4:19:83	5:49:50

a. Explain the predominant fuel used by the rowers throughout the race.

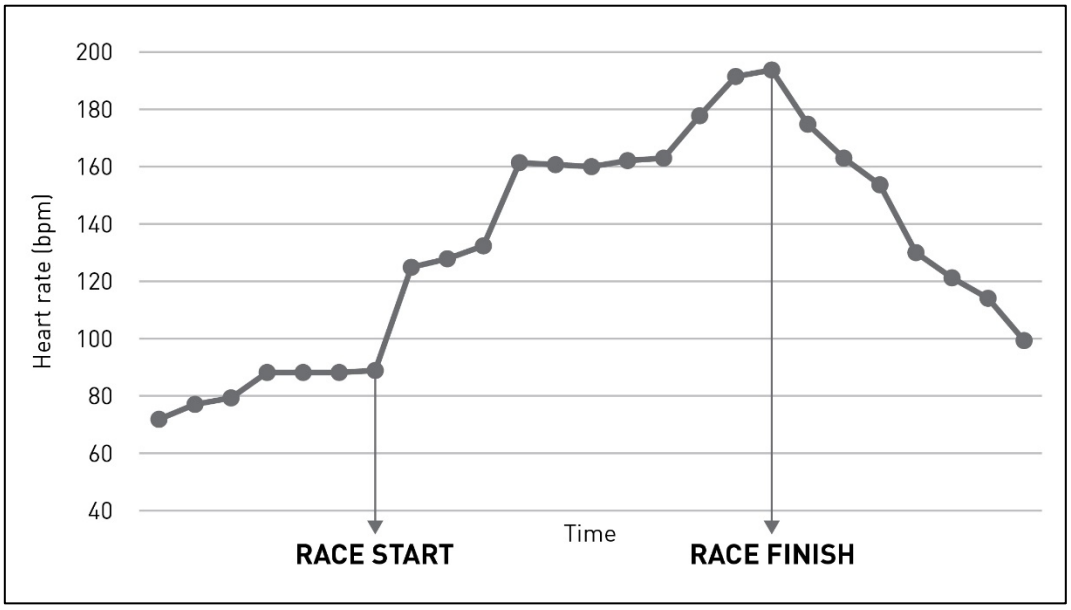
2 marks

One of the crew members had completed a lot of additional anaerobic training in the lead-up to the event, significantly more than the rest of the crew.

b. Discuss whether their blood lactate level, if measured at the end of a high-intensity training session on a rowing ergometer, would be higher or lower than the other members of the crew.

3 marks

c. All the crew members are breathing rapidly immediately after they finish the race. The graph below shows heart rate measured before, during and after the race for one of the crew members.



Referring to the graph, describe what is occurring for the crew member immediately after the race.

2 marks

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_____

_____

_____

d. Thirty minutes after the race, the coach hands each of the crew a chocolate milk drink.

Describe the benefits of this post-race drink for their recovery.

2 marks

_____

_____

_____

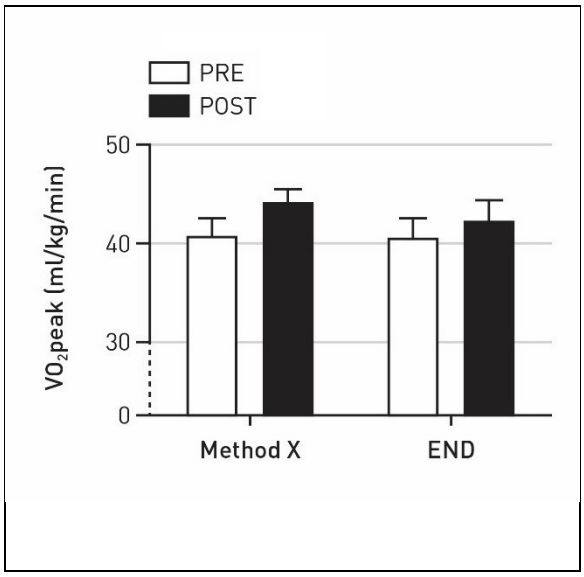
e. Provide a brief qualitative kinematic analysis of the crew's 2000 m race using data in the table. Refer to the type of motion, distance and the acceleration occurring for each 500 m split.

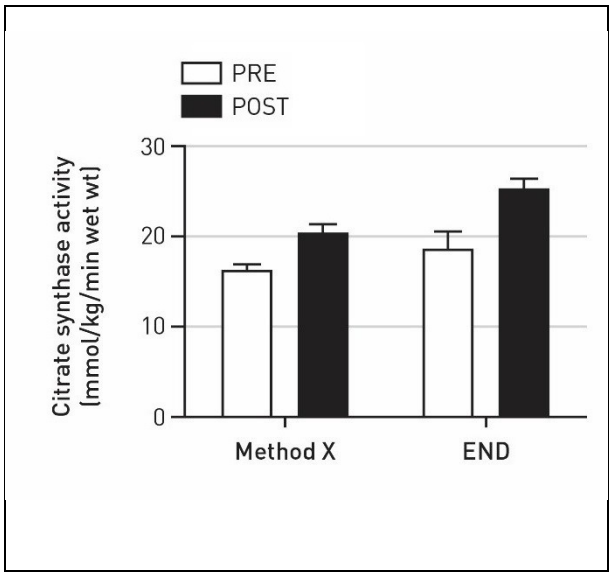
5 marks

Question 9 (7 marks)

A 2012 study investigated chronic adaptations from a new aerobic training method known as Method X that involved intermittent bursts of high-intensity exercise followed by low-intensity exercise or rest.

Results from the study are shown in the graphs below. It shows peak VO_2 and mitochondrial enzyme (citrate synthase) changes measured in a group completing a six-week program using Method X and a group completing a traditional endurance training program (END).





Source: Redrawn from Burgomaster et al., 'Similar metabolic adaptations during exercise after low volume sprint interval and traditional endurance training in humans', *Journal of Physiology*, January 2008, p.156.

a. Using the data in the graphs, identify the type of aerobic training represented by Method X.

1 mark

_____

b. Explain how the adaptations shown in the pre- and post-program data are beneficial to the performance of an aerobic athlete.

3 marks

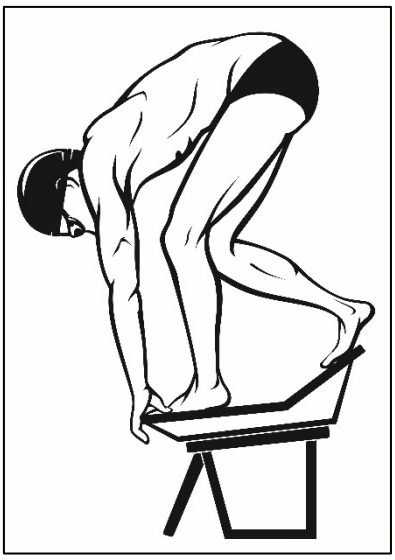
c. Gabriela is training for a half marathon. Her friend suggests participating in the type of training identified in **part a.** Gabriela participates in a Method X training session on spin bikes with a group twice a week.

Evaluate whether this suggestion would be a suitable inclusion in Gabriela's training program in preparation for her marathon.

3 marks

Question 10 (4 marks)

The image below depicts the set phase of a swimming race dive using an angled diving block.



Critique the effectiveness of this starting position for a 100 m swimming race from a biomechanical perspective, making reference to Newton's laws and biomechanical principles of equilibrium.

Question 11 (8 marks)

Mini-golf is a modified version of golf that involves golf clubs that are considerably lighter and shorter than ordinary golf clubs. Other modified golf equipment for children includes shorter and lighter golf clubs and much lighter balls that are made from plastic, rather than metal.

It is hoped that the modified equipment will allow young cognitive learners to develop putting and swinging skills more easily and to improve their performance of these fundamental golf skills. Explain the coaching concept of modifying golf equipment by applying your understanding of biomechanical and coaching principles.

Your response should include a discussion of:

- constraints based coaching
- inertia, force and acceleration
- moment of inertia.

END OF QUESTION AND ANSWER BOOK