

SPORT SCIENCE

SPT315118

Section **A** Exercise Physiology

Pages: 20
Questions: 7

Preparation time for this exam: 15 minutes

Suggested working time: 60 minutes

Instructions:

- Answer **all** questions and **all** items within each question.
- Write your answers in the spaces provided in this exam paper.
- The exam is **two (2) hours and thirty (30) minutes** 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

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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
Totals	15	15	150 minutes (2.5 hours)	150 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.

Question 1

Marker use

This question assesses **Criterion 1**.

Queensland teen sensation Gout Gout has made a remarkable impact on the athletics track competing in both the 100 m and 200 m sprint events.



Figure 1

- a) The 100 m sprint is over in approximately 10 seconds. Gout would utilise stored ATP molecules as a source of immediate energy for the 100 m. What is ATP and how does it provide this immediate energy source?

/2

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- b) State the predominant muscle fibre type used by Gout and list **three (3)** characteristics of it.

/2

Muscle fibre type:

Characteristic 1:

Characteristic 2:

Characteristic 3:

Question 1 continues

Question 1 continued

Marker use

- c) Complete Table 1 as it relates to **two (2)** different athletic events.

Characteristic	400 m	Marathon
	Male Olympic Record (OR): 43.03 secs Female OR: 48.17 secs	Male OR: 2 hr 6 mins 26 secs Female OR: 2 hr 22 mins 55 secs
Predominant energy system		
Fuel source		
Limiting factors		
Duration of energy supply		

Table 1

/3

Total
Q1
/7

Question 2

Marker use

This question assesses **Criterion 1**.

In touch football, the aim is to score more touchdowns than the opposing team.

Players 'tag' or touch opposition players instead of tackling them whilst the attacking team aims to evade these touches.



Figure 2

- a) List **two (2)** acute cardiovascular and **two (2)** acute respiratory responses to exercise that the touch football players would experience.

/2

Acute cardiovascular

1.

2.

Acute respiratory

1.

2.

- b) Explain how the **three (3)** energy systems would interplay in their contributions to the touch football player's game.

/3

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Question 2 continues

Question 2 continued

Marker use

- c) The touch football players would need to utilise energy produced from the Krebs Cycle (KC) and Electron Transport System (ETS). Provide an outline of how the KC and ETS produce energy.

/3

Total
Q2
/8

Question 3

Marker use

This question assesses **Criterion 1**.

Grace Tame is the first solo woman to complete the Bruny Island Ultra (64 km) race in under 5 hours, breaking her own record in 4 hours 51 minutes and 52 seconds.



Figure 3: Grace Tame's Strava run (left) and running the Bruny Island Ultra (right).

- a) If Tame theoretically were to weigh 54 kg and her oxygen consumption was 3.8 litres per minute, calculate her:

Absolute VO_2 max

Relative VO_2 max

- b) For this endurance event, Tame would need to minimise the accumulation of lactate in her blood and muscles. Describe **two (2)** ways she would achieve this:

1.

2.

/2

/2

Question 3 continues

Question 3 continued

Marker use

c) Define 'hitting the wall' and explain how Tame would avoid this.

/2

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d) Tame would have developed a very high VO₂ max as a result of her training. Name and briefly explain **four (4)** factors that affect an individual's VO₂ max.

/4

Factor	Explanation
1.	
2.	
3.	
4.	

Table 2

Total
Q3

/10

Total
C1

/25

Question 4

Marker use

This question assesses **Criterion 2**.



Figure 4

A hockey game consists of 4 x 15-minute quarters. Players need to train for both skills and fitness aspects of the sport.

- a) For a typical training session, describe the purpose of the warm up and give **one (1)** example of a skill development aspect of the session.

Warm up purpose:

.....

Skill development example:

.....

- b) Explain how the hockey players could utilise the principles of **specificity**, **intensity** and **variety** in their training:

Specificity:

.....

.....

Intensity:

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.....

Variety:

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.....

/2

/3

Question 4 continues

Question 4 continued

Marker use

- c) The **pre-season** phase of the training year consists of the **general** and **specific preparation** phases. Explain what the hockey team would do in each of these phases.

/2

General preparation:

.....

.....

Specific preparation:

.....

.....

Total
Q4
/7

Question 5

Marker use

This question assesses **Criterion 2**.

Soccer coaches use a variety of training methods to achieve the best outcomes for the fitness and skills of their players.



Figure 5

- a) Following a game, the soccer players may experience **delayed onset muscle soreness (DOMS)**. Explain what **DOMS** is.

/1

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- b) Select **one (1)** skill-related component of fitness and explain why it would be important for the soccer players to develop.

/2

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- c) Soccer players may use **resistance training** with a focus on **progressive overload**. Give a practical example of how this might look.

/2

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Question 5 continues

Question 5 continued

Marker use

- d) At the half time break, the soccer player would experience alactacid debt. What happens during this time in relation to **ATP** and **PC stores**, **myoglobin** and **haemoglobin**?

/3

ATP and PC stores:

.....

Myoglobin:

.....

Haemoglobin:

.....

Total
Q5
/8

Question 6

Marker use

This question assesses **Criterion 2**.

The cycling race 'Tour of Tasmania' takes place over three days including the following:

- day 1: 54 km criterium
- day 2: 118 km road race plus 4.5 km individual time trial
- day 3: 82 km road race.



Figure 6

This year, cyclists rode a total of 258 km with the winner taking 6 hours and 11 minutes.

- a) At the conclusion of days 1 and 2 (176.5 km of racing), it would be vital to ensure recovery is as effective as possible for the following day. Explain **two (2)** recovery strategies the cyclists may use to aid their performance.

/2

Recovery strategy 1:

.....

Recovery strategy 2:

.....

- b) In the lead up to the Tour of Tasmania, cyclists would utilise **tapering** in an attempt to **peak** for the competition. Explain these **two (2)** bolded terms.

/2

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Question 6 continues

Question 6 continued

Marker use

- c) Cyclists would be recommended to follow nutritional replenishment protocols regarding what they eat and drink. What would be suggested, and in what time frame should this take place?

/3

- d) Due to the duration and intensity of this event, lactic acid will have accumulated in the blood and muscles. Explain the fate of this by-product.

/3

Total
Q6
/10

Total
C2
/25

Question 7

Marker use

This question assesses **Criterion 5**.

Sport Scientists collect data on players on game day and in the training week that follows. This data is then analysed to identify workload patterns, intensity levels and potential areas for improvement.

Figure 7 depicts data from five selected players:

Table of Player Data from Athlete Management System – week 14 out of 22 – Competition Phase

Player	Game day data 12 July			Daily questionnaire data (averaged from 13-18 July)				Week training data 13-18 July		
	GPS tracking distance (km)	Athlete RPE	Game time (minutes)	Sleep quality	Fatigue rating	Stress level	General muscle soreness	GPS tracking distance (total, km)	Athlete RPE (average)	Training time (total, minutes)
Amelia	12.3	9	80	10	2	3	3	15.3	6	200
Harriet	8.4	8	62	9	2	5	4	10.6	7	120
Jade	6.7	7	52	7	8	5	6	22.2	9	240
Lulu	10.3	9	75	9	7	6	6	30.7	8	320
Meg	4.0	10	28	6	1	8	9	5.0	3	80

Key:

Averages for week (player rating out of 10)

Sleep Quality: (1 = very poor, 10 = excellent)

Fatigue Rating: (1 = no fatigue, 10 = extremely fatigued)

Stress Level: (1 = no stress, 10 = extremely stressed)

General muscle soreness: (1 = no soreness, 10 = extremely sore)

Athlete RPE (Rate of perceived exertion): (1 = little effort, 10 = maximal effort)

Figure 7

a) Which players ran the following in the week 12–18 July (**game and training**)?

Use data in your response.

The furthest distance:

.....

The least time:

.....

/2

Question 7 continues

Question 7 continued

Marker use

- b) Using the data, select the player who was injured during the match and has been managing a muscular injury for the week. Provide **two (2)** pieces of evidence for your choice.

/2

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- c) Which player do you believe to be working hard in training to improve their cardiovascular endurance? Use data to back up your reasoning.

/2

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- d) Which player is likely to have the best **aerobic** fitness in the team? Explain your choice using **two (2)** pieces of data.

/2

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- e) Using the data available, if you were the Sport Scientist for the team, what **two (2)** recommendations would you take to the coach?

/2

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Total
Q7/C5
/10

Acknowledgements

Sources:

Figure 1: <https://www.theguardian.com/sport/2025/mar/15/unruffled-unstoppable-gout-gouts-sparkling-summer-continues-with-100m-title-in-brisbane>

Figure 2: <https://www.examiner.com.au/story/8091069/keeping-in-touch-with-youth/>

Figure 3: Left: Instagram @tamepunk 5 December 2024;

Right: <https://www.abc.net.au/listen/programs/hobart-mornings/grace-tame-first-woman-run-bruny-island-ultra-in-under-five-hrs/104688484>

Figure 4: <https://www.adelaidenow.com.au/>

Figure 5: https://websites.mygameday.app/assoc_page.cgi?client=1-10178-0-0-0&sID=317230&&news_task=DETAIL&articleID=33642397

Figure 6: <https://provelosuperleague.com/events/tasmania>

Figure 7: This figure and data were created specifically for the SPT315116 Sports Science exam paper.

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:

- Answer **all** questions and **all** items within each question.
- Write your answers in the spaces provided in this exam paper.
- The exam is **two (2) hours and thirty (30) minutes** 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
Totals	15	15	150 minutes (2.5 hours)	150 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**.

19-year-old Sam Konstas made his test debut for Australia by smashing 60 runs off 65 balls in the Boxing Day test match in December 2024. He went on to play in the test match in January but was soon after released from the Australian squad to return to play in the Sheffield Shield for New South Wales.



Figure 8

- a) Konstas is on the fringe of selection to the Australian squad. When playing for his state, he will need to consolidate his skills through both **fixed** and **varied** practice. Explain how Konstas might utilise these **two (2)** types of practice.

/3

Fixed practice:

.....

.....

Varied practice:

.....

.....

- b) Which of these types of practice (in **part a**) might be more useful to Konstas?

Explain why you think this is the case.

/2

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.....

Question 8 continues

Question 8 continued

Marker use

- c) Konstas would be provided with feedback about his performance from his coach.

List the **four (4)** roles of feedback.

/2

1.

2.

3.

4.

- d) List **two (2)** factors which would affect the projectile motion of a cricket ball in flight.

Factor 1:

Factor 2:

/1

- e) When standing at the crease, ready to face a ball, Konstas bends his knees and stands with his feet apart. Explain this basic stance with reference to **two (2)** factors affecting his balance.

/2

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Total
Q8
/10

Question 9

Marker use

This question assesses **Criterion 3**.

The Australian Diamonds netball team have the 2026 Commonwealth Games and 2027 Netball World Cup coming up. The Diamonds have training camps together for extended periods of time as players come from their regional teams from all around Australia.



Figure 9

Part of this training camp time is spent getting to know each other, how each person plays and forms a part of the team.

- a) **Selective Attention** is an important aspect of team play. Explain **two (2)** things a coach can do to help improve a player's Selective Attention.

/2

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- b) Explain the importance of **two (2)** different senses for the netball players.

/3

Sense 1:

.....

Sense 2:

.....

Question 9 continues

Question 9 continued

Marker use

- c) Define Schema and explain how the netball players would develop it together.

/3

- d) Explain how the following would influence a netball player's Reaction Time:

/4

Hick's Law:

Signal Detection:

Total
Q9
/12

Question 10

Marker use

This question assesses **Criterion 3**.

Scotty James is an Australian halfpipe snowboarder who is a 4 x Olympian (2010, 2014, 2018 and 2022). The event involves performing stunts or tricks whilst snowboarding down the half pipe slope.

He achieved a bronze medal in 2018 and a silver medal in 2022. His goal is an Olympic gold.



Figure 10

- a) Even though James has been boarding for many years, when he wants to introduce a new trick or move into his routine, aspects of his performance would return to the cognitive stage of learning. Identify **four (4)** characteristics of this stage of learning.

/2

1.
2.
3.
4.

- b) Explain how James's routine would be transferred from his Short Term Sensory Storage (STSS) through to his Short and Long Term Memory .

/3

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-
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Question 10 continues

Question 10 continued

Marker use

c) Describe **two (2)** factors which could interfere with the memory process.

/3

Factor 1:

.....

Factor 2:

.....

d) James receives extrinsic scores (in the form of numbers) from the judges at the end of his snowboarding run. Explain what type of feedback this is in relation to the:

/2

i. Nature of the feedback:

.....

ii. Timing of the feedback:

.....

e) Classify and briefly explain one of James's snowboarding runs in terms of:

/3

i. Movement precision:

.....

ii. Type of movement:

.....

iii. Environmental predictability:

.....

Total
Q10

/13

Total
C3

/35

Question 11

Marker use

This question assesses **Criterion 5**.

The following is an analysis of the men's 100 m final of the 2017 World Athletics Championship.

100 m Sprint Results

Athlete	Reaction Time (seconds)	0-10m	10-20m	20-30m	30-40m	40-50m	50-60m	60-70m	70-80m	80-90m	90-100m	Overall Time (seconds)
Gatlin	0.138	1.74	1.02	0.91	0.90	0.88	0.86	0.86	0.87	0.87	0.87	9.92
Coleman	0.123	1.75	1.00	0.90	0.88	0.87	0.86	0.88	0.88	0.88	0.92	9.94
Bolt	0.183	1.78	1.02	0.90	0.88	0.88	0.85	0.85	0.86	0.86	0.89	9.95
Blake	0.137	1.74	1.02	0.91	0.90	0.89	0.88	0.87	0.88	0.87	0.89	9.99
Simbine	0.141	1.78	1.03	0.92	0.92	0.87	0.84	0.86	0.87	0.88	0.90	10.01
Vicaut	0.152	1.80	1.03	0.90	0.89	0.87	0.87	0.88	0.89	0.90	0.90	10.08
Prescod	0.145	1.89	1.05	0.92	0.92	0.89	0.86	0.86	0.87	0.88	0.88	10.17
Su	0.224	1.81	1.03	0.92	0.91	0.89	0.89	0.89	0.89	0.90	0.92	10.27

Fastest Splits (seconds)

Figure 11

a) Which athletes finished in the following places (provide data as evidence)?

i. 2nd:

ii. 6th:

b) Which athlete had the greatest number of fastest splits?

.....

c) What was the fastest reaction time recorded and who achieved it?

.....

.....

/2

/1

/1

Question 11 continues

Question 11 continued

Marker use

- d) Calculate the theoretical fastest possible time, taking into account reaction time and splits (to **three (3)** decimal places).

/2

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- e) Who would have won the race if it had been a 50 m sprint (on the basis of these times only) and how long would it have taken? (To **three (3)** decimal places.)

/1

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- f) Gatlin did not achieve the greatest number of fastest splits. How did he win the race? Provide data as evidence.

/3

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Total
Q11/C5
/10

Acknowledgements

Sources:

Figure 8: <https://www.abc.net.au/news/2024-12-26/australia-india-boxing-day-test-sam-konstas-virat-kohli/104763676>

Figure 9: <https://netball.com.au/news/diamonds-primed-netball-nations-cup>

Figure 10: <https://www.owia.org/park--pipe-news/category/scotty-james>

Figure 11: Adapted from <https://worldathletics.org>

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:

- Answer **all** questions and **all** items within each question.
- Write your answers in the spaces provided in this exam paper.
- The exam is **two (2) hours and thirty (30) minutes** in length. The suggested working time for this section is **approximately 45 minutes**.
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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
Totals	15	15	150 minutes (2.5 hours)	150 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**.



Figure 12

Alexa (Lex) Leary is an Australian swimmer who achieved two gold and a silver medal at the Paris Paralympics as part of a 30-member team. After breaking the World Record for the S9 100 m Freestyle, Lex said: “I’ve just come so far in life. Being told three years ago I wouldn’t live ... but I am. I proved the world wrong. Tonight was my show. It was a great one. I was so nervous. I was honestly frightened to go out there. I had to just pull something in me and go, ‘Come on Lex, let’s get it’”.

- a) Leary described how she had to gather her self-confidence before her swim. Define self-confidence.

/1

- b) Leary would have set process goals with her coach. What is a process goal and how do they aim to improve performance?

/3

Question 12 continues

Question 12 continued

Marker use

- c) Leary's motivation would need to be self-determined. Identify the **three (3) innate needs** of the **self-determination theory** and state how they would apply to Leary?

/3

- d) Leary derives her motivation **intrinsically**. Explain what this means and how it would benefit her.

/3

Total
Q12
/10

Question 13

Marker use

This question assesses **Criterion 4**.

Brisbane Lions premiership coach Chris Fagan was successful in ensuring that his team were both physically and psychologically prepared before winning the 2024 AFL Grand Final.



Figure 13

- a) List **two (2)** motivational techniques Fagan may use to increase the motivation of an individual player on his team.

/1

.....

.....

- b) Fagan would have to develop competition strategies to use with his team. Select **two (2)** competition strategies, and explain how these may impact the team.

/3

Strategy 1:

.....

.....

Strategy 2:

.....

.....

- c) Fagan observes one player on the ground in the Grand Final showing signs of over arousal. Explain the **catastrophe theory** in relation to this situation and list **two (2)** actions Fagan could use to assist the player to return to the optimal arousal level.

/3

Catastrophe theory explanation:

.....

.....

Actions:

.....

.....

Question 13 continues

Question 13 continued

Marker use

- d) Fagan would regularly have de-briefing conversations with his players on an individual basis. Name the **four (4)** guidelines he would need to use when de-briefing.

/2

1.
2.
3.
4.

- e) In the Grand Final, players would potentially suffer from anxiety. Using any **two (2)** different types of anxiety, state how these may impact an individual player.

/3

Anxiety type 1:

Impact:

.....

Anxiety type 2:

Impact:

.....

Total
Q13
/12

Question 14

Marker use

This question assesses **Criterion 4**.

Australian high jumper Eleanor Patterson has a career best jump of 2.02 metres. High jump involves attempting to be the last person standing as the bar continues to rise with three failed jumps ruling you out of a competition. Eleanor is a big user of psychological techniques to improve her performance.



Figure 14

a) Patterson states that it is very important for her to have high **self-efficacy** in her ability to succeed before every single jump. Explain how the following would impact Patterson:

/3

i. Verbal Persuasion:

.....

ii. Performance Accomplishments:

.....

iii. Physiological State (Arousal Control):

.....

b) Patterson uses Visualisation heavily during a competition. Explain how she might explicitly use the following **two (2)** mental rehearsal techniques.

/3

i. Instant Preplay:

.....

.....

ii. Performance Review:

.....

.....

Question 14 continues

Question 14 continued

Marker use

c) During a competition, Patterson must switch her concentration and attention. Explain **when** and **how** she would be using the following dimensions:

/3

i. Narrow Internal:

.....

.....

ii. Narrow External:

.....

.....

d) Explain **two (2)** reasons why Patterson may experience an 'attentional error'.

/2

Reason 1:

.....

Reason 2:

.....

e) Provide **two (2)** specific examples of how Patterson might use SMARTER goal setting before her next event.

/2

Example 1:

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Example 2:

.....

Total
Q14

/13

Total
C4

/35

Question 15

Marker use

This question assesses **Criterion 5**.

Four players from a rugby team are rated as a result of psychological testing. Results are as follows:

Key: A rating of 10 is very high and a rating of 1 is very low.

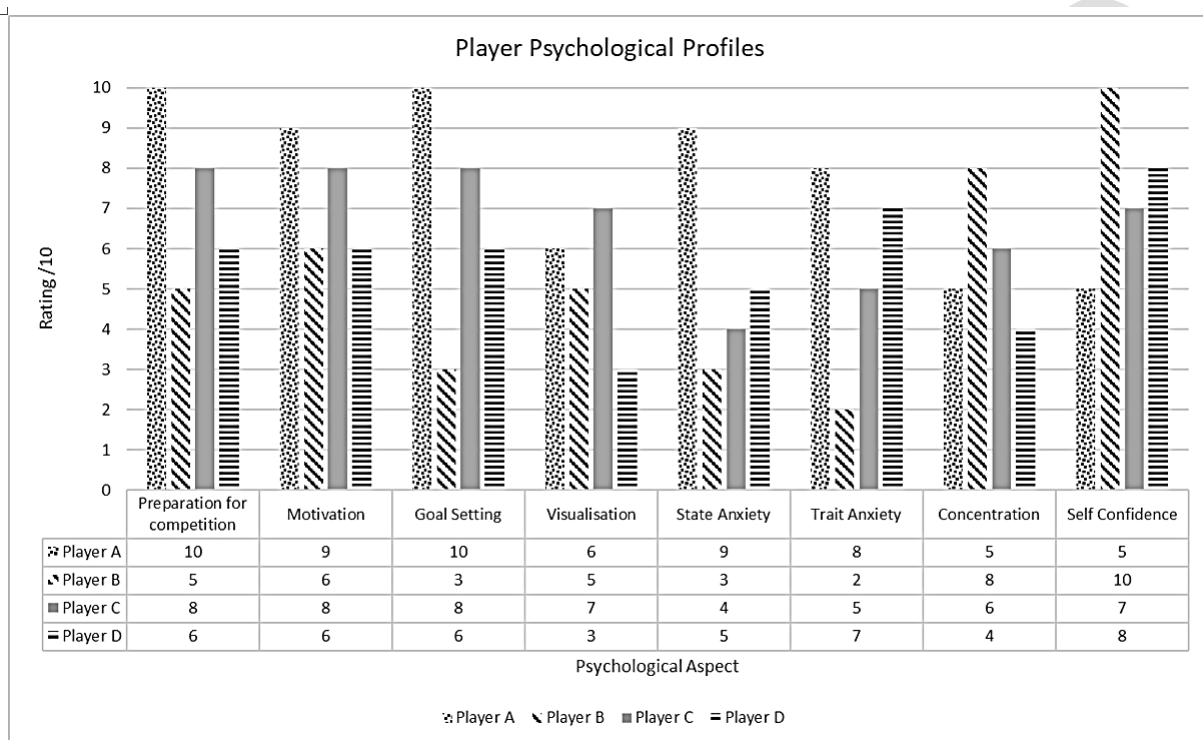


Figure 15

Using the data from Figure 15, respond to the following:

- a) Which player will the coach need to be most aware of on game day in terms of their psychological profile results?

/1

- b) Rank the players on their pre-competition preparation, using ratings from the 'Preparation for competition' and 'Goal Setting' columns only.

/2

Question 15 continues

Question 15 continued

Marker use

- c) Would you suggest that Player D should work on visualisation or self-confidence? Why?

/1

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.....

- d) Based on this psychological profile, which player would you expect to perform the best? Use the data to explain your choice.

/2

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- e) Compare and contrast players A and B in **four (4)** key areas of their profiles.

/4

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Total
Q15/C5
/10

Acknowledgements

Sources

Figure 12: <https://www.swimmingworldmagazine.com/news/australias-alexa-leary-rocks-paris-paralympics-with-golden-swim-and-second-world-record/>

Figure 13: <https://www.afl.com.au/news/1233752/chris-fagan-revels-in-greatest-moment-as-brisbane-lions-complete-fairytale-recovery>

Figure 14: <https://www.nine.com.au/sport/olympics/paris-2024-athletics-track-field-womens-high-jump-eleanor-patterson-exclusive-20240802-p5jzeu.html>

Figure 15: This figure and data were created specifically for the SPT315116 Sports Science exam paper.

End of Section C

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