



OFFICE OF TASMANIAN
ASSESSMENT, STANDARDS
& CERTIFICATION

Tasmanian Certificate of Education
External Assessment 2017

PLACE YOUR CANDIDATE
LABEL HERE

SPORT SCIENCE

(SPT315113)

PART 1

Time: 60 minutes

Pages:	16
Questions:	5

Candidate Instructions

1. You **MUST** make sure that your responses to the questions in this examination paper will show your achievement in the criteria being assessed.
2. Answer **ALL** questions.
3. Answers must be written in the spaces provided on the examination paper.
4. You should make sure you answer all parts within each question so that the criterion can be assessed.
5. This examination is 3 hours in length. It is recommended that you spend approximately 60 minutes in total answering the questions in this booklet.
6. All written responses must be in English.

On the basis of your performance in this examination, the examiners will provide results on each of the following criteria taken from the course statement:

- Criterion 1** Demonstrate knowledge and understanding of the physiological aspects of exercise.
- Criterion 4** Analyse and interpret sport science related data and information.
- Criterion 5** Demonstrate knowledge and understanding of interrelationships between exercise physiology, skill acquisition and sport psychology.

Question 1

This question assesses **Criterion 1**.

A middle distance runner has a personal best time of 4:35.34 for the 1500m event.

- (a) (i) What is the predominant energy system used by this runner in this event? (1 mark)

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- (ii) Identify **ONE** by-product of the system identified in part (a). (1 mark)

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- (iii) What is the predominant fuel source for this event? (1 mark)

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- (b) (i) The runner has a high VO_2 Max and therefore has well developed cardiovascular endurance. Explain these **TWO** terms and their relationship. (3 marks)

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- (ii) Choose **ONE** suitable training method this runner could utilise and explain how this method may improve their VO_2 Max. (2 marks)

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Question 1 continues.

Question 1 (continued)

(c) Describe the production of ATP for this runner using the predominant energy system mentioned in part (a)(i).

(i) What is the name of the process? (1 mark)

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(ii) How is ATP produced during this event? (3 marks)

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Question 2

This question assesses **Criterion 1**.

Endurance training places a large amount of physiological stress on the human body, which may result in fatigue.

- (a) What type and colour is the muscle fibre that an endurance athlete is attempting to develop when training? (1 mark)

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- (b) Outline **TWO** major causes of fatigue an endurance athlete may experience, explaining why fatigue occurs. (2 marks)

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- (c) Explain Glycogen Sparing and how an endurance athlete may take advantage of this chronic training adaptation. (2 marks)

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Question 2 (continued)

- (d) (i) Complete the table below using chronic cardiovascular training effects **at rest** for an endurance athlete. (3 marks)

Chronic training effect at rest	Explanation of why it physiologically occurs
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- (ii) Outline the relationship between the training effects identified in the table above. (2 marks)

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- (e) Endurance training may result in athletes overtraining. What is overtraining and what are **TWO** physiological symptoms that an athlete may experience when they overtrain? (2 marks)

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Question 3

This question assesses **Criterion 1**.

The 1000 m Sprint Kayaking event is a sport held on calm water. The kayaker is seated, facing forward and uses a double-bladed paddle and pulls the blade through the water on alternate sides propelling the boat forward.



- (a) Using the image above, identify **TWO** fitness components required by the kayaker and justify your selection. (3 marks)

Fitness Component 1:

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Justification:

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Fitness Component 2:

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Justification:

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Question 3 continues.

Question 3 (continued)

- (b) Explain interval training. Outline **TWO** variables that the kayaker could change to vary an interval training session. (2 marks)

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- (c) What is **ONE** training principle that should govern the kayaker’s training program and justify your selection? (2 marks)

Training Principle:

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Justification:

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- (d) The kayaker may have to compete multiple times a day. Name **ONE** physiological recovery strategy that could be used throughout the competition and describe this strategy. (2 marks)

Strategy:

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Description:

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Question 3 (continued)

- (e) During recovery, the kayaker's heart rate remains elevated. Explain with reference to excess post-exercise oxygen consumption (EPOC), what is occurring physiologically during this process. (3 marks)

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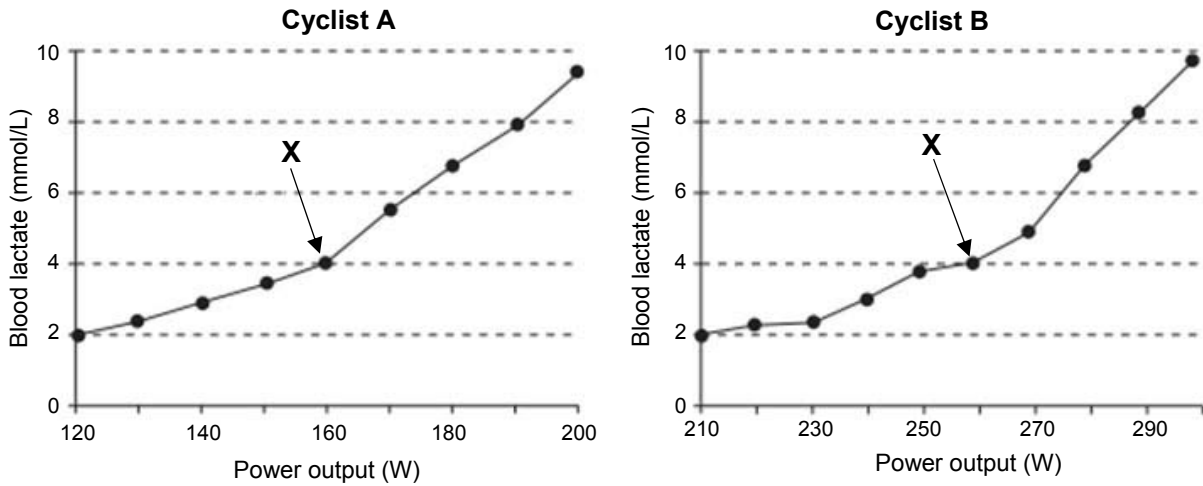
Question 4

This question assesses **Criterion 4**.

All answers to this question must make reference to the information that follows.

Two Cyclists, with the same body weight, participated in a stationary cycle test to the point of exhaustion, starting at an intensity that produced 2 millimoles per litre (mmol/L) of blood lactate. One Cyclist was aerobically trained and the other cyclist was untrained.

Changes in blood lactate concentration with increasing intensity of work on a stationary cycle to point of exhaustion



- (a) What was each cyclist’s blood lactate concentration and maximum power output at point of exhaustion: (2 marks)

Cyclist A:

Cyclist B:

- (b) What was each cyclist’s blood lactate concentration and power output when they reached their LIP (point X)? (2 marks)

Cyclist A:

Cyclist B:

- (c) Explain the relationship between blood lactate production and power output for Cyclist A and Cyclist B. (3 marks)

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Question 4 continues.

Question 4 (continued)

- (d) What would be the most likely effect on blood lactate if Cyclist A tried to maintain a power output of 170 Watts (W) for an extended time? (2 marks)

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- (e) Explain which of the two cyclists (A or B) was untrained by making reference to the graphs. (3 marks)

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PART 2

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Criterion 2 Demonstrate knowledge and understanding of the principles of skill acquisition.

Criterion 4 Analyse and interpret sport science related data and information.

Criterion 5 Demonstrate knowledge and understanding of interrelationships between exercise physiology, skill acquisition and sport psychology.

Question 6

This question assesses **Criterion 2**.

When learning a new motor skill athletes must detect one or more stimuli, process the information, perform the skill and receive feedback.

(a) Choose **ONE** of the following motor skills and outline the information processing model that is involved in each of the components below. (2 marks)

- catching a ball
- throwing a ball
- kicking a ball

Motor skill:

Sensory input:

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Processing:

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Output:

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Feedback:

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(b) Outline **TWO** factors that could affect an athlete learning a new skill. (2 marks)

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(c) Choose **ONE** motor skill and list its subroutines in the correct order. (2 marks)

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Question 6 continues.

Question 6 (continued)

- (d) (i) What stage of skill learning is a beginner in when learning a new motor skill? Identify **THREE** characteristics of this stage. (2 marks)

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- (i) Identify **TWO** changes that will occur when a beginner has progressed to the next stage of learning. (2 marks)

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- (e) When learning a new motor skill which type of practice would be best suited to developing the skill and justify your selection. (2 marks)

Type of practice:

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Justification:

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Question 7

This question assesses **Criterion 2**.

Decision making is a fundamental element of any sport, especially open, fast, dynamic team sports. Decision making takes place due to an input that is transferred into the different memory storage sites.

(a) List and describe the **THREE** different memory storage sites and for **EACH** site include:

- The length of time and amount of information that can be retained.
- Methods of increasing the efficiency of the site.
- A sporting example of your choice.

(6 marks)

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(b) How does selective attention increase an athlete's short term memory (STM) capacity? (1 mark)

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Question 7 continues.

Question 7 (continued)

- (c) Explain Hick's Law and the implications on an athlete's capacity to remember information. (2 marks)

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- (d) Explain how viewing video footage of a team/opponent may help an athlete to improve their spatial anticipation and take advantage of the Psychological Refractory Period (PRP). (3 marks)

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Question 8

This question assesses **Criterion 2**.

Improving biomechanics is one important way of enhancing athletic performance, minimising injuries and in turn, promoting longevity in the sport.

Select **ONE** skill you are familiar with:

- (a) (i) Give **TWO** examples of how having biomechanical knowledge could improve performance in the skill you have selected. (2 marks)

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- (ii) List the steps you would take to analyse the skill mentioned above to improve it biomechanically. (2 marks)

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- (b) Outline how senses can be utilised to perform the skill mentioned in part (a)(i) by providing **THREE** examples? (3 marks)

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Question 8 continues.

Question 8 (continued)

(c) Explain what a starter mechanism is, using any example. (2 marks)

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(d) Apply Newton's Second Law of Motion to a sporting example of your choice. (1 mark)

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(e) Explain how angle of release influences projectile motion, using any example. (2 marks)

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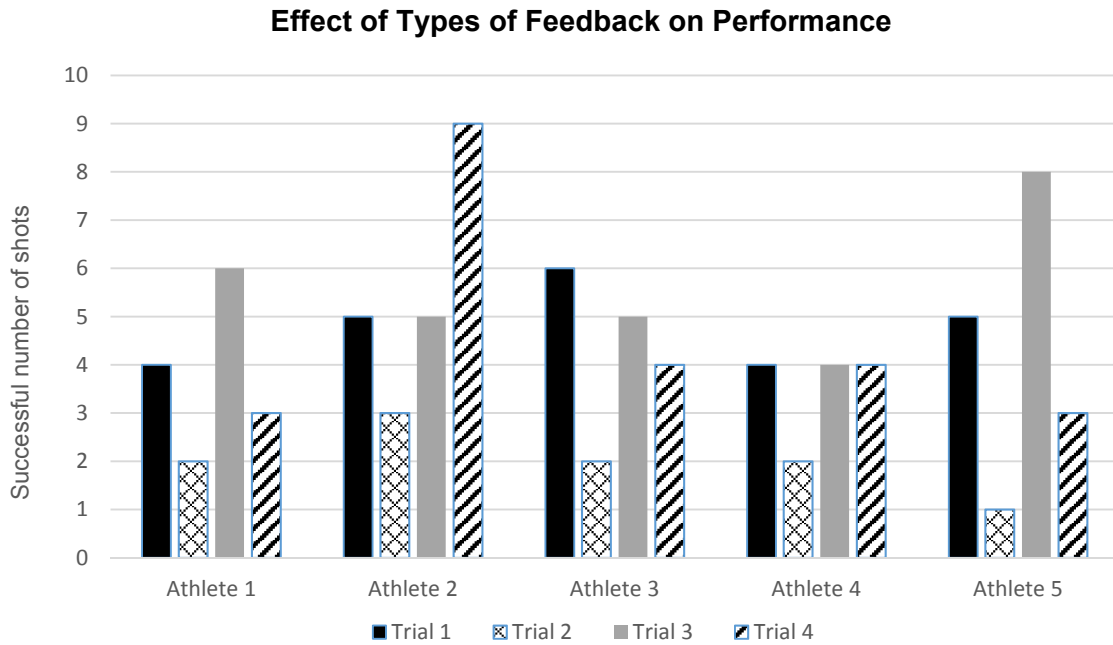
Question 9

This question assesses Criterion 4.

All answers to this question must make reference to the information that follows.

Five novice male basketballers (all with a blind-fold on) are instructed to take 10 shots from the free throw line at the hoop under different conditions.

- Trial 1: basketballers are given knowledge of performance after every shot (feedback is only given about the execution of the movement)
- Trial 2: basketballers are given knowledge of results after every shot (feedback about whether the ball went in or not)
- Trial 3: basketballers are given both knowledge of performance and knowledge of results
- Trial 4: no feedback is provided to the basketballers



(a) Which athlete/s performed best with: (2 marks)

Knowledge of performance:

Knowledge of results:

(b) Which athlete overall had the least amount of successful shots on all four trials? (2 marks)

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Question 9 continues.

Question 9 (continued)

- (c) Which athlete(s) performed better when they were given more than one type of feedback? (3 marks)

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- (d) Which athlete(s) performed the same or better when given no feedback? (2 marks)

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- (e) Compare all trials to determine which trial produced the best overall score. What does this suggest about the best type of feedback for basketballers based on these results? (3 marks)

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PART 3

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- Criterion 3** Demonstrate knowledge and understanding of psychological factors which influence athletic performance.
- Criterion 4** Analyse and interpret sport science related data and information.
- Criterion 5** Demonstrate knowledge and understanding of interrelationships between exercise physiology, skill acquisition and sport psychology.

Question 11

This question assesses Criterion 3.

Successful athletic performance depends on many factors, including the level of an athlete's arousal. Arousal is determined by psychological processes such as emotions and positive or negative thoughts.

- (a) The Inverted 'U' Hypothesis is one theory on arousal, explain this theory using a sporting example. (2 marks)

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- (b) How can you apply the Inverted 'U' hypothesis to achieve optimal arousal for fine and gross motor skills? (2 marks)

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- (c) Outline **ONE** coping strategy for **EACH** time period below that an athlete may use to maintain their optimal arousal level. (2 marks)

Prior to competition:

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During competition:

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Question 11 (continued)

- (d) Outline **TWO** techniques (**ONE** athlete directed and **ONE** coach directed) that can be implemented to assist an under aroused athlete. (2 marks)

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- (e) Explain the Catastrophe theory with reference to the terms 'arousal' and 'anxiety' using a sporting example of your choice. (4 marks)

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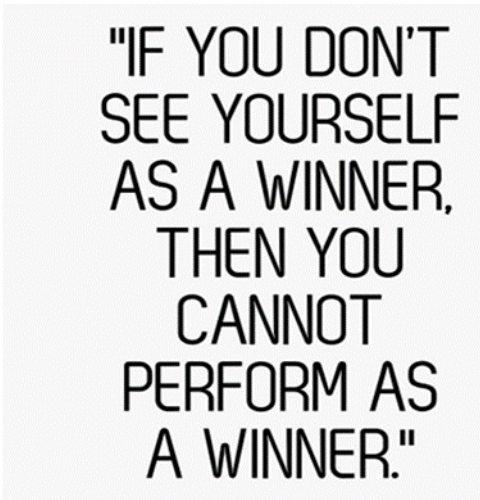
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Question 12

This question assesses Criterion 3.

As an athlete performing to the best of your ability, challenging yourself every training session is tough. The results are often not seen until months or even years of training. Therefore, it is critical for athletes to use different motivational techniques.



Source: Google images

- (a) The above image is an example of what athletes may use as a motivational technique. Identify **TWO** types of motivation this image is representative of and justify your selection. (4 marks)

Type of motivation:

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Justification:

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Type of motivation:

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Justification:

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Question 12 (continued)

- (b) How might using this type of motivational technique affect an athlete's self-confidence? (1 mark)

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- (c) 'If an athlete has good self-confidence in general, this may transfer across into their preparation and performance in a sporting event.'

Explain the concept that is referred to in the statement above and outline **TWO** antecedents that Bandura states would enhance the concept. (3 marks)

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- (d) (i) A high level of self-confidence may contribute to an athlete being better able to control their attention. Choose **ONE** sporting situation and discuss the appropriate attentional control necessary for optimal performance. (2 marks)

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- (ii) Explain a sporting situation where optimal attentional control may change. (2 marks)

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Question 13

This question assesses Criterion 3.

It has been stated that *'Athletic success is as much psychological as it is physical'*. It is critical that an athlete is aware of a range of psychological factors that could impact their performance.

(a) Explain how self-talk, mental rehearsal and concentration could either positively or negatively impact an athlete's performance. Provide a sporting example with **EACH** explanation.

(i) Self-talk (2 marks)

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(ii) Mental rehearsal (2 marks)

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(iii) Concentration (2 marks)

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(b) Outline **THREE** benefits of goal setting for an athlete. (3 marks)

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Question 13 continues.

Question 13 (continued)

- (c) When an athlete sets goals it is advisable that they adhere to a number of guidelines. Choose **THREE** guidelines an athlete could use and explain why each of these would be of benefit to an athlete of your choice. (3 marks)

Guideline 1:

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Guideline 2:

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Guideline 3:

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Question 14

This question assesses Criterion 4.

All answers to this question must make reference to the information that follows.

Three 17 year old female athletes (A, B and C) took part in three rounds of fitness tests to determine their motivation levels to perform. All three athletes had similar beginning fitness levels, height and weight. They completed the fitness tests under three different sets of conditions.

- Round (Rd) 1** Athletes completed all fitness tests in complete isolation from the other athletes with no external motivating factors (internal motivation only)
- Round (Rd) 2** All athletes competed against each other
- Round (Rd) 3** All athletes competed against each other, with friends/ family watching and an extrinsic reward of \$5 000 on offer for the best overall performing athlete.

Table 1 - Results for Three Athletes on a Series of Fitness Tests

Test	Athlete A			Athlete B			Athlete C		
	Rd 1	Rd 2	Rd 3	Rd 1	Rd 2	Rd 3	Rd 1	Rd 2	Rd 3
Beep Test (level and shuttle)	5.2	5.0	4.8	6.1	11.9	14.5	11.0	10.5	10.4
Vertical Jump (cm)	21.6	19.1	16.5	31.8	36.8	41.0	43.2	38.1	41.2
1RM Bench Press (kg)	10	10	10	7.5	10	15.5	10	7.5	7.5
Sit and Reach (cm)	-1	-1	-1	+6	+7.5	+8	+9.5	+9	+9.5
40m Sprint (secs)	8.2	8.0	7.9	6.1	5.5	5.5	6.0	6.2	6.4
Illinois Agility Test (secs)	24.9	25.8	26.7	24.0	20.8	17.7	19.9	18.5	19.1

Note: RM = Repetition Maximum - maximum amount of force that can be generated in one maximal contraction.

Based **ONLY** on the above information:

- (a) Which athlete achieved the highest result on the beep test and in which round did it occur? (1 mark)

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- (b) Which athlete achieved the lowest result on the Vertical Jump Test **and** in which round did it occur? (1 mark)

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- (c) How many seconds did Athlete A improve their 40m Sprint time by, from Round 1 to Round 3? (1 mark)

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Question 14 continues.

Question 14 (continued)

(d) Which athlete is likely to be motivated intrinsically? Provide **TWO** possible reasons why. (3 marks)

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(e) Which athlete performs best when extrinsic motivating factors are present? Provide **TWO** possible reasons why. (3 marks)

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(f) Which athlete appears to present as amotivated towards the series of fitness tests? Provide **TWO** possible reasons why. (3 marks)

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Question 15

This question assesses Criterion 5.

North Melbourne Australian Football League (AFL) player Brent Harvey announced his retirement from AFL football earlier this year after a record 432 matches with the club, across 21 years. He kicked 518 goals, won the North Melbourne Best and Fairest award 5 times and won 1 Grand Final. He was also chosen as a member of North Melbourne's Team of the Century (the best players at the club over the last 100 years), which indicates he is a very talented AFL footballer.

Discuss **TWO** interrelationships between how Brent was able to use psychological skills (**Sport Psychology**) to play elite level football for so long and maintain his high level of fitness (**Exercise Physiology**). (12 marks)

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Question 15 continues.

Question 15 (continued)

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Question 15 continues.

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