

SPORT SCIENCE

SPT315118

Section **A** Exercise Physiology

Pages: 20

Questions: 7

Preparation time for this exam: 15 minutes

Suggested working time: 60 minutes

Instructions:

- There are **four (4)** sections to this exam.
- Answer **all** questions and **all** items within each question.
- Write your answers in the spaces provided in this exam paper.
- The exam is **three (3) hours** in length. The suggested working time for this section is **approximately 60 minutes**.
- All answers must be written in **English**.
- You **must** make sure your answers address the listed criteria.

Marker use	
C1	/ 25
C2	/ 25
C5	/ 10

Guide to Exam Structure

	Questions available	Questions to answer	Suggested working time	Marks available
Section A	7	7	60 minutes	60 marks
Section B	4	4	45 minutes	45 marks
Section C	4	4	45 minutes	45 marks
Section D	3	2	30 minutes	30 marks
Totals	18	17	180 minutes (3 hours)	180 marks

Criteria

You **must** make sure your answers address:

- Criterion 1 describe and analyse physiological aspects of exercise
- Criterion 2 analyse and explain physiological responses to training and recovery
- Criterion 5 analyse and interpret sport science data and information.

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Question 1

Marker use

This question assesses **Criterion 1**.

Nina Kennedy is the current Commonwealth Games champion in the women's pole vault. Pole vault is an explosive event that requires many hours per week of specialist training. The start of the run up to the finish of the jump takes on average six (6) seconds.



Figure 1: Photo of pole vaulter Nina Kennedy facing the bar during a jump.

<https://www.abc.net.au/news/2022-07-18/australias-nina-kennedy-bronze-medal-pole-vault-world-titles/101246990>

a) What fuel source(s) would be the most utilised during a pole vault?

/1

b) Where is energy stored in an ATP molecule?

/1

c)

i. Which muscle fibre type would be most advantageous for the pole vault event?

/1

ii. Outline why you selected this muscle fibre type.

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Question 1 continues

Question 1 continued

Marker use

d) Outline **three (3)** chronic training effects a Pole Vaulter would experience.

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Question 2

Marker use

This question assesses **Criterion 1**.

Jenna O’Hea is the current captain of the Australian Opals women’s basketball side. Her improved form over the past several years has been attributed to an increase in fitness.

- a) Outline **two (2)** reasons why it would be advantageous for Jenna to have a high VO₂ Max.

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- b) Why is a relative VO₂ Max reading considered a better measure of aerobic fitness when compared to absolute VO₂ Max?

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- c) The lactic acid system would be utilised by Jenna at various times throughout a basketball game. Explain how an accumulation of lactic acid could be detrimental to Jenna’s performance.

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Question 2 continues

Question 2 continued

Marker use

- d) As Jenna sprints down the court, outline what is likely to happen to both her systolic and diastolic blood pressure readings.

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Question 3

Marker use

This question assesses **Criterion 1**.

Poland's Dawid Tomala won gold in the Men's 50 km race walk at the Tokyo Olympic Games in 2021 in a time of 3:50:08 in only his second race over the 50 km distance.

- a) List the predominant fuel source Dawid would use for a 50 km walk event and name the process by which it produces energy.

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- b) What role does myoglobin play in an event like race walking?

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- c) Explain how Dawid could manipulate his fat intake to improve his overall performance? Ensure you name this concept.

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- d) With an appropriate definition, describe when Dawid would reach his aerobic steady state.

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Question 3 continues

Question 3 continued

Marker use

- e) With reference to the Energy Continuum, explain how the energy systems would be utilised by Dawid throughout a 50 km race walk.

/3

Total
C1
/25

Question 4

Marker use

This question assesses **Criterion 2**.

Tony Reinmuth is an Australian powerlifter who is the current Australian record holder for the squat with a lift of 400 kg.



Figure 2: Photo of Tony Reinmuth squatting, surrounded by spotters.

<https://powerlifting.net.au/news/2017/05/29/mu-at-the-fitness-show-sydney/>

a)

- i. Name the most applicable component of fitness related to the back squat.

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- ii. Identify the way this fitness component would be measured.

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- b) Identify and define the most appropriate type of resistance training Tony would undertake.

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Identification:

Definition:.....

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Question 4 continues

Question 4 continued

Marker use

- c) Define tapering and describe how Tony might manipulate the variables of his training leading into a major competition.

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Question 5

Marker use

This question assesses **Criterion 2**.

Hobart's Rob Wilkinson is an Australian mixed martial artist (MMA) who competes in the light heavyweight division of the Professional Fighters League. MMA is a sport that requires its athletes to compete for three, 5-minute rounds.



Figure 3: Photo of Rob Wilkinson punching a competitor during an MMA fight.

<https://www.abc.net.au/hobart/programs/drive/rob-wilkinson/101714568>

- a) Identify the **three (3)** parts of a training session.

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- b) Part of Rob's preparation would involve flexibility training. Identify and describe **three (3)** different types of flexibility training.

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Question 5 continues

Question 5 continued

Marker use

- c) Define Lactate Threshold Training and outline why this would be an appropriate training method for Rob.

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- d) With an appropriate definition, describe why Rob would want to avoid the training principle of detraining.

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Question 6

Marker use

This question assesses **Criterion 2**.

Squash is a dynamic racquet sport requiring many changes of direction and quick movements. International matches are best of five (5) sets and can last over an hour in duration.



Figure 4: Photo of two (2) female squash players competing in front of an audience.

<https://squashmagazine.com/2020/01/gohar-or-go-home-nouran-gohar-and-ali-farag-capture-u-s-open-titles/>

- a) Plyometrics may be used as part of a squash player's overall training. What safety considerations need to be considered when engaging in plyometrics?

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- b) Define Excess Post-Exercise Oxygen Consumption (EPOC).

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Question 6 continues

Question 6 continued

Marker use

- c) Identify and describe what type of peaking would be most appropriate for a squash player.

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Identification:

Description:.....

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- d) Identify **four (4)** variables a squash player should consider when planning out their training year.

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- e) Due to its high intensity, lactic acid would be produced during a game of squash. Using percentage break down, what would be the fate of lactic acid after a squash game is completed?

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Total
C2
/25

Question 7

Marker use

This question assesses **Criterion 5**.

An elite level cyclist completes three (3) all out 10-minute efforts on a cycle ergometer on separate days. Day 1 they complete a 40-minute recovery on the bike at an intensity of 65% VO₂ Max. Day 2 they complete a 40-minute recovery on the bike at an intensity of 35% VO₂ Max. Day 3 the recovery consists of sitting on a chair for 40 minutes.

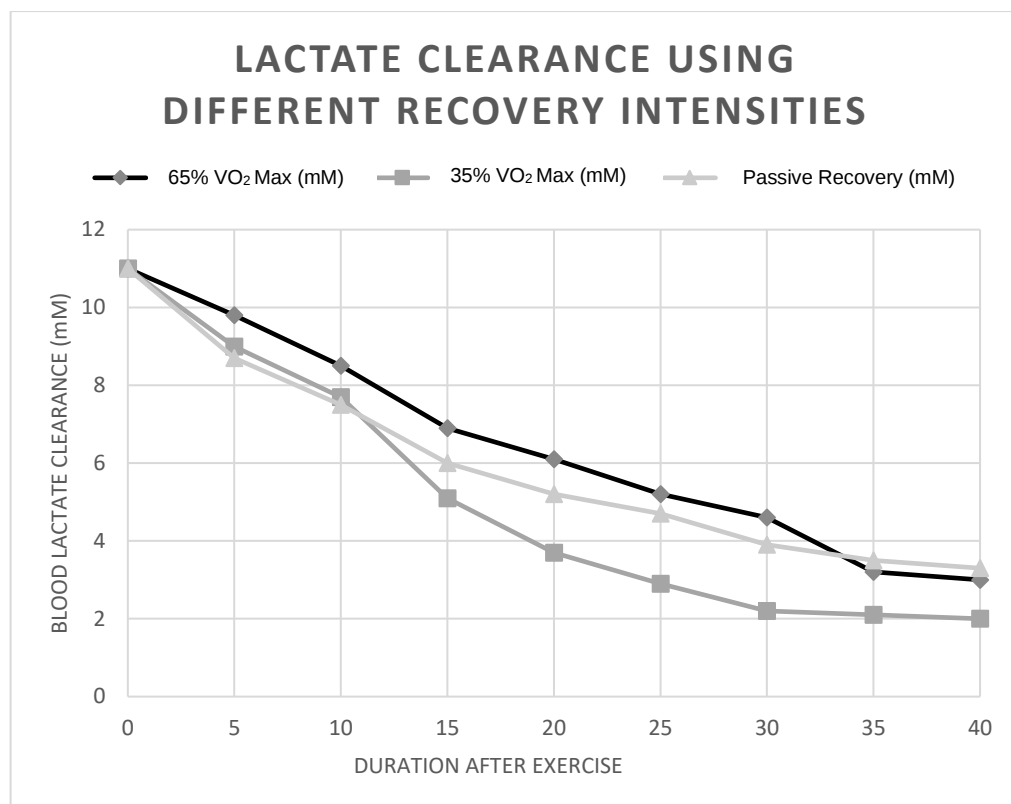


Figure 5: Graph of blood lactate clearance (mM).

Duration after Recovery (mins)	65% VO ₂ Max (mM)	35 % VO ₂ Max (mM)	Passive Recovery (mM)
0	11	11	11
5	9.8	9	8.7
10	8.5	7.7	7.5
15	6.9	5.1	6
20	6.1	3.7	5.2
25	5.2	2.9	4.7
30	4.6	2.2	3.9
35	3.2	2.1	3.5
40	3	2	3.3

Table 1

Question 7 continues

Question 7 continued

Marker use

- a) At what point in time on the graph did the 35% recovery method become the most effective at clearing lactate, and what was the blood lactate clearance at this point in time?

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- b) Using appropriate data, outline which recovery intensity would be most effective.

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- c) Using appropriate data, explain what is happening between the 30-to-35-minute time frame for the 65% intensity recovery regime and the passive recovery regime.

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Question 7 continues

Question 7 continued

Marker use

- d) In the first five (5) minutes of recovery, compare and contrast lactate clearance of the **three (3)** different recovery methods. Use data in your response.

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Total
C5
/10

End of Section A

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SPORT SCIENCE

SPT315118

Section **B** Skill Acquisition

Pages: 16

Questions: 4

Suggested working time: 45 minutes

Instructions:

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- Answer **all** questions and **all** items within each question.
- Write your answers in the spaces provided in this exam paper.
- The exam is **three (3) hours** in length. The suggested working time for this section is **approximately 45 minutes**.
- All answers must be written in **English**.
- You **must** make sure your answers address the listed criteria.

Marker use	
C3	/ 35
C5	/ 10

Guide to Exam Structure

	Questions available	Questions to answer	Suggested working time	Marks available
Section A	7	7	60 minutes	60 marks
Section B	4	4	45 minutes	45 marks
Section C	4	4	45 minutes	45 marks
Section D	3	2	30 minutes	30 marks
Totals	18	17	180 minutes (3 hours)	180 marks

Criteria

You **must** make sure your answers address:

- Criterion 3 analyse and discuss concepts of skill acquisition in sport
- Criterion 5 analyse and interpret sport science data and information.

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Question 8

Marker use

This question assesses **Criterion 3**.

Aussie Hoops is Basketball Australia's junior development program aimed at participants aged 5 to 10.

a) Define motor skill.

/1

b) Describe how a game of basketball could go from an open environment to a more closed environment.

/2

c)
i. Identify the stage of learning a beginner athlete would be in. Outline **three (3)** characteristics of this stage of learning.

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Stage of Learning:

Characteristics:

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Question 8 continues

Question 8 continued

Marker use

- ii. List **four (4)** key instructional points the coach needs to be aware of for athletes in the beginning stage of learning.

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- d) Explain how a young basketballer's focus on anticipation could have a negative effect on the team's performance and provide an example.

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Question 9

Marker use

This question assesses **Criterion 3**.

Oscar Piastri is an Australian racing driver currently competing in Formula One (F1) for McLaren. After being a reserve driver throughout 2022, he made his official F1 debut in 2023.



Figure 6: Photo of Oscar Piastri in his Formula One car.

<https://www.autoweek.com/racing/formula-1/a43465112/why-f1-australian-grand-prix-fans-are-all-in-for-oscar-piastri/>

- a) In order to make it to Formula One, Oscar would have spent many hours practising and refining his skills. List and outline **two (2)** factors that would have affected his ability to acquire the skills necessary to perform at this level.

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- b) Identify the most important sense needed to perform in F1 motor racing. Detail how this sense would be utilised in motor racing.

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Question 9 continues

c)

- i. During a race Oscar receives information via radio from his pit crew about the quality of his turns and timing of his laps. List all the ways this feedback could be classified.

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- ii. If Oscar received too much information from his pit crew, this might be an example of what?

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- d) Define schema and explain how it could be applied to the sport of F1 motor racing.

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Question 9 continued

Marker use

- e) If Oscar's car travels at an average 210 km/hr, how far can it travel in two (2) hours?

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- f) The shape of Oscar's car is designed to be as streamlined as possible. What does this reduce?

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Exam continues over the page

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Question 10

Marker use

This question assesses **Criterion 3**.

Minjee Lee is Australia's highest ranked golfer on the Ladies PGA tour.

- a) In terms of projectile motion, what would Minjee have to take into consideration if she was to hit a golf shot from an elevated position?

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- b) What is Newton's first law of motion and how could it be applied to the game of golf?

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Definition:.....

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Application:

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- c) It would be important for Minjee to receive feedback about her golf swing to keep on improving and contend for major titles. List and outline the **four (4)** main roles of feedback.

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Question 10 continues

Question 10 continued

Marker use

- d) Prior to completing a golf shot, identify **four (4)** input factors relating to golf that Minjee may take into consideration.

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e)

- i. Identify **two (2)** observation techniques that would play an important part in analysing a golf swing.

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- ii. Outline an advantage of each observation technique you have listed.

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Technique 1:.....

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Technique 2:.....

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- f) How can Minjee ensure optimal balance when playing a golf shot?

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Total
C2
/35

Question 11

Marker use

This question assesses **Criterion 5**.

The coach of a talented 12-year-old shot putter wanted an indication of the athlete's upper body strength and power. The athlete completed a 5-set bench press protocol measuring average distance covered by the barbell, average power generated by the athlete on the barbell and the average velocity of the barbell. The weight on the bar started at 20 kg and gradually increased by 5 kg each set.

Set	Reps	Load (kg)	Distance (Barbell) (cm)	Power (watts)	Average Velocity m/s
1	5	20	43	176	0.88
2	5	25	39	183	0.74
3	5	30	41	195	0.66
4	4	35	42	186	0.54
5	3	40	49	160	0.41

Table 2

a) How many total reps did the athlete complete?

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b) Describe the relationship between average velocity and load lifted over the course of the five (5) sets. Use data to support your answer.

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Question 11 continues

Question 11 continued

Marker use

- c) At what load should the athlete train if they were wanting to develop upper body power? Use data to support your answer.

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- d) What is the total distance covered by the barbell in this bench press protocol across all five (5) sets? Show your calculations.

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- e) What is the average power output being generated over the five (5) sets? Show your calculations.

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Total
C5
/10

End of Section B

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SPORT SCIENCE

SPT315118

Section **C** Sport Psychology

Pages: 16
Questions: 4

Suggested working time: 45 minutes

Instructions:

- There are **four (4)** sections to this exam.
- Answer **all** questions and **all** items within each question.
- Write your answers in the spaces provided in this exam paper.
- The exam is **three (3) hours** in length. The suggested working time for this section is **approximately 45 minutes**.
- All answers must be written in **English**.
- You **must** make sure your answers address the listed criteria.

Marker use	
C4	/ 35
C5	/ 10

Guide to Exam Structure

	Questions available	Questions to answer	Suggested working time	Marks available
Section A	7	7	60 minutes	60 marks
Section B	4	4	45 minutes	45 marks
Section C	4	4	45 minutes	45 marks
Section D	3	2	30 minutes	30 marks
Totals	18	17	180 minutes (3 hours)	180 marks

Criteria

You **must** make sure your answers address:

- Criterion 4 examine and discuss how sport psychology influences athletic performance
- Criterion 5 analyse and interpret sport science data and information.

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Question 12

Marker use

This question assesses **Criterion 4**.

Australian Rugby Union team the Wallabies play the New Zealand All Blacks annually for the Bledisloe Cup. Australia have not held the trophy since 2002.

- a) Provide an example of a coping strategy that may be applied to team sports such as Rugby Union.

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- b) Identify and outline **two (2)** ways in which goal setting could benefit the Wallabies.

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- c) The All Blacks have an excellent record away from New Zealand. Outline **two (2)** strategies they may have put in place to help deal with a hostile crowd.

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Question 12 continues

Question 12 continued

Marker use

- d) Outline **two (2)** examples of internal stressors the Wallabies coaching staff may have experienced over the last 20 years as a result of not beating the All Blacks.

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- e) Define state anxiety. Explain how this may impact the Wallabies.

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Question 13

Marker use

This question assesses **Criterion 4**.

CrossFit is a sport that requires its athletes to be mentally and physically strong. In competition, CrossFit athletes are asked to perform tasks they may not have performed before.



Figure 7: Photo of a female CrossFit competitor lifting a barbell over her head.

<https://www.crossfit.com/essentials/magic-ultimate>

- a) When competing in any event in CrossFit it would be desirable for athletes to be in Flow State. Define Flow State.

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- b) A CrossFit athlete wanting to give up the sport due to injuries, poor form and lethargy might be an example of what?

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Question 13 continues

Question 13 continued

Marker use

- c) List and outline **four (4)** pre-competition strategies the CrossFit athletes would have planned for prior to arriving at the competition venue.

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- d) With an appropriate definition, explain why a CrossFit athlete may use instant pre-play prior to executing an exercise like an overhead press (refer to Figure 7).

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Definition:.....

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Application:

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- e) Provide a CrossFit example of a **process goal** and an **outcome goal**.

i. Process goal:

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ii. Outcome goal:

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Question 13 continues

Question 13 continued

Marker use

- f) Provide a reason why it is important to set process goals and not just outcome goals.

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Exam continues over the page

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Question 14

Marker use

This question assesses **Criterion 4**.

Peter Bol is an Australian middle distance runner who has overcome adversity in 2023 when faced with an incorrect positive drug test. Peter was unable to compete for a short period of time until his ban was lifted. Peter may have had a lot of self-doubt after his initial positive drug test.

- a) After a positive drug test, Peter would need a lot of self-determination. Identify and outline **two (2)** innate needs as stated in the Self Determination Theory.

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- b) List **four (4)** extrinsic motivators Peter may use to compete at the elite level.

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- c)
- i. With reference to the Inverted U Hypothesis, describe how being over aroused could affect Peter's performance.

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Question 14 continues

Question 14 continued

Marker use

- ii. List **four (4)** strategies Peter could engage in to lower his arousal levels on the morning of his race.

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- d) List **two (2)** antecedents of self-efficacy. Outline how the absence of these antecedents could have negatively contributed to Peter's performances after the positive drug test.

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- e) Describe how Peter's attentional focus may change from an individual training session to the first 100 metres of a competition 800 metre race.

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Total
C4
/35

Question 15

Marker use

This question assesses **Criterion 5**.

A study was performed on a group of 12 female college students looking at the effects of motivational music, visualisation and a pep talk from a coach on their ability to maintain an isometric muscular endurance task. The task required participants to hold dumbbells in a crucifix position for as long as possible.

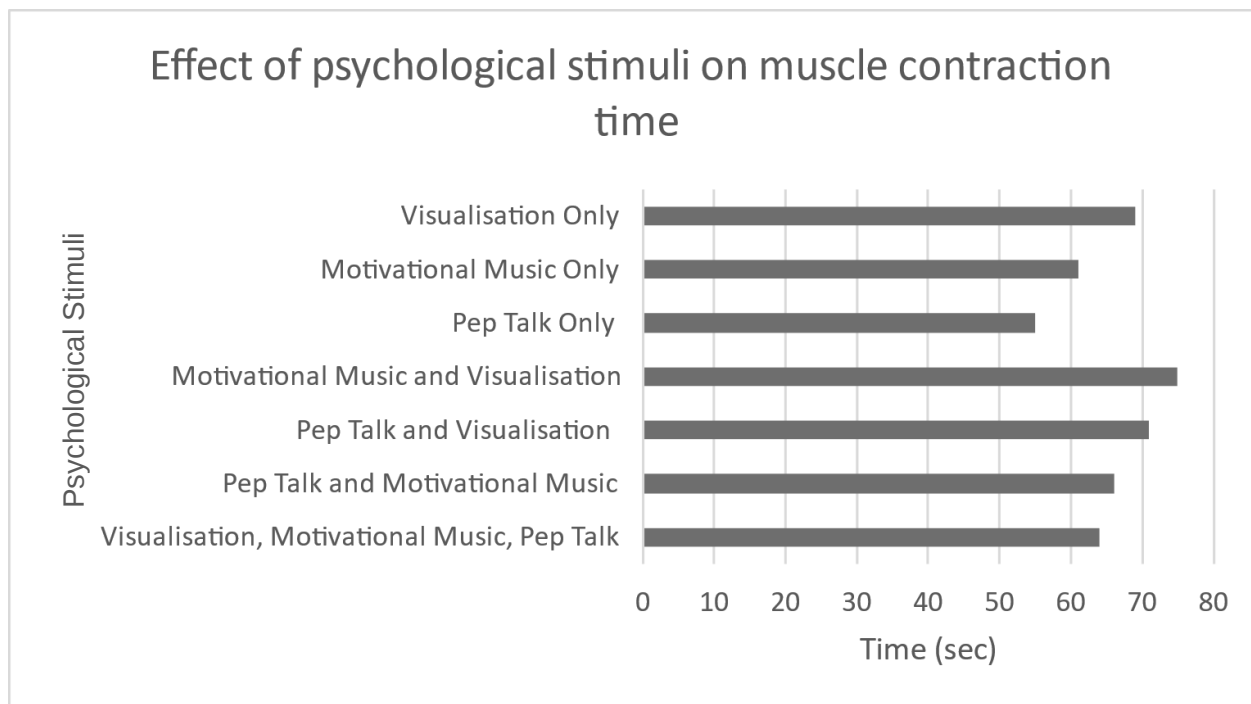


Figure 8: Graph of the effect of psychological stimuli on muscle contraction time.

- a) Using appropriate data, rank the least effective stimuli to the most effective stimuli.

Least.....

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Most.....

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Question 15 continues

Question 15 continued

Marker use

- b) According to Figure 8, explain, using comparative data, why a pep talk is considered the least effective strategy.

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- c) With the use of appropriate data, outline which result may be considered an anomaly.

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- d) By including **all** situations in which motivational music was used as a stimuli, calculate the average time of the isometric hold of the dumbbells.

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Total
C5
/10

End of Section C

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Section **D** Cross-Discipline Links

Pages: 16

Questions: 3

Suggested working time: 30 minutes

Instructions:

- There are **four (4)** sections to this exam.
- Answer **two (2) questions only** in this section.
- Write your answers in the spaces provided in this exam paper.
- The exam is **three (3) hours** in length. The suggested working time for this section is **approximately 30 minutes**.
- All answers must be written in **English**.
- You **must** make sure your answers address the listed criteria.

Marker use	
C6	/ 30

Guide to Exam Structure

	Questions available	Questions to answer	Suggested working time	Marks available
Section A	7	7	60 minutes	60 marks
Section B	4	4	45 minutes	45 marks
Section C	4	4	45 minutes	45 marks
Section D	3	2	30 minutes	30 marks
Totals	18	17	180 minutes (3 hours)	180 marks

Criteria

You **must** make sure your answers address:

- Criterion 6 examine and discuss cross-discipline links.

Blank Page

Question 16

This question assesses **Criterion 6**.

Earlier this year in one of the most sensational transfers of recent times, Portuguese star soccer player Cristiano Ronaldo moved to Saudi club Al-Nassr. Prior to his signing with Al-Nassr he had been playing at Manchester United where his form was poor and he was not in the starting 11.

Use **two (2)** cross discipline links between **sport psychology** and **skill acquisition** that will explain how Cristiano can find his best form at his new club.

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Question 16 continues

Question 16 continued

Marker use

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Question 16 continues

Question 16 continued

Marker use

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Question 16 continues

Question 16 continued

Marker use

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Question 17

Marker use

This question assesses **Criterion 6**.

Madison de Rozario is an Australian Paralympic athlete and wheelchair racer who specialises in middle and long-distance events. Madison holds the world record in the women's 800m and previously held the record in the women's 1500m.

Use **two (2)** cross discipline links between **sport psychology** and **exercise physiology** to demonstrate how her overall fitness and psychological preparation can positively impact her training prior to the upcoming Australian championships.

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Question 17 continues

Question 17 continued

Marker use

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Question 17 continues

Question 17 continued

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Question 17 continues

Question 17 continued

Marker use

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Question 18

Marker use

This question assesses **Criterion 6**.

No matter which sports they compete in, athletes will always try to gain an advantage over their opponents by improving their physical condition and their skill execution.

Select an athlete or team, specify their sport, and use **two (2)** cross-discipline links between **Exercise Physiology** and **Skill Acquisition** to demonstrate how they can improve their performance.

My sport is:.....

My athlete and/or team is:.....

You may wish to consider a specific scenario: e.g., lead up to a major match/competition, during pre-season; returning to a team after being 'dropped'/injured, etc.

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Question 18 continues

Question 18 continued

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Question 18 continues

Question 18 continued

Marker use

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Question 18 continues

Question 18 continued

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