

**Victorian Certificate of Education  
2015**

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER           Letter

**PHYSICAL EDUCATION**  
**Written examination**

**Thursday 5 November 2015**

**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**

<i>Section</i>	<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
A	15	15	15
B	14	14	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 28 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**

Kirsty is a 45-year-old office worker who is a keen golfer on the weekends. To assess her physical activity levels, she is recording the number of minutes that she is active each week.

How many minutes of moderate-intensity physical activity does Kirsty need to accumulate per week to meet Australia's Physical Activity Guidelines for her age group?

- A. 30–60 minutes
- B. 60–100 minutes
- C. 100–140 minutes
- D. 150–300 minutes

**Question 2**

The aerobic system provides ATP during recovery.

Which food fuel would be the main contributor to ATP production during extended rest periods?

- A. lipids
- B. protein
- C. creatine
- D. carbohydrates

**Question 3**

Theo wants to design a training program for his hockey season.

Which one of the following should he do first?

- A. Complete fitness testing.
- B. Undertake an activity analysis.
- C. Design specific training sessions.
- D. Determine the length and periodisation of the training program.

**Question 4**

Brett is a 25-year-old apprentice plumber who records on a self-report survey that he completed 300 minutes of moderate-intensity physical activity in a week.

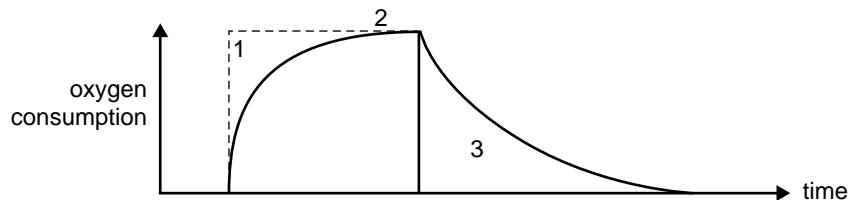
Which one of the following activities that Brett completed during the week is an example of a moderate-intensity activity?

- A. fishing
- B. jogging
- C. lawn bowls
- D. competitive hockey

**Question 5**

Which of the following lists of foods would a marathon runner select to carbohydrate load?

- A. steak, milk, raw nuts, honey
- B. legumes, avocados, eggs, bananas
- C. cereals, pasta, soft drink, garlic bread
- D. salad sandwich, chocolate, strawberries, sports drinks

**Question 6**

On the graph above, the number 1 indicates the period when

- A. oxygen uptake is at resting levels.
- B. oxygen supply equals oxygen demand.
- C. oxygen supply does not equal oxygen demand.
- D. post-exercise oxygen consumption is in excess of resting levels.

**Question 7**

$VO_2$  max. is the product of

- A. cardiac output (L/min) and tidal volume (L).
- B. stroke volume (mL/min) and heart rate (bpm).
- C. tidal volume (L) and arteriovenous oxygen difference (mL/100 mL).
- D. cardiac output (L/min) and arteriovenous oxygen difference (mL/100 mL).

**Question 8**

The relative contributions of carbohydrate and fat as fuel for exercise change as exercise intensity increases. As intensity increases, the contribution of

- A. carbohydrate and fat will stay the same.
- B. carbohydrate will increase and the contribution of fat will decrease.
- C. carbohydrate will decrease and the contribution of fat will increase.
- D. carbohydrate and fat will decrease, and the contribution of creatine will increase.

**Question 9**

Which one of the following best describes a fitness test performed repeatedly without testing error?

- A. accurate
- B. relevant
- C. specific
- D. reliable

**Question 10**

Which one of the following is an example of an initiative designed to increase physical activity behaviour that addresses the individual level of the social-ecological model?

- A. support groups
- B. urban planning
- C. education programs
- D. providing facilities for physical activity

**Question 11**

Sports dieticians use a ranking system for carbohydrates known as the glycaemic index (GI).

Which one of the following lists correctly ranks the foods from high GI to low GI?

- A. hypertonic sports drink, boiled potato, flavoured yoghurt
- B. boiled potato, hypertonic sports drink, flavoured yoghurt
- C. flavoured yoghurt, boiled potato, hypertonic sports drink
- D. boiled potato, flavoured yoghurt, hypertonic sports drink

**Question 12**

Training anaerobically can lead to a significant increase in the body's

- A. oxidative enzymes.
- B. lactate inflection point (LIP).
- C. capillarisation of skeletal muscles.
- D. ability to buffer the metabolic by-product build-up.

**Question 13**

One method of assessing physical activity is a self-report, often completed as a recall survey.

What limitation of this method of assessment may result in higher levels of physical activity being reported?

- A. reactivity
- B. social desirability bias
- C. contextual data is unable to be recorded
- D. measurement of physical activity is restricted to walking

**Question 14**

Which one of the following shows the correct information about the fuels used in ATP production?

	<b>Fuel</b>	<b>Stored in the muscle as</b>	<b>Travels through the body as</b>	<b>Example of food</b>
A.	carbohydrate	glycogen	glucose	nuts
B.	lipids	triglycerides	free fatty acids	avocado
C.	protein	amino acids	nutrients	egg
D.	creatine	creatine phosphate	hydrogen ions	fish

**Question 15**

Hyperbaric chambers are high-oxygen environments.

Which one of the following physiological responses will result from hyperbaric chamber therapy?

- A. increased red blood cells
- B. increased protein synthesis
- C. reduced swelling and reduced fluid retention
- D. increased recovery time between performances

**SECTION B**

**Instructions for Section B**  
 Answer **all** questions in the spaces provided.

**Question 1** (8 marks)

a. Prior to fitness testing, what must be obtained from participants? 1 mark

\_\_\_\_\_

b. Complete the table below by providing the missing fitness component or recognised fitness test for each given item. 4 marks

Fitness component	Recognised fitness test
flexibility	
	body mass index (BMI)
agility	
	1 repetition maximum (RM)

c. Describe how each of the following types of flexibility exercises should be performed. 3 marks

• Static stretching \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

• Ballistic stretching \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

• Proprioceptive neuromuscular facilitation (PNF) \_\_\_\_\_

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**Question 2** (3 marks)

Outline the role of each of the following in the aerobic production of ATP.

- Haemoglobin \_\_\_\_\_

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- Myoglobin \_\_\_\_\_

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- Mitochondria \_\_\_\_\_

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**Question 3** (9 marks)

Some companies in Australia have introduced activity-based workspaces as an initiative to encourage physical activity and reduce the sedentary behaviour of employees at work. These companies have installed workspaces that include standing desks at which employees can choose to stand rather than sit.



- a. Using the social-ecological model, explain why only providing activity-based workspaces might not be a very effective initiative to increase physical activity and reduce sedentary behaviour at work.

2 marks

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b. Installing standing desks is a change made at the physical environment level.

Provide another example of a workplace initiative that targets each level of the social-ecological model that could encourage physical activity or reduce the sedentary behaviour of employees.

4 marks

- Individual level \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Social environment level \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Physical environment level \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Policy level \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

To assess the influence of the introduction of standing desks on the physical activity levels and sedentary behaviour of their employees, some companies provided employees with a pedometer to wear all day at work.

c. Outline **one** reason why pedometers might **not** be the best method of assessing the influence of standing desks on physical activity levels and sedentary behaviour.

1 mark

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

d. Suggest a more appropriate method of assessing the influence of standing desks on physical activity and sedentary behaviour. Outline one reason for your choice.

2 marks

Method \_\_\_\_\_

Reason \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Question 4** (6 marks)

Men's gymnastics involves performance in the pommel horse event (shown below). In this static hold, the gymnast supports himself with his hands. His feet and body are not supposed to touch the pommel horse or the ground.



Source: Air Images/Shutterstock.com

- a. Using the image above, identify two health-related fitness components required to perform the skill shown by the gymnast. Justify your selection with reference to the skill shown in the image.

4 marks

Fitness component 1 \_\_\_\_\_

Justification \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Fitness component 2 \_\_\_\_\_

Justification \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- b. Men's gymnastics involves performance on five different apparatus across a day's competition.

Name one physiological recovery strategy to enhance performance throughout the competition and describe how the gymnast can implement the strategy.

2 marks

Strategy \_\_\_\_\_

Description \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Question 5** (10 marks)

- a. Explain the changes in oxygen uptake from rest, during sub-maximal exercise and in recovery, and how this has an impact on ATP production.

4 marks

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Maximal oxygen uptake is a valid measure of cardio-respiratory fitness.

- b.** Describe a test that could be used to **directly** measure an athlete's maximal oxygen uptake.  
You may use a diagram in your answer.

2 marks

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**Question 6** (9 marks)

The Australian Sports Anti-Doping Authority's (ASADA) website lists the sanctions imposed on athletes over the past five years for violations of ASADA's rules. Stimulants are the most common illegal substance that has been used by athletes who have violated the rules.

- a. i.** Circle the athlete whose performance would benefit the most from taking a stimulant. 1 mark

rifle shooter      platform diver      power lifter

- ii.** Identify two perceived psychological benefits of consuming a stimulant during competition. 2 marks

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

- iii.** Other than death, list two potential harms associated with consuming a stimulant. 2 marks

1. \_\_\_\_\_

2. \_\_\_\_\_

At the Hopman Cup tennis tournament in January 2015, Serena Williams lost the first set 0–6 and she asked the umpire if she could have an espresso coffee.

- b.** Explain, physiologically, how the caffeine may have enabled Williams to improve her performance and win the match. 2 marks

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\_\_\_\_\_

Until 2004, it was illegal under the World Anti-Doping Agency's (WADA) code to consume more than six to eight cups of coffee before and during competition. Since caffeine was removed from the prohibited substance list, caffeine use in competition has soared. This year, WADA put caffeine on the monitoring list.

- c.** With reference to WADA criteria, explain why WADA may want to monitor caffeine use. 2 marks

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Question 7** (7 marks)



Source: © Victorian Health Promotion Foundation (VicHealth); source material available at [www.vichealth.vic.gov.au](http://www.vichealth.vic.gov.au)

‘TeamUp’ is an initiative of VicHealth that encourages physical activity. The initiative takes the form of an app that aims to help people overcome some of the barriers, such as time, transport, social isolation and cost, that stop them from taking part in physical activity.

- a. Which component of the social-ecological model does ‘TeamUp’ target? 1 mark

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- b. Apply the social-ecological model to critique the likely effectiveness of ‘TeamUp’ in encouraging physically active behaviour. 4 marks

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In recent times, the introduction and use of global positioning systems (GPS) in field-based sports have allowed full game movements, along with player and positional demands, to be monitored and assessed as part of an activity analysis.

- b.** Other than GPS, name a method of data collection that can be used to determine movement patterns. 1 mark

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- c.** By referring to the relevant training principle, outline why it is important for fitness staff in football clubs to have accurate data. 2 marks

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The total distance covered is similar for midfielders and forwards. However, midfielders spend a significantly greater amount of time than forwards in a steady state.

During training, fitness staff manage player recoveries. Theoretically, midfielders should perform active recoveries while forwards perform passive recoveries.

- d. i.** Explain why midfielders and forwards should complete different recoveries during training. 2 marks

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- ii.** Outline two purposes of an active recovery following intense efforts. 2 marks

1. 

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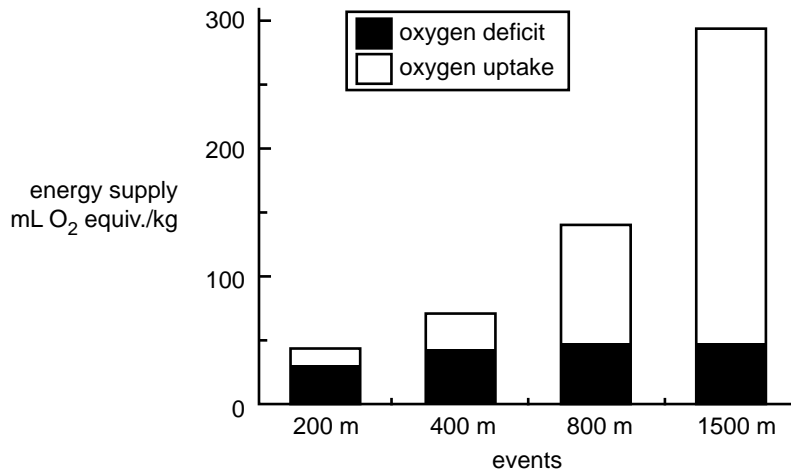
2. 

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**Question 9** (4 marks)

The graph below shows the energy system contribution in track athletes during simulated running events on a treadmill.



Source: P Gastin and P Le Rossignol, 'Energy systems: Re-evaluating high intensity energy contributions', in 'Update of content: Energy systems', VCE Physical Education, February 2001, Board of Studies (Vic), p. 5

- a. Explain why the contribution from the aerobic energy system increases as the race distance changes from 400 m to 1500 m. 2 marks

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- b. The rate of ATP production is greater in the anaerobic energy systems.  
 Explain how the rate of ATP production influences the average speed for both the 400 m and 1500 m events. 2 marks

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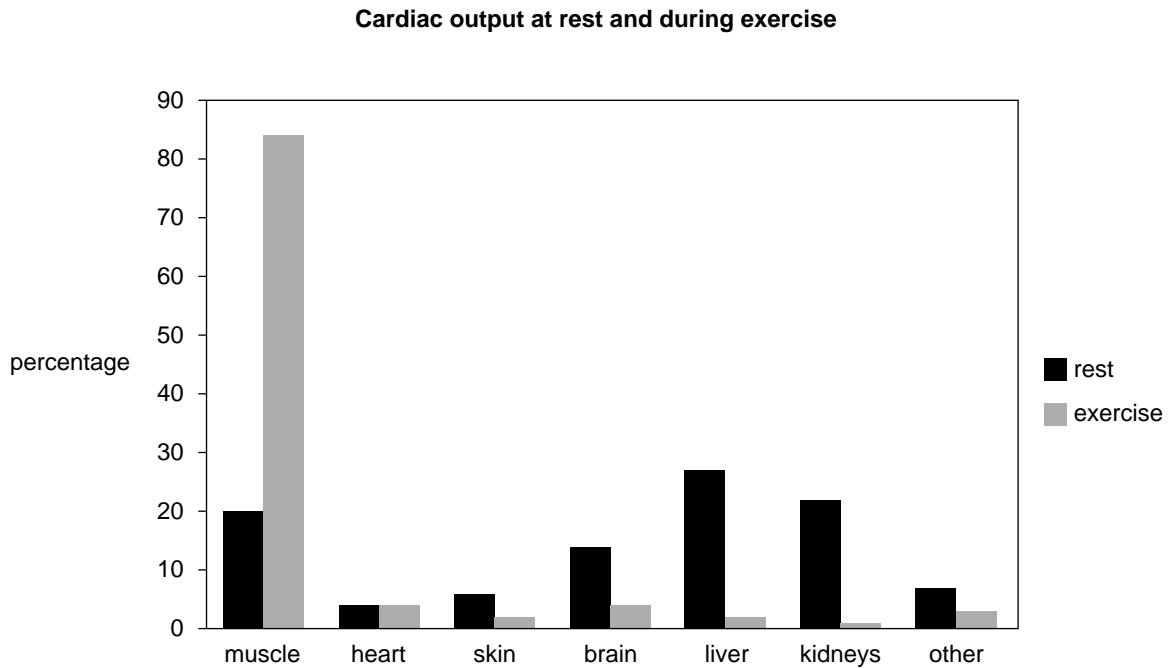
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**Question 10** (5 marks)

At the start of exercise there is a redistribution of blood flow away from organs to the working muscles, as shown in the graph below.



- a.** By referring to the data in the graph, explain why a redistribution of blood flow is needed during exercise. 3 marks

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- b.** Explain, physiologically, how this redistribution takes place. 2 marks

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**Question 11** (10 marks)

The table below shows one week of a training program that was designed to increase the aerobic fitness of a previously sedentary 18-year-old student.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30-minute run at 70% HR max.	rest	45-minute circuit	20-minute run at 70% HR max.	rest	60-minute bike ride at 70% HR max.	40-minute basketball game

- a. Does the program allow the student to meet Australia’s Physical Activity Guidelines? Justify your response with specific reference to each of the four guidelines. 4 marks

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- b. Identify two training principles that have been correctly implemented to achieve an increase in aerobic fitness. Provide evidence from the training program to support your answer. 4 marks

1. \_\_\_\_\_

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2. \_\_\_\_\_

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- c. According to the American College of Sports Medicine, each individual training session should include a warm-up, conditioning phase, cool-down and stretch.

What is the purpose of each of the following?

2 marks

- Warm-up \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- Cool-down \_\_\_\_\_

\_\_\_\_\_

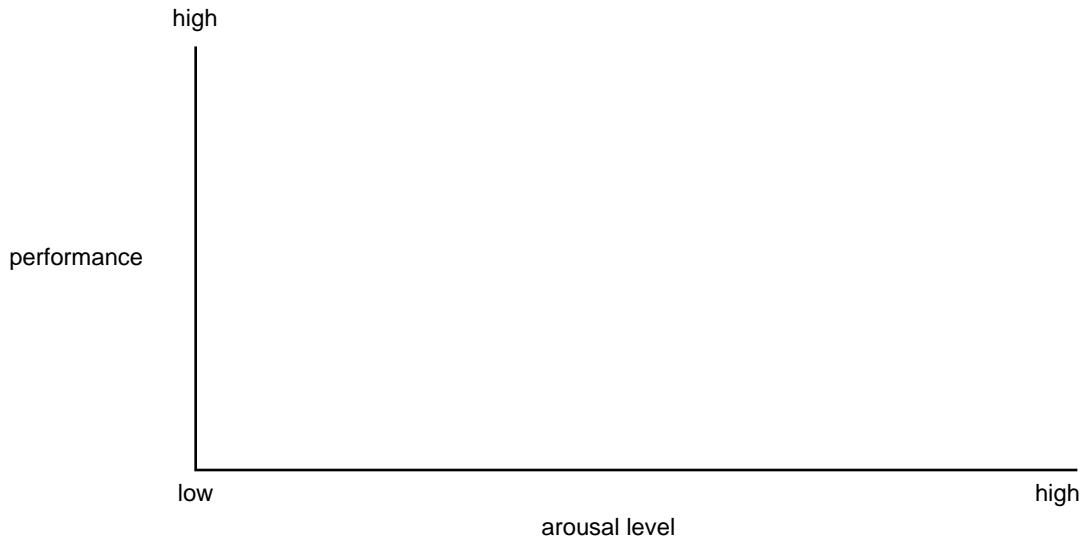
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**Question 12** (8 marks)

In September 2015, the Commonwealth Youth Games were held in Samoa. The Games were for athletes under 18 years of age. These athletes participated in a range of different sports, including archery and rugby sevens. In the archery event, arrows are shot from bows at targets over two hours. In the rugby sevens event, five high-intensity matches of 30-minutes duration are held over two days.

Arousal levels for both archery and rugby sevens need to be optimal.

- a. i. Draw and label **two** inverted U's to show optimal arousal for an athlete participating in archery and rugby sevens. 2 marks



- ii. Justify the placement of your inverted U's using examples from archery and rugby sevens. 2 marks

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Jemima was competing in archery for the first time. She was nervous, fidgeting and moving around in preparation for her competition.

Robyn was about to play her third rugby sevens match of the tournament. The first two matches were tough and the adrenaline had worn off. She felt tired and had hoped she would not have to play the third match.

- b. i.** On the graph in **part a.i.**, indicate with an X the level of arousal of each athlete at this time. 2 marks
- ii.** Outline one arousal regulation strategy for each sport in the table below. The strategies need to be different and need to be performed before the match. 2 marks  
An example has been provided for you.

<b>Archery</b>	<b>Rugby sevens</b>
<i>controlled/centred breathing – slow breathing used to relax, refocus and release tension</i>	<i>elevated breathing rate – increases the state of awareness</i>

**Question 13** (5 marks)

Source: [www.probatter.com/cricket.php](http://www.probatter.com/cricket.php)

Probatter is a computer program used in batting practice in elite-level cricket that shows opposition bowlers running up and then delivering the same types of balls that the batter will face in a match.

- a. Name the psychological strategy that the cricketers are using with this program. 1 mark

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In cricket, elite fast bowlers sprint approximately 20 m to the wicket before making an all-out effort to deliver the ball to the batsman. The bowler then walks back to the mark and bowls another ball. Each ball, including recovery, takes approximately 30 seconds to bowl and each over (six balls) takes approximately three to four minutes.

Bowlers deliver the ball at an average of 140 km/h during a test match, where they have to bowl approximately 20 overs in a day's play. When playing in the Twenty20 (T20), the average speed of delivery rises to 145 km/h as bowlers deliver a maximum of four overs in a match.

- b. Name the most likely cause of fatigue in a fast bowler. 1 mark

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- c. With reference to the fatigue and recovery mechanisms of the body, explain why bowlers can have a quicker average delivery speed in a T20 match than in a test match. 3 marks

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**Question 14** (8 marks)

Participation in physical activity generally poses little risk. When an athlete completes core strength training, the risk of injury is also lowered.

a. State two other benefits of completing core strength training to performance in sport. 2 marks

1. \_\_\_\_\_

2. \_\_\_\_\_

Core strength training can be completed without equipment or it can be undertaken with equipment such as stability balls, medicine balls and balance boards (shown below).



stability ball



medicine balls



balance board

Sources (from left): Ljupco Smokovski/Shutterstock.com;  
FrameAngel/Shutterstock.com; Halfpoint/Shutterstock.com

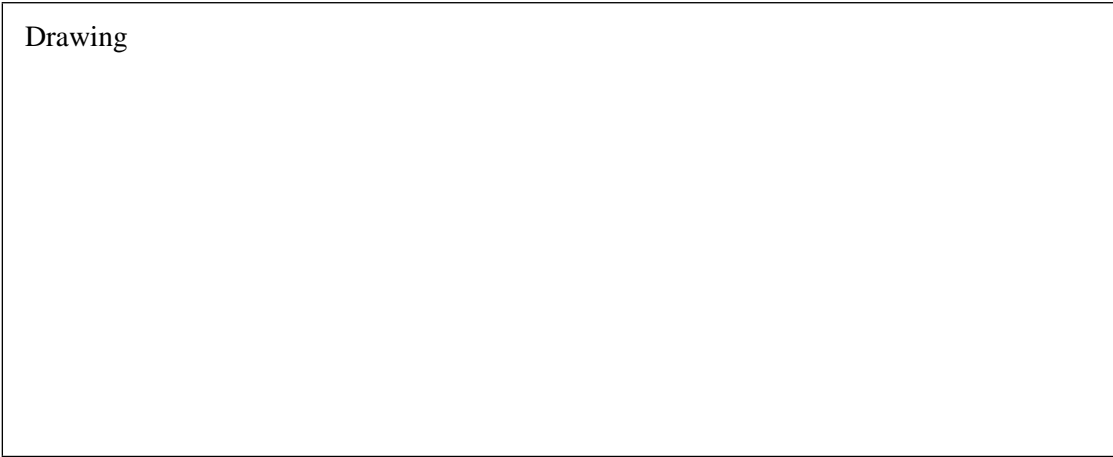
- b. Select **one** piece of equipment shown on page 26 and describe **or** draw a core exercise that uses the piece of equipment selected. 1 mark

Description \_\_\_\_\_

\_\_\_\_\_

**OR**

Drawing



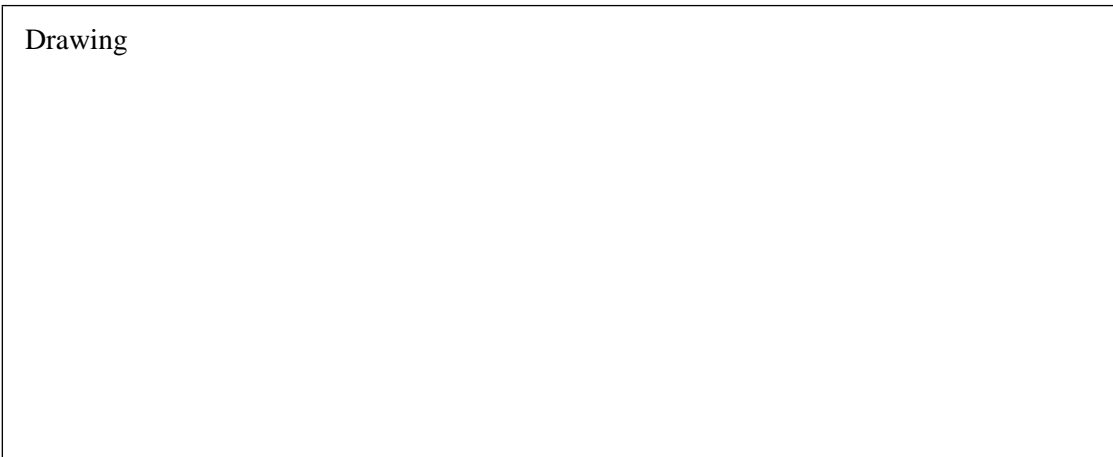
- c. Describe or draw an alternative exercise that will overload the same muscle or muscle groups that were used in **part b**. 1 mark

Description \_\_\_\_\_

\_\_\_\_\_

**OR**

Drawing



When an individual takes up resistance training for the first time, strength gains are made without the muscle gaining size (hypertrophy).

**Relative roles of neural and muscular adaptations in strength improvement**

Due to copyright restrictions,  
this material is not supplied.

Source: DG Sale, 'Neural adaptation to resistance training',  
in *Medicine and Science in Sports and Exercise*,  
vol. 20, no. 5, 1988, p. S142

- d.** Using the information provided in the graph above, explain, physiologically, why strength gains can be made without the muscle gaining size. 2 marks

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- e.** Other than muscular hypertrophy, identify one chronic adaptation to the muscular system that occurs as a result of anaerobic training. Explain the benefit of this change to the athlete. 2 marks

Chronic adaptation \_\_\_\_\_

Explanation \_\_\_\_\_

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