

2025 ASSESSMENT REPORT

SPT315118 SPORT SCIENCE

General Comments

The 2025 Sport Science exam paper was considered a fair paper that allowed candidates of all abilities to perform to their potential, with few mentioning that the paper could not be completed within the allocated time. While not all candidates were able to match their internal results in the exam setting, an awareness of the comments made in this Examiner's Report will help provide guidance on what can be done to increase the likelihood of such an outcome.

Several markers still made comments about not being able to read some candidates handwriting. If a marker cannot read a candidate's writing it makes it extremely difficult to award any marks for a question.

Several markers made comment of a general improvement in the consistency in the use of relevant units to support Criterion 5 responses. Despite this positive trend, candidates are reminded that relevant units are vitally important as a lack of supportive data or consistent application of relevant units cost easy marks. In a similar light, candidates who used a ruler to support their interpretation of figures for Criterion 5 were generally in an advantageous position compared to their peers.

Unfortunately, it was observed that some candidates were placing as many answers as they can think of for a question in hope that if the correct answers are included, they will be marked as such. It must be made clear that if two answers are asked for and four are given, only the first two will be considered.

Students also need to be reminded that each section relates to a theory topic. Thus, when completing Section B, theory relating to Skill Acquisition is required.

As the subject is called Sport Science, it tends to attract many candidates with an interest in Sport. Perhaps a more apt name would be the Science of Sport, as the subject is better suited to those with a science background than those who simply love their sport. Someone with a combination of both attributes, as well as the ability to write concisely and succinctly is the ideal candidate. While the option to apply knowledge to a sport of choice is sometimes provided, having a strong general knowledge regarding as many different sports as possible would be advised, given the range of sports that information was asked to be applied to, it is important that students apply their knowledge to the given scenario/sport.

Candidates hoping to achieve at the higher levels are reminded of the need to use the more technical and specialised language that is relevant to the question at hand. In addition, candidates are reminded that there is a limited range of universally known and accepted abbreviations and acronyms suitable for exam use in Sport Science; many of which only have relevance when related to a specific context (e.g. ATP, VO_2 max, LIP, EPOC, DOMS, etc.). Most of these abbreviations occur in the Exercise Physiology section of the exam. Consequently, many acronyms and abbreviations developed by individuals or classes to assist in learning and recall,

particularly in the Skill Acquisition and Sport Psychology sections, may not be suitable and may cause marks to be deducted if they are unknown to the marker (e.g. HIPS, VAMP, CAR).

The criterion which continues to consistently cause the biggest challenge for candidates to match their internal marks on is Criterion 6, Cross-Discipline Links (CDL's). While most candidates attempted and answered the questions, which was pleasing, many students had trouble addressing the criterion.

This criterion continues to challenge candidates though and it needs to be reiterated that to gain a "t" a genuine attempt needs to be made in answering at least one of the questions. In marking this section, 5 out of the 10 marks are allocated to the relevance and application of the theory to the specifics of the question, which includes the use of specific examples. Many candidates who answered the questions scored poorly for several reasons. The use of prepared links that did not fit the question was a major factor where the answers did not address the question. Other issues related to students showing little understanding of how to inter-relate across two core units or provide detailed examples or application to the question. Invariably, candidates who write good quality CDL's also do well on other criteria, as they need the breadth and depth of knowledge to provide detailed answers in the first place. Therefore, the biggest advice for candidates is to adapt their knowledge for the question.

It did also seem that only a few candidates ran out of time which was pleasing. The standard of handwriting continues to be an issue.

ALL candidates should ensure they leave enough time to complete Section D to the required standard. Some try to rush through other sections of the exam to "make extra time" for this section. Such haste can cause errors in the work that is rushed and is not advised. Candidates should be encouraged to make use of the reading time to consider the three questions and determine the direction of the questions. For many candidates, time is saved by entering the exam with 'pre-prepared, generic links' - for their preferred core unit links. While such a method can be effective for stronger candidates with the knowledge and understanding to adapt and adjust these links to the respective athlete/sport, it seems to catch out those who lack that ability.

Section A – Exercise Physiology A/B

Question 1 – Criterion 1

- a. Generally well answered. Candidates answered this in various ways by naming, explaining its structure and/or defining ATP. How it produces energy was not as clearly answered, and this is where most students lost marks, as they did not understand that they needed to describe ATP splitting. Some made links to ATP-PC, which was not required.
- b. Type IIB was the correct answer, but some students incorrectly indicated Type IIA or generalised as fast twitch instead of specifying the type. Three characteristics were usually provided well.
- c. Marks were lost in this section when students included the wrong energy system for the timeframe (i.e. ATP-PC for 43.03 seconds). Fats were left out of the aerobic fuel source by some students. Some students had difficulties explaining the limiting factors of the Anaerobic Glycolysis and Aerobic Energy Systems. Duration answers lacked specific detail (e.g. "Marathon duration forever").

Question 2 – Criterion 1

- a. Generally well answered. Any errors occurred when students did not list responses under the correct category (i.e. HR increase under respiratory).
- b. Most students named the 3 energy systems. At times, students listed the systems but did not explain how they related to the sport of touch football. Some prepared responses did not clearly outline the interplay of the energy systems.
- c. Students were able to identify the Krebs Cycle and ETS. The better answers explained the fuel source (pyruvic acid with oxygen present), where ATP was created, and where the by-products originated from within each stage of the cycle. Some answers only listed a diagram to show understanding, but the stronger answers explained what the diagram meant.

Question 3 – Criterion 1

- a. Students are reminded to include units and go to at least one decimal place. Students either clearly knew how to calculate or demonstrated that they did not know the formula.
- b. Students were able to recognise a strategy to minimise lactate accumulation; however, they did not provide a clear description of how it helps their performance. A larger incorrect trend was students suggesting nutritional strategies to improve the lactate inflection point (LIP).
- c. Candidates answered well. There needs to be a link between hitting the wall and the strategy provided. Some strategies did not link with hitting the wall. Some students did not gain full marks because they did not state that fats became the dominant fuel source.
- d. The table was generally filled in well. Some students listed factors that assist in O₂ transport instead of VO₂ max factors. Students lost marks for explanations that were too vague.

Question 4 – Criterion 1

- a. The warm-up was explained well; however, stronger answers mentioned two factors for the purpose of the warm-up. The skill development section was vague, with some answers just naming a skill rather than explaining how it can be implemented in soccer. Some answers related to conditioning rather than skill development.
- b. **Specificity** – some students named specific skills rather than linking to specificity-training methods, muscle groups, and energy systems.
Intensity – some key aspects of how hard a training session should be and how this could be measured were missing.
Variety – some students described using a variety of skills rather than using a variety of training methods.
Some students listed answers rather than making a link to hockey players.
- c. **General preparation** – usually well answered, with a connection to the build-up of a fitness base.
Specific preparation – answers were less detailed, with only some linking to volume and intensity adjustments in the program and sport-specific planning.

Question 5 – Criterion 1

- a. Students were able to use the question stimulus to answer. Additional answers included timing and stiffness. Some also tried to explain why it happened, but the question did not require this.
- b. Some candidates named health-related components instead of skill-related components. Some of the skill-related factors needed clearer explanations, links to soccer, and justification

of their importance. For example: “Soccer – agility – to dribble the ball” rather than linking to performance outcomes such as getting around players or switching play.

- c. Unfortunately, this question was poorly answered. Students provided a wide range of examples. Stronger responses were more specific, used correct terminology, and showed how training was adjusted over time. The most challenging part for students was demonstrating a realistic progressive overload strategy.
- d. Most students provided a basic overview of ATP-PC stores, myoglobin, and haemoglobin. Students should be aware that 3- and 4-mark questions require a higher level of detail regardless of structure. A large percentage of students simply attempted to list information.

Question 6 – Criterion 1

- a. Students showed knowledge of all recovery strategies except passive recovery, which was not applicable. Stronger answers were relevant to the scenario as it is a multi-day race. Better answers related to the event and answered the question, which is to aid their performance.
- b. Strategies were mostly named but vague in their connection or explanation.
- c. Students attempted to say peaking is tapering without acknowledging the defined differences. They explained tapering better than peaking.
- d. Generally well answered regarding nutrition and hydration timing. Errors occurred when students discussed preloading; if framed as replenishment between competitions, it was acceptable, but many overlooked the requirement to refer to replenishment.
- e. Generally well answered. Students outlined the percentages of lactic acid fate. Some students were unable to recall the correct percentages and major fate. More detailed responses included sentence structure explaining what happened in detail.

Question 7 – Criterion 1

- a. This question was well answered. Some students did not calculate total distance and least time. Mistakes arose when students added the furthest distance in a game (Amelia: 12.3 km) and furthest distance in training (Lulu: 30.7 km) rather than adding the total combined distances.
- b. Well answered. Errors occurred when units were not included.
- c. Unfortunately, for this question, some students did not support their answers with the inclusion of data.
- d. Well answered.
- e. Students provided a good summary of the strategies available. Some responses were not relevant recommendations to the team. Better answers used data to support their answers and demonstrated a more comprehensive understanding.

Section B – Skill Acquisition

Question 8 – Criterion 3

Overall, this question was well answered by most candidates.

- a. Many candidates were able to apply fixed and varied practice to Konstas with some specific detail in their application to playing cricket. A few students confused fixed practice with whole, part or massed practice and some confused varied practice with the variety training principle in exercise physiology. Unfortunately, many answers were too general.

- b. Better answers were able to justify their selection with application to theory rather than repeating answers given in part a) or being too general.
- c. Unfortunately, this question was not well answered. Many students were not familiar with the roles of feedback and appeared to 'guess' their responses.
- d. Most candidates knew various factors that affect projectile motion and could answer this question adequately.
- e. Better answers made a direct connect that bent knees means lowering Konstas centre of gravity and standing with his legs apart increased his base of support. Weaker answers did not clearly show a complete understanding of the above.

Question 9 – Criterion 3

- a. Many candidates included a definition of selective attention which was not required. Many students were able to answer this question although some referred to factors relating to sport psychology theory which were not relevant such as arousal.
- b. Overall, well answered with some good application to netball especially those who selected vision and hearing.
- c. Better answers were able to give good clear definitions of schema. Unfortunately, there were many answers which were vague. Better answers were able to explain how the netball players practicing in a variety of conditions would develop various schemas with some clear netball examples.
- d. Some students confused Hick's Law with the Psychological Refractory Period or Signal Detection with Selective Attention. These are different concepts. Stronger answers were able to provide clear definitions and then application to how they influence a netball players reaction time. This was a four-mark question so specific detail was required.

Question 10 – Criterion 3

- a. Most students were able to include some characteristics of a cognitive learner. Unfortunately, some confused this question and provided answers which related to what a coach could do when players are in this stage of learning. These answers were not relevant.
- b. This question focuses on "how" information i.e. James' routine can be transferred through the different stages of learning into his long-term memory. Many students provided memory related theory but didn't focus enough on "how" the information transferred.
- c. Students generally knew the answers to this question. Better responses included the required detail as the question required students to "describe" the factors.
- d. This was a great application question. The students who knew the various categories of feedback were able to classify the example given. Students were also required to explain or outline the type of feedback. Students were more successful with the timing of feedback (terminal) rather than the nature of feedback (KOR).
- e. Once again this was a good application question. Unfortunately, many students seemed confused by this question and did not "classify" James' snowboarding run. These students were not able to comprehend what this question was asking or did not know the theory. Better answers were able to classify the "snowboard run" and to explain/justify with direct reference to snowboarding.

Question 11 – Criterion 3

This question overall was very well answered with many students receiving high marks.

- a – c. These questions were all “table” reading type questions which most students were able to answer correctly. Some students unfortunately didn’t include data or units to support their answers.
- d. Most students added up the fastest splits from each 10-metre segment and reaction time to get the correct answer. Many students wrote this information down. This was not required but if this aspect was correct and they then made a mistake on their calculators they were awarded some part marks.
- e. Most students were able to select the correct runner and support with correct data by adding up the RT and the first five-time splits.
- f. This was a good application question. Better answers were able to recognise that Gatlin was the most consistent runner and were able to support their answer by being clear with their reasoning and selection of relevant data.

Section C – Sport Psychology

Question 12 – Criterion 4

- a. This was generally answered well. Worth noting that re-stating that self-confidence is a general confidence in all situations doesn’t really define it. Restating the term is not a definition. Belief in oneself and their ability was a better definition.
- b. Candidates provided a range of different responses to the definition of a process goal. Stronger responses included explicit reference to developing skill technique and/or strategy of an athlete. This was supported with a reason for process goals towards that of enhancing quality of training and working in conjunction with the other forms of goals.
- c. Candidates were generally able to provide all three innate needs of the self-determination theory however some made errors in confusing this theory with Bandura’s Antecedents. Candidates who provided the appropriate innate needs were generally able to support with examples specific to the athlete for at least two of the three innate needs.
- d. Generally, candidates were able to provide a clear definition for intrinsic motivation with adequately detailed explanations for what intrinsic motivation relates to and being able to provide relevant support for why this form of motivation would benefit the athlete in the given situation.

Question 13 – Criterion 4

- a. Candidates generally gained full marks on this question. Most candidates were able to provide two distinct motivational techniques that the coach would have been able to use to increase the motivation for an individual player. Some answers focused on athlete directed techniques alone which did not meet the requirements of the questions.
- b. Candidates struggled with this question with many providing strategies that leaned on many different aspects of sport psychology but not the focus point of competition strategies. Candidates that received full marks focused on the appropriate strategies that fall during the competition frame. Students were provided scaffolding for their responses which seemed to

support those students who chose appropriate competition strategies. Stronger responses directly focused on how the strategies would directly impact the team in a positive manner.

- c. This question had a large range of responses. Most students were able to provide two relevant actions for returning an athlete to optimal arousal. However, few were able to provide a full explanation for Catastrophe Theory. This was tricky due to the limited space for a full explanation of the theory. Stronger responses clearly referenced the three dimensions of performance, arousal and cognitive anxiety. Many candidates provided descriptions for the inverted U hypothesis in place of catastrophe theory.
- d. Candidates generally understood the four guidelines for de-briefing following a performance. Stronger responses closely followed course literature. Weaker responses focused only on a limited number of de-briefing guidelines and/or repeated guidelines in different ways.
- e. Candidates did quite well on this question with most able to identify relevant anxiety types. However, many struggled to provide appropriate impacts on performance based on the chosen anxiety type. Some candidates mistakenly included examples of anxiety symptoms including somatic, behavioural and cognitive symptoms which did not align with the question stimulus. Stronger responses clearly indicated the source of the anxiety with the stated impact on the player.

Question 14 – Criterion 4

- a. Candidates were generally able to provide athlete appropriate examples for both verbal persuasion and performance accomplishment. However, there was significant confusion in the application of knowledge for Physiological state (arousal control) with many candidates indicating this is a purely psychological focus rather than a more appropriate focus on the physiological state of the athlete impacting on the strength of their self-efficacy.
- b. Generally well answered by candidates, with most being able to refer to broad descriptions for both visualisation techniques. However, it was observed that few provided explicit applications of the two visualisation techniques, rather providing general indications of when they may occur and potentially what the focus may be on in terms of general athlete application. Some candidates confused performance review with debriefing and/or biomechanical analysis steps.
- c. Attentional dimensions were not answered strongly by candidates. In particular, the application of narrow internal dimension for Patterson was a clear difficulty for many. There was a significant cross over with the use of visualisation concepts to narrow internal without application to the actual performance. Narrow external focus was answered with greater accuracy with many candidates successfully choosing the appropriate number of environmental cues in focus which may be relevant for a high jump athlete.
- d. Attentional errors were generally answered well by candidates, with many being able to identify one to two appropriate specialised terms that are associated with attentional error. However, few were able to apply this to the stimulus of the question which asked to explain why these attentional errors may be occurring for Patterson in her context of competition.
- e. Candidates generally demonstrated an understanding of the SMARTER goal setting framework. Stronger responses included either two contextually appropriate SMARTER goal statements for Patterson and/or providing reference to specific components of SMARTER with appropriate examples that would be useful for Patterson going forward to her next event.

Question 15 – Criterion 5

Students generally seemed to find this question easy to interpret with the format of data being clear and appropriately formatted in both a bar graph and associated table.

- a. Most students were able to indicate the appropriate athlete and provide data to support. Some students forgot data which limited their ability to support their response.
- b. Many full mark answers for this question.
- c. Many full mark answers for this question. Some students did not use data to support their choice which limited their ability to demonstrate a full answer to the question.
- d. Stronger responses included a confirmation as to why data was selected. Weaker answers placed simpler information such as choice of athlete and 2 pieces of data without support. Stronger responses provided a clear explanation for the contrast between high scores and low anxiety scores as a reason for choice.
- e. This question was generally answered well; with many students achieving full marks. Stronger responses were able to compare data for four different key areas of their profile and contrast similarities and differences of the athletes with reference to the potential impact on how the players would perform in contrast to each other. The use of data in this question was generally very good with only some students lacking data which limited their capacity to meet the requirements of the question.

Section D – Cross-Discipline Links (CDL's)

For the 2025 paper, candidates seemed to attempt most of the three questions. Most students could come up with a valid link that suited the scenario. To continue the move towards achieving greater success on this criterion, the following common errors should be avoided:

- Providing definitions of the linking areas for most of the answer (dumping theory) without relating the theory to the question (application). Additionally, some answers used several vague mentions of different theory elements rather than being concise about which specific theory linked the relevant core areas (e.g., Training programs is very broad). Better answers narrowed down their link to one/two elements on each side of the link e.g. specific and measurable goals or Training Session (skills part).
- Some students would benefit from using an “If then” type statement to help show cause and effect between two core areas.
- Writing very general examples; for example, for goal setting, many students stated that an “athlete would set a process goal” or even that the athlete would “set a goal” without giving an example of a goal that was specific to the sport and the athlete. A lot of students referred to ‘you’. The answer should refer to the athlete in the scenario.
- Not mentioning the athlete or the situation at all, meaning they could have been referring to any sport. Better responses included theory that was relevant to the scenario and included short examples as to what this would ‘look like’ in the sport.
- Some students indicated that two discipline areas would work together (i.e. goal setting and aerobic fitness) to achieve a good performance, rather than describing how aspects in one area might influence sporting performance in another, as per the elements of C6. This is not answering the question.
- Self-efficacy worked much better than self-confidence as a link.

- Not providing a middle step when linking; for example, motivation > schema. You can't just have high motivation and expect that to improve schema. You need to increase motivation (with specific extrinsic rewards for example), which makes the athlete do more varied practice, which in turn develops schema because (which looks like – give an example).
- Links that didn't work, i.e. Arousal to chronic adaptations, etc.
- Using the wrong core areas or answering with intra-relationships (psych to psych), and there were a handful of answers where the link was not obvious, as it was omitted, making identifying the linked areas difficult.
- Students describing some unhealthy behaviours, “the coach would negatively motivate the athlete by...”. Focusing on inappropriate and negative aspects of motivation in a positively directed question is not the focus of the question.
- Directional changes in the answer. Stating a specific link direction and then responding to it in the other direction in the application.
- Invalid/irrelevant link ideas – i.e., elite athletes using motivation to become autonomous when they are already autonomous.
- Reversing the positive perspective answers – examples being in a negative perspective or spending too long in discussion on a negative perspective before flipping to positive.
- Lots of candidates were confused about what a process goal is; for example, ‘a process goal is to play at Nationals’, or ‘a process goal is the number of goals scored’.
- Jumping straight from defining variety into practice examples rather than training examples. Variety needs to be about physiological training that, in turn, benefits an athlete's ability to practice, e.g. you could use variety to develop the different adaptations or COFs, and this would allow the athlete to do different kinds of practice. Better answers explained how the cause and effect helped the athlete in the scenario during their event.
- Many links did not state the effect. E.g., “highly motivated to utilise variable practice and thus be able to adapt to different scenarios on the field. The mixture of variable practice...to variety in training”. Answers where the reader would not know the sport involved because there is nothing related to the sport in the answer.
- Training year poorly applied... to numerous scenarios....

Better responses included the following elements:

- are well set out with inclusion of a relevant linking statement
- applied the concepts and reflected the depth of understanding required
- are concise and efficient, with good spacing and the use of appropriate, specialised terminology (The candidate clearly prepared well, knowing what relevant examples are.)
- refer to the question details throughout, including relevant background theory, or as a combination of sport-specific theory and examples blended into one
- had a clear, logical structure and explained within the application how the theory interrelated and not just happened ‘side by side’
- related to the scenario set out in the question
- balanced answers with the same amount of application and theory from both sides
- used relevant examples from the sporting scenario to show a deeper understanding
- comprehensively demonstrated how one core area affected the other.

2025 Solutions

Section A – Exercise Physiology A/B

Question 1 – Criterion 1

a. Adenosine Tri Phosphate (½ mark)

ATP has three phosphate bonds (½ mark)

When one phosphate is broken off (splits) the molecules we are left with are adenosine diphosphate (ADP) and Pi (an inorganic phosphate) (½ mark)

Thus, when broken off they release energy (½ mark)

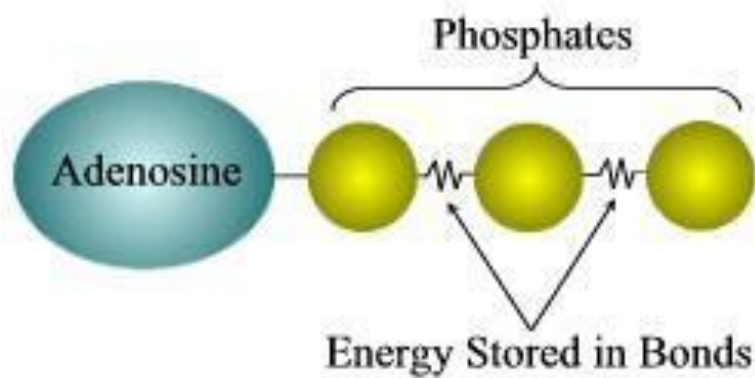
OR

The bond between the second and third phosphates (½ mark) is broken when electrical nerve impulses from the brain cause an enzyme to be released (½ mark)

OR

If students draw the below diagram = (1 mark)

For full marks, the below needs Adenosine Tri Phosphate (½ mark) and an explanation around ADP and Pi splitting (½ mark).



TOTAL 2 marks

b. **Muscle Fibre Type:** Type IIb (½ mark)

Characteristics (any 3 from below: ½ mark each)

Colour	White (pale)
Characteristics (Aerobic/Anaerobic)	Possess purely anaerobic characteristics
Speed of action	Fast
Force production	High
Resistance to fatigue	Low
Fibre diameter	Large
Capillary supply	Low
Number of Mitochondria	Low

Glycolytic Capacity (ability to use LA system)	High
Oxidative Capacity (ability to use aerobic system)	Low
Size of motor nerve	Very Large
Major storage fuel	CP, Glycogen

TOTAL 2 marks

c. Complete Table 1

Characteristic	400m	Marathon
Predominant energy supply	Lactic Acid System OR Anaerobic Glycolysis	Aerobic Energy System OR Aerobic Glycolysis / Lipolysis OR Oxygen System
Fuel Source	Glycogen/Glucose/CHO	Carbohydrates (CHOs), Fats and Proteins
Limiting factors	Produces Lactic acid and hydrogen ions, which causes muscle fatigue Or Acidosis	Requires sufficient oxygen and fuel, so takes time before it will work at full capacity OR It cannot supply sufficient ATP for very high intensity exercise
Duration of energy supply	Can take up to approximately 2 minutes / 120 seconds May refer to duration of most effectiveness 30-45secs	2 / 2 ½ / 3 minutes onwards (it can be the predominant energy source from 30 seconds into exercise) Unlimited as long as fuel is available Unlimited as long as fuel available

TOTAL 3 marks

Question 2 – Criterion 1

a. Any two acute cardiovascular from (½ mark each factor):

- Increased Heart Rate (HR)
- Increased Stroke Volume (SV)
- Increased Cardiac Output (Q)
- Increased Systolic Blood Pressure
- Increased Blood Flow
- Redistribution of Blood Flow to working muscles
- Increased a-v O₂ difference
- Decreased Blood Plasma volume
- Increased blood lactate concentrations
- Blood pH decreases.

Any two Acute Respiratory from: (½ mark each factor)

- Increased Respiratory Rate (respiratory frequency)
- Increased Tidal Volume (volume per breath)
- Increased Ventilation (volume per minute)
- Increased Oxygen Uptake (VO_2) or volume of oxygen consumed.

TOTAL 2 marks

b. Interplay of energy systems in Touch Football

Short bursts of pace/sprints, <10 second efforts to evade a touch / to tag someone = ATP-PC system.

Lactic Acid system predominant for longer sprints >10 seconds for a longer sprint to the try line or to run an opponent down or repeat efforts of high intensity.

Aerobic energy system for the in-between periods of play, walking, waiting, returning to the centre, lining up, jogging (may refer to work rate at below 85%).

The three energy systems continuously interplay and work together to supply all the energy needs for the Touch Football player.

1 mark for each energy system – must include links to the example

TOTAL 3 marks: Need to apply all three energy systems for full marks.

c. Provide an outline of how the KC and ETS produce energy:

Once CHOs and fats are broken down into Pyruvic Acid, *this may be included but not required*.

Pyruvic Acid enters the KC where O_2 combines with carbons, producing CO_2 as a byproduct (½ mark)

Some ATP is produced at this point as are Hydrogen ions which move into the next stage of the process, the ETS (½ mark)

Once in the ETS, Hydrogen ions and oxygen mix to form H_2O (water) (½ mark)

Heat is also produced as a byproduct (½ mark)

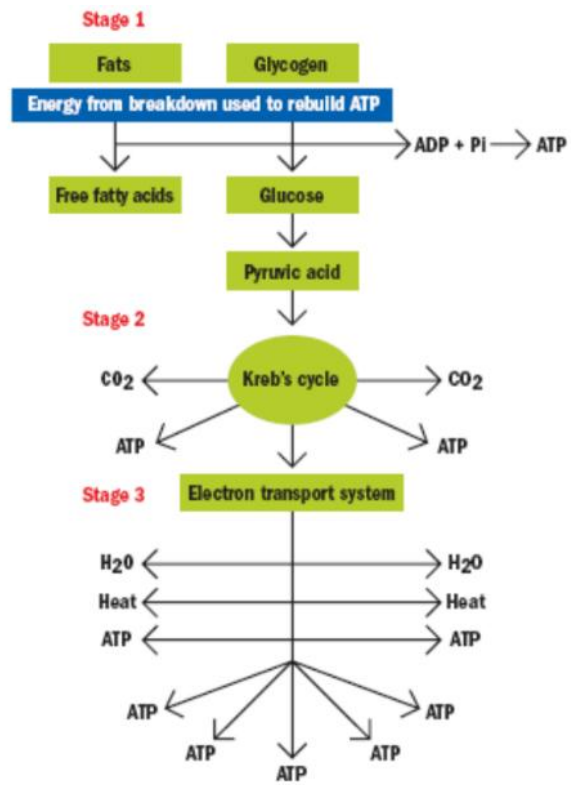
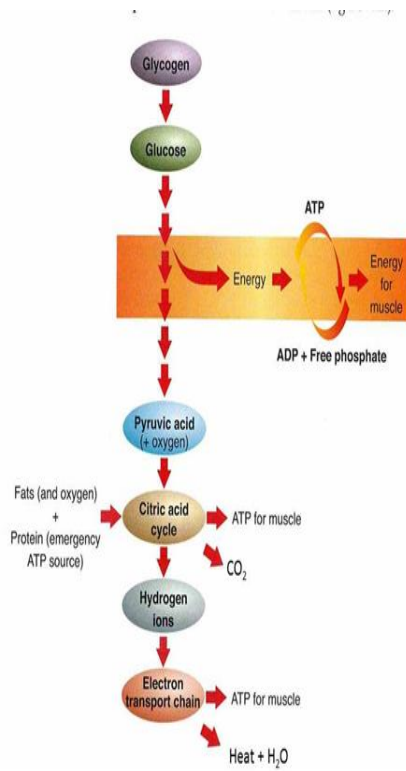
Water may be sweated or urinated out, or breathed out as water vapour (½ mark)

A large amount of ATP (*may refer to amounts i.e. 36*) is produced in the ETS (½ mark)

Students may also wish to draw a diagram such as: (diagram required some explicit explanation regarding the above points for full 3 marks)

Figure 2.11:

The process of aerobic glycolysis is more complex than the other two systems, providing both advantages and disadvantages in ATP production.



TOTAL 3 marks

Question 3 – Criterion 1

- a.
- Absolute VO₂ max:** 3800 mL/min (millilitres per minute) OR 3.8 L/min (Litres per minute)
1 mark
 - Relative VO₂ max:** $3800 / 54 = 70.37$ mL/kg/min (millilitres per kilogram per minute)
Conversion to 3800 ml, Correct calculation and rounding = ½ mark, Correct units = ½ mark
- 1 mark each**
TOTAL 2 marks
- b. **Minimise the accumulation of Lactate** (any two descriptions from):
- As an adaptation to training to increase her tolerance to lactate (½ mark) e.g. through Lactate threshold training (½ mark)
 - Lower her intensity to run below her lactate threshold (½ mark) therefore minimising lactate accumulation (½ mark)
 - She has increased her lactate inflection point (½ mark) through Interval LIP Training OR Continuous LIP training (½ mark)
 - Buffering (½ mark) will aid in the removal of H⁺ into the bloodstream (thus neutralise the pH, causing the muscles to be less acidic). Buffering occurs due to a chronic training adaptation (½ mark)

1 mark each

TOTAL 2 marks (state method ½ and description ½)

- c. **Hitting the wall** occurs during extended exercise (e.g. Bruny Ultra), when the athlete experiences a relatively sudden fatigue, decrease in power output and the inability to improve power output **OR** it happens when glycogen stores become exhausted and as a result fats become the primary fuel source used by the aerobic system to produce ATP (½ mark). Oxidation of fat is relatively slow compared to oxidation of glycogen, resulting in the slowed production of ATP; therefore, Grace slows down dramatically as she cannot maintain her current pace/km (½ mark)

Grace would **avoid** hitting the wall by (any of the following needed for 1 mark):

- Ensuring she refuels during the race with appropriate carbohydrates.
- She would also eat high CHO foods prior to the event to 'stock up' and ensure her fuel supplies are full.
- She would also have trained her body to adapt to glycogen spare, i.e. use fat fuels earlier to delay this hitting the wall.

1 mark definition and 1 mark explain strategy of how to avoid it.

TOTAL 2 marks

- d. **Any four factors plus *brief explanation* affecting VO₂ max from:**

Factor	Explanation
Aerobic Fitness	As a result of aerobic training, several chronic adaptations will occur which will enhance the ability of the body to take in, transport and utilise oxygen more efficiently. Consequently, the better your aerobic fitness, the better your VO ₂ Max.
Body Size	VO ₂ max is usually expressed relative to bodyweight because oxygen and energy needs differ relative to size. It can also be expressed relative to body <i>surface area</i> , and this may be a more accurate when comparing children and oxygen uptake between genders.
Gender	Even with similar training regimes, women tend to have lower VO ₂ Max scores than men, mainly due to having less muscle mass and more fat stores.
Heredity	All people can improve their VO ₂ Max with training, but the extent to which they can improve is genetically determined.
Age	The peak for trained endurance athletes may not be achieved until mid to late 20's or into the 30's. VO ₂ Max declines most rapidly after the age of approximately 50 years. This is due to decreases in cardio-respiratory efficiency, muscle mass and increases in body fat. However, VO ₂ max is <i>always higher in active people</i> , and the rate of decline is slower in active people of all ages.

TOTAL 4 marks

½ mark for each factor and ½ mark for each explanation

2 marks if explanations are brief

3 marks for very clear and concise explanations

Question 4 – Criterion 2

- a. **Warm up purpose:** Prepare the body for exercise ($\frac{1}{2}$ mark) and reduce the possibility of joint or muscle injury or soreness ($\frac{1}{2}$ mark). May refer to by increasing any of the acute responses.

Skill development example (any example relating to the below in relation to hockey):

- Skill development focuses on the specific hockey skills and teamwork required for hockey.
- Appropriate hockey skills can be worked on in conjunction with conditioning work.
- Hockey players could work on a short corner and the skills involved in this aspect of the game.
- Any other hockey related example involving hockey skills or teamwork.

TOTAL 2 marks

- b. $\frac{1}{2}$ mark for showing understanding of the principle and $\frac{1}{2}$ to 1 mark application to hockey:

Specificity: Application of the definition of A training program must stress the physiological systems (fitness components, energy systems and body parts) to achieve specific training adaptations (changes or improvements) OR

The use of relevant energy systems, muscle groups, movement patterns/skills should be specific (relevant) to the sport, in this case, hockey ($\frac{1}{2}$ mark)

The hockey players should select specific training methods such as fartlek training that will develop the specific fitness i.e. aerobic endurance and speed required for their 4 x 15-minute game ($\frac{1}{2}$ mark)

Intensity: Refers to how hard the workload is in a particular session ($\frac{1}{2}$ mark)

For example, the hockey players may be asked to let the coach know what their RPE is at any time ($\frac{1}{2}$ mark)

There are several ways the hockey players could measure or calculate the intensity at which they are working during their training session. Answers could refer to any of the following:

- *energy expended per unit time, e.g. 37.8 kJ/min*
- *percentage of VO_2 max (e.g. 85% VO_2 max)*
- *exercise heart rate, often called target heart rate (THR) or target training zone, is a percentage of maximum heart rate (MHR) (e.g. 80% maximum heart rate)*
- *rate of perceived exertion (RPE) developed by Borg*
- *most accurate: oxygen consumption and blood lactate levels (but requires expensive equipment).*

Variety: Variety relates to varying the training program to help to maintain motivation and avoid plateaus OR

Variety adds spice to the training and helps to maintain your motivation OR

Other relevant explanation may refer to variety prevents plateaus from occurring in training adaptations/fitness components

($\frac{1}{2}$ mark for showing understanding of the principle)

One strategy for motivating the hockey players may be to vary the training sessions in the following ways:

- Vary where they train, e.g. do beach runs, hill runs, park runs, road runs; train in the gym; swim at the local pool.
- Vary how hard they train, e.g. 2 easy days, 1 hard day, 2 easy days, and so on.
- Vary the selection of people they train with, e.g. schoolmates, friends, family, teammates, workmates, bring in an accomplished player to hold a session.
- Changing exercises e.g. different legs exercises, back squat, split squat, sled push due to varied nature of a Hockey game, etc.

TOTAL 3 marks

c. General Preparation:

- During the general preparatory or fitness foundation phase, emphasis is placed on developing general aerobic fitness as a solid base ($\frac{1}{2}$ mark) OR
- During this subphase, the volume of training is high, but the intensity is low to start with and increases very slowly OR
- Specialised programs to remedy specific player weaknesses should be continued during this subphase ($\frac{1}{2}$ mark)

$\frac{1}{2}$ mark for volume

$\frac{1}{2}$ for how they do it

$\frac{1}{2}$ mark for intensity

$\frac{1}{2}$ mark for timeframe

****A combination for 1 mark**

Specific Preparation: During the specific preparatory subphase, there is a shift in training towards more specific game-related hockey fitness work ($\frac{1}{2}$ mark). The intensity of training should increase while the volume slowly decreases ($\frac{1}{2}$ mark)

$\frac{1}{2}$ mark for volume

$\frac{1}{2}$ for how they do it

$\frac{1}{2}$ mark for intensity

$\frac{1}{2}$ mark for timeframe

****A combination for 1 mark**

1 mark each – TOTAL 2 marks

Question 5 – Criterion 2

- a. **DOMS** describes a phenomenon of muscle pain, soreness or stiffness that occurs one to three days after exercise ($\frac{1}{2}$ mark)

It is most frequently felt when you begin a new exercise program, change your exercise routine, or dramatically increase the duration or intensity of your exercise routine ($\frac{1}{2}$ mark)

OR Pain, soreness, stiffness, micro tears in muscles and linking to intensity and duration of DOMS.

TOTAL 1 mark

- b. Relevant skill related component for soccer = ½ mark, correct understanding of theory = 1 mark, application to soccer = ½ mark: Examples include:

Skill related component	Relate to soccer player
Agility (½ mark)	The ability to change direction quickly and accurately (1 mark) It relates to soccer as it requires lots of movement in varying directions (½ mark).
Speed (½ mark)	Speed involves movement from one point to another in the fastest possible time (1 mark) Really important for the soccer players to sprint to contest or defend the ball (½ mark)
Muscular Power or Power	The ability to produce maximal force as quickly as possible in a contraction This combines speed and strength Most appropriate where short explosive bursts are required such as in soccer when jumping up to head the ball
Balance	Balance is the maintenance of a body's state of equilibrium This can be dynamic, when the body is moving or static, when the body is stationary Applicable to all sports
Co-ordination	Coordination is when a motor skill is performed fluently and effectively. It can rely on coordination between hand-eye; foot-eye; whole body, etc It is relevant in all ball sports, including soccer
Reaction Time	Reaction time is the time between receiving a stimulus and starting a response This is most applicable in sports where time to react is critical, including soccer, particularly for the goalie. Reactions take place all the time to the opposition or to teammates

TOTAL 2 marks

- c. Any example of **resistance training** with **progressive overload** that would be appropriate for soccer players:

Application of **Resistance training** types relevant to soccer: Isotonic, Isometric, Bodyweight or other. Application reps, sets, work interval and recovery interval = 1 mark

Progressive Overload (application of any of the following): increase the resistance/load being lifted, increase the number of reps or sets, increase the number of sessions, increase the length of the session, increase the intensity, decrease time in between sets depending on what you wanted to achieve. = 1 mark

Isotonic Resistance training such as a Front squat

Week 1 - 3 sets of 10 reps @ 40 kg

Week 2 - 3 sets of 10 reps @ 42.5 kg

Answers should focus on changing variables to create PO including discussion of sets, reps, weights used (resistance).

TOTAL 2 marks

- d. *1 mark each (but students may answer this question differently, answers could be flexible, some students may define myoglobin/haemoglobin, etc. in their answers to show an understanding, this could also be worth ½ mark for each definition).*

ATP-PC stores – Alactacid debt takes 2–4 litres of oxygen for the replenishment of phosphagens (stored ATP and PC) (½ mark) and is fully replenished in 2–3 minutes (½ mark)

Myoglobin – (intramuscular oxygen stores) is a protein that stores oxygen and aids in the delivery of oxygen from the cell membrane to the mitochondria (½ mark but not required). During the alactacid debt the re-saturation of myoglobin occurs (1 mark). Breathing rates remain high to ensure the circulatory system can transport oxygen to the muscles so that replenishment of myoglobin stores can occur.

Haemoglobin: Oxygen is transported in the blood on haemoglobin (oxy-haemoglobin) it replenishes the haemoglobin with oxygen – oxyhaemoglobin in the blood. (1 mark)

The whole process uses between 2–4 litres of oxygen (½ mark) and is usually 50% complete within 20–30 seconds (½ mark) and fully completed within 2–3 minutes (½ mark)

They may refer to but not necessary, the respiratory system/circulatory system (Heart Rate/blood flow) remaining high to ensure the extra amount of oxygen can be transported to the muscles so that replenishment of the above can occur (½ mark)

TOTAL 3 marks

Question 6 – Criterion 2

- a. **Recovery strategies** (1 mark each) from (the list below is NOT exclusive):

Accepted answers are logical and acceptable as it is a multi-day race. Need to be related to the event and answer the question – which is to aid their performance.

Cool Down (Exercise or Active recovery)

An active recovery involves the continuation of the exercise/cycling at a reduced intensity (or tapering off after the completion of the race). It should be followed by a stretching regime including static or PNF stretches. Important due to having to back up the following days.

Stretching

Passive stretching for at least 5-10 minutes, with each stretch being held for at least 10 seconds. Their purpose in recovery is to help muscles to relax, realign muscle fibres and re-establish their normal range of movement and return to their pre-exercise length.

Cold Water Immersion (CWI) (Plunge)/Cryotherapy

Primarily used post training sessions/back-to-back competitions, training in the heat or during the acute phases of muscle injury, soreness or bruising. Try to accumulate up to 10 minutes in the plunge pool to shoulder level in a single immersion or multiple shorter immersions. So they can blunt the inflammation present so they can ride well the next day.

Contrast water therapy (CWT) (Spa/Plunge)

Alternating between hot and cold water. Try to have equal time on both spa and plunge pool and always finish after a plunge.

Hot-water immersion (HWI)

This is usually done in a temperature of about 37-40°C and can be done in a spa to use the jets as a form of massage therapy as well to improve blood circulation.

Massage

There are conflicting views on the effectiveness of the use of massage as a form of recovery, some suggest that it has no scientific basis as a means of recovery.

Compression

Compression garments do not seem to have any adverse effects and **may** have some positive effects from a physiological perspective (studies show mixed outcomes). It is from a perceived psychological perspective; they seem to be considered most effective by those who use them.

Low intensity pool sessions

Pool recovery sessions are a great way to get the body moving again following an event and/or hard training session - the water minimises bodyweight and is a therapeutic way to recover with a combination of swimming, mobility, deep water running and shallow water wading. It's a perfect way to get bruised and fatigued bodies moving again with very minimal risk of injury.

Rehydration

Ensure adequate rehydration, many athletes weigh themselves before and after activities (and continue the rehydration process until the figures are equal or drink 1/1.5 litres for every kg lost or monitor urine colour). Ongoing rehydration during the activity will reduce the amount of rehydration necessary during recovery. Answers may refer to carbohydrate/electrolyte replenishment.

Consumption of CHOs (Carbohydrates):

In the immediate post exercise period, athletes are encouraged to consume a **carbohydrate rich** snack or meal (that **provides 1-1.2 g of carbohydrate per kg body weight**) **within the first hour of finishing**. Research suggests that food with a high glycemic index (foods that quickly release glucose) should be consumed immediately following activity.

Consumption of Protein:

Endurance athletes will benefit from consuming **15-25g of high-quality protein** in the **first hour** after exercise. Adding a source of carbohydrate to this post exercise snack will further enhance the training adaptation by reducing the degree of muscle protein breakdown.

1 mark each – TOTAL 2 marks (½ mark for strategy, ½ mark for explanation relevant to cycling)

- b. **Tapering** – A reduction in training before a major event to allow for complete recovery and optimal performance due to reduced fatigue and maximum strength or endurance (1 mark).

Peaking refers to those training techniques that result in players reaching their optimum state of readiness to perform (1 mark). Peaking is related to training intensity and must be considered on two levels: over the whole year, and for specific individual games or events (1 mark).

1 mark each term – TOTAL 2 marks

- c. **Nutritional replenishment protocols:**

Consumption of CHOs (Carbohydrates):

In the immediate post exercise period, athletes are encouraged to consume a **carbohydrate rich** snack or meal (that provides **1-1.2 g of carbohydrate per kg body weight**) **within the first hour of finishing**

Research suggests that food with a high glycemic index (foods that quickly release glucose) should be consumed immediately following activity. Some answers may refer to the glycogen window i.e. in the first 20 mins.

Consumption of Protein:

Endurance athletes will benefit from consuming **15-25g of high-quality protein** in the **first hour** after exercise.

Adding a source of carbohydrate to this post exercise snack will further enhance the training adaptation by reducing the degree of muscle protein breakdown.

Drink:

Water, sports drinks to replenish fluids lost. To ensure adequate rehydration, many athletes weigh themselves before and after activities (and continue the rehydration process until the figures are equal or drink 1/1.5 litres for every kg lost or monitor urine colour).

1 mark for each suggestion – Suggest one mark for each of the above i.e. CHO, Protein and Fluids. (Maximum 1 mark if only stating CHO, Protein and fluids).

Water/electrolytes, CHO drinks, cordial, etc. is in the answer above, so food e.g. should be there also e.g. rice/jelly... protein shake... rice and chicken (later) ... Etc.

Only 2 marks if no drinks were included.

TOTAL 3 marks

d. **Fate of Lactic Acid:**

65% oxidised to Carbon Dioxide and Water (CO₂ and H₂O) (½ mark)

20% converted into glucose by liver (½ mark). Stored in liver and muscles as glycogen

10% converted in liver to protein (½ mark)

5% converted into glucose (½ mark)

4 correct with percentages for 3 marks

1 mark for correct percentages (only 2 or 3 correct = ½ mark)

If they answer:

Lactic acid may be taken up by the heart and other skeletal muscle and converted back into Pyruvic acid and further metabolised to generate energy in the form of ATP. (For 1 ½ marks)

TOTAL 3 marks

Question 7 – Criterion 5

No units: ½ mark off for each time units were not included with a maximum of 1 ½ marks in total.

a. **Furthest distance:** Lulu (½ mark) 41km (½ mark) (30.7 training, 10.3 game day).

Least time: Meg (½ mark) 108 minutes (½ mark) (80 training, 28 game day).

1 mark each – TOTAL 2 marks

b. **Injury** = Meg (1 mark). 2 pieces of evidence (1 marks) from:

Least game minutes (28 mins), Least game day distance covered (4.0km), Shortest training time (80 minutes), Shortest training distance covered (5.0km), Fatigue rating 1 (no fatigue), General muscle soreness 9 (very sore), Stress level 8 (high).

TOTAL 2 marks

c. **Improving CV Endurance** = Lulu (1 mark). Evidence (1 marks) from:

Greatest distance in training (30.7km), Athlete RPE average for training 8 (high – working hard), Athlete RPE for game day 9 (very high effort), Highest training time (320 minutes).

TOTAL 2 marks

d. **Best aerobic fitness** = Amelia (1 mark). Evidence (1 marks) from:

Highest Game Day GPS tracking distance (12.3km), Played most game time minutes (80 mins), low fatigue rating (2) and low stress level (3).

TOTAL 2 marks

e. **Any two recommendations which would be applicable for the coach from:**

Meg managing her injury, sleeping poorly (6) and is under high stress (8).

Amelia – congratulate on super performance and work rate on game day (80 mins, 12.3km, 9 Athlete RPE).

Lulu is clearly working hard on improving her fitness (320 mins training time, 30.7km).

Jade has worked very hard (Athlete RPE average 9) in training all week – potentially can play more minutes next time (12 July 52 mins game time). Feeling fatigued (8) and moderate soreness (6).

Harriet is a solid contributor with 8.4 km game day distance and RPE of 8, playing 62 minutes. Has low fatigue (2) and is sleeping well (9).

Some answers may refer to team recommendations rather than player specific. ½ mark for any suitable recommendation and ½ mark for correct data.

TOTAL 2 marks

Section B Skill Acquisition

Question 8 – Criterion 3

- a. **Fixed practice:** is when the same movement skill is practiced over and over again **OR** is learning through repetition and the environment doesn't change (½ mark). **OR**

Konstas would use fixed practice to repeat shots batting in nets or using a bowling machine in a predictable setting (1.5 marks)

Varied practice: practicing in varying situations (½ mark) **OR** This would help Konstas to adapt his shots to the variety of game-like situations that he may need to face. (½ mark)

Batting, facing varying speed **or** length of ball and spin to account for the variability of balls he may need to face in a game/varying situations (1.5 marks)

1.5 marks each – ½ mark for showing some understanding of the theory and 1 mark for the example/application to cricket.

TOTAL 3 marks

- b. **Varied practice** (½ mark) would be more useful to Konstas because it is more suitable for open environment/changing environments/externally paced type skills (½ mark) which can vary enormously. Varied practice is more 'match' like (½ mark) help to improve and develop schema (½ mark) **OR**

Fixed practice (*accepted if answered well such as*): to focus on one element/fault/shot due to it (½ mark) being a weakness or want to get better (1 mark) some application to cricket for ½ mark.

TOTAL – 2 marks

- c. **Four roles of feedback include:**

1. motivate
2. reinforce
3. regulate/change the performance during the activity
4. inform/improve future performance.

½ mark each – **TOTAL 2 marks**

d. **List two factors affecting Projectile Motion of cricket ball in flight from:**

- velocity/speed of release/momentum of run-up
- angle of release
- height of release
- shape
- air resistance/wind
- spin.

½ mark each – TOTAL 1 mark

e. **Balance –**

Konstas is improving his balance by:

1. Standing with feet apart: Konstas is increasing his base of support. The greater the area of support, the greater the degree of stability **OR**
2. Bending his knees: Konstas is lowering his centre of gravity **OR**
3. COG over BOS: *keeping his centre of gravity over the base of support.*

For example, Konstas can enhance his stability by lowering his centre of gravity by bending the knees and flexing the trunk (1 mark) widen his base of support by placing the feet further apart (1 mark)

1 mark each – TOTAL 2 marks

Question 9 – Criterion 3

a. **A coach can improve Selective Attention by (any 2 from):**

- making the relevant signals stand out
- using language suited to the level of performer
- including as few relevant cues as possible in initial practice
- directing a player's attention to performance cues
- basing explanations on the past experience of players
- using larger objects (larger balls easier to catch than smaller)
- using contrasting colours (bright coloured balls)
- slowing down objects (slower ball throw easier to catch than faster)
- teach them to ignore noise/reduce noise/distinguish between relevant and irrelevant cues.

Accept those worded that make the environment harder.

1 mark each – TOTAL 2 marks

b. **Explain importance of two senses for netball players – any two from:**

Vision/sight – Examples of the use of vision could include a netball player watching the play to determine where to pass and where the opposition are. (1 mark)

Equilibrium (balance) is the internal sense that tells you that your body is in balance and under control. It is very important in netball which requires rapid changes in movement or require specific balance and control. (1 mark)

Proprioception/kinesthesia is the body's ability to sense its position, movement, and force in space without using sight **OR** it is a complex and automatic process mediated by sensory receptors in muscles, tendons, and joints that provide the brain with information about the body's location and state. This sense is crucial for balance, coordinated movement, and interacting with the world effectively. In netball the GD knows where the GA is by having an awareness they are standing directly behind them.

Touch: An elite netballer knows as soon as the ball is thrown whether it is a good shot by the way that it 'feels'. It enables you to know how much force to place behind a netball throw in order to get the ball to travel the correct distance at the correct speed **OR**

Hearing – Hearing whether it be listening for the umpire's whistle, the coach's de-briefing, a message from a teammate or hearing an opponent nearby.

Feel = ½ mark max

1 mark for each sense explained/applied (½ mark for explanation of a sense and ½ mark for application to netball. If students just list 2 senses = ½ mark)

TOTAL 3 marks

- c. Marking scheme: 1 mark definition, *Application to either Open skills/Varied practice or game like scenarios* = 1 mark and 1 mark application to netball i.e. "how".

Schema are rules which we learn in order to execute skills in differing environments and situations (1 mark). Having a wide variety of practice under a wide range of open skill conditions with their teammates will develop schema. (1 mark). They might play a half-court game of netball where they focus on developing some set attacking plays so they C, WA, GA and S know where to move for each other (1 mark)

1 mark for definition, 1 mark for explanation of how and application to netball (1 mark)

TOTAL 3 marks

- d. **Hicks Law:**

As the number of stimulus response alternatives increases so does the time taken to react (1 mark). **OR** Hick's Law maintains that there is a linear relationship between reaction time and the amount of information to be processed. (1 mark) **OR** By deliberately increasing the number of stimulus-alternatives a player presents to their opponent, you can automatically delay his or her processing time thus Reaction Time will therefore increase (1 mark). For example, having various alternatives for any pass or moves for a given situation such as increasing the number of options of players for the centre pass will delay the RT for the opposition (1 mark)

Thus 1 mark for Hick's Law definition and 1 mark for application to netball and how it increases RT.

Signal Detection is the determination of whether or not a cue or stimulus is present (1 mark)

If the sense organs are unable to detect a stimulus or if the stimulus is not very strong, the time it takes for the brain to receive information from the senses to process the information will be impacted; therefore, if a netball player fails to hear the umpire's whistle blow, they will continue to play on as a result of not detecting the signal (1 mark).

1 mark for signal detection definition and 1 mark for application to netball/influence on RT.

2 marks each – TOTAL 4 marks

Question 10 – Criterion 3

a. **Identify four characteristics of cognitive stage of learning** from (not an exhaustive list):

- make many errors
- getting an idea of the skill
- devote much attention to step-by-step procedures
- have a high attentional demand
- rarely repeat the skill the same each trial
- can perform the skill slowly
- watch for feedback from each previous skill attempt
 - poor timing
 - unnecessary movements
 - rapid progression of skill and improvement in performance
 - self-talk about what to do next
 - may be frustrated and lose motivation.

Any 4 – ½ mark each – TOTAL 2 marks

b. **Focus is HOW information is transferred; the routine from STSS to STM to LTM by:**

STSS: Initially, James will need to attend to his short-term sensory storage/STSS. This has the ability to receive unlimited information; relevant information will pass into James' Short Term Memory through selective attention with the remainder being lost or replaced (1 mark for explaining how information passes through SA).

STM: James will practice/rehearse with the information he needs and then some of it may pass into long term memory. James' STM will hold the information as he gives it attention **OR**

STM can be improved by chunking (putting single pieces of data together into groups. We then remember the groups which contain more information than just the individual items). This obviously increases the total volume of information which can be stored in STM. (1 mark)

LTM: Information which has been repeated or rehearsed will move to James' Long Term Memory and will stay there permanently if it stays encoded (understood). **OR** It contains information about past experiences and movement patterns which may be compared with information about new stimuli. (1 mark)

1 mark for each aspect of memory – TOTAL 3 marks

To get full marks, answers need to focus on HOW

c. **Describe two factors that could interfere with memory process:**

Any 2 from (½ mark for the factor and 1 mark for the explanation):

Relevance and meaningfulness (½ mark) – Information that is relevant to what you are attempting to achieve and/or if it has particular meaning to you, can more easily transfer information to your STM. (1 mark)

Interference (distractions) – 'Noise' can interfere with your ability to concentrate on sensory information and transfer it to the short-term memory.

Chunking or coding – Putting single pieces of data together into groups, i.e. meaningful wholes, which are then remembered as a unit rather than separate objects.

Rehearsal or practice – You must rehearse/practice information for it to be transferred into the STM.

Overloading – As the STM is limited to 5-9 items of information which can only be retained for around 60 seconds, any number of stimuli above this will mean that certain information is lost as capacity is 'overloaded'.

1 ½ marks each – TOTAL 3 marks

- d. **Nature of Feedback:** Knowledge of results (½ mark) is the feedback which provides information about the outcome of a performance **OR** i.e. the judges score in this case. (½ mark)

Timing of Feedback: Terminal (or discrete or delayed) feedback (½ mark) is the feedback that is provided after a skill has been performed (½ mark) i.e. Scores are given to Scotty, after his run has been completed.

1 mark each – TOTAL 2 marks

- e. **Movement Precision:** Gross Motor skills involve movements (½ mark) for example Scotty's use of his whole body doing a somersault whilst snowboarding. (½ mark)

Type of Movement: Serial (½ mark) Scotty's run consists of piecing a number of discrete skills together in his run such as stunts or tricks. (½ mark)

Environmental Predictability:

Closed Skills are performed in highly predictable environments where the performer has full control of the timing of the movements. The performer can commence the action when they are ready. Thus, this skill is internally paced where the performer goes through a pre-learned motor program without needing to consider environmental changes. Scotty would have a predetermined set of tricks or stunts that he would have rehearsed in a routine, which makes aspects of the run 'closed'.

Open Skills (accepted if justified well) Aspects of the snowboarding half-pipe such as snow depth and quality would create more 'open' challenges making the run less predictable and thus more open. Any decision-making processes within an open skill are often made within a very short space of time – often fractions of a second – this would be the case during Scotty's run – he would need to be adaptable due to changing weather conditions.

1 mark each – TOTAL 3 marks

Question 11 – Criterion 5

No units: ½ mark off for each time units were not included with a maximum of 1 ½ marks in total.

- a. **2nd:** Coleman (½ mark) = 9.94 seconds (½ mark)

6th: Vicaut (½ mark) = 10.08 seconds (½ mark)

1 mark each (½ mark for athlete, ½ mark for data with correct units) – TOTAL 2 marks

- b. Bolt ($\frac{1}{2}$ mark) – with 5 ($\frac{1}{2}$ mark) fastest splits
(students may list each split but not required)

20-30m: 0.90sec

30-40m: 0.88sec

60-70m: 0.85sec

70-80m: 0.86secs

80-90m: 0.86secs.

TOTAL 1 mark

- c. Fastest RT: Coleman ($\frac{1}{2}$ mark) = 0.123 seconds ($\frac{1}{2}$ mark)

TOTAL 1 mark

- d. Theoretical fastest time = 9.793 seconds (add all fastest splits 9.670secs and RT 0.123secs)

Fastest: The sum of the following:

RT= 0.123

0-10m: 1.74sec

10-20m: 1.00sec

20-30m: 0.90sec

30-40m: 0.88sec

40-50m: 0.87sec

50-60m: 0.84sec

60-70m: 0.85sec

70-80m: 0.86secs

80-90m: 0.86secs

90-100m: 0.87secs.

TOTAL 2 marks

- e. Coleman ($\frac{1}{2}$ mark) at 5.523secs ($\frac{1}{2}$ mark)

RT= 0.123

0-10m: 1.75sec

10-20m: 1.00sec

20-30m: 0.90sec

30-40m: 0.88sec

40-50m: 0.87sec.

TOTAL 1 mark

- f. Gatlin won through being the most consistent ($\frac{1}{2}$ mark).

His RT was third fastest with 0.138secs. He was equal fastest on split 0-10m (1.74 secs) and fastest for 90-100m (0.87 secs). Between 10-90m he was only 0.1sec to 0.2sec away from the fastest split. (2.5 marks)

Relevant data x 3 pieces making reference to fastest time splits etc:

Other relevant data: He was 3rd fastest RT (0.138 secs), second fastest splits for 10-20m (1.02 secs), 20-30m (0.91 secs), 40-50m (0.88 secs), 60-70m (0.86 secs), 70-80m (0.87 secs), 80-90, (0.87 secs) and 3rd fastest for 30-40m (0.90 secs), 50-60m (0.86 secs).

TOTAL 3 marks

Section C – Sport Psychology

Question 12 – Criterion 4

- a. **Define self-confidence:** A person's belief in themselves ($\frac{1}{2}$ mark) and their abilities ($\frac{1}{2}$ mark)

TOTAL 1 mark

- b. **Process Goals** focus on actions such as physical movement and event strategies (1 mark)

Example isn't asked so not required. If they include an example and not a definition = $\frac{1}{2}$ mark.

Any of the following for 1 mark each:

- Process goals provide the means to improve our performance and take us to a level which may well see us achieve a desired result.
- They also provide the important reference points for training and performance which provide direction and motivation and keep a lid on anxiety.
- Process goals are stepping stones which the athlete will follow to improve performance. They provide structure for each training set, session, period, year and career.

1 mark for process goal, 2 marks for explanation – TOTAL 3 marks

- c. **Three innate needs of self-determination theory (apply to Lex)**

Competence – Lex seeks to control the outcome of the event and experience mastery of her freestyle stroke (1 mark)

Relatedness – Lex feels the universal need to interact, be connected to, and experience caring for others. She feels this as part of the Australian Swimming team (1 mark)

Autonomy – Lex feels the universal urge to be a causal agent of her own life and act in harmony with herself/Lex feels she has a strong connection with the sport and fully enjoys swimming for her as a person i.e. She has owned the event and feels powerful to control this aspect of her life (1 mark)

If they only state the 3 needs = 1 mark, 2 needs = $\frac{1}{2}$ mark. OR 2 marks for correct definitions without application to athlete/ specific sport of the question

TOTAL 3 marks

d. **Intrinsic Motivation** is derived *internally* or intrinsically (1 mark)

It is usually in the form of satisfaction from doing something well, feeling proud about what you have achieved and enjoying the activity for what it is (1 mark) **OR** Intrinsic motivation comes from within, is fully self-determined and characterised by interest in, and enjoyment derived from, sports participation.

- **Benefit:** any one of the following (**1 mark** each for any of the following but need to relate to Lex and not be theory “dump” Maximum ½ mark for general benefits x 2 without connection the situation of athlete):
 - Intrinsic motivation is considered to be the healthiest type of motivation and reflects Leary’s motivation to perform swimming simply for the reward inherent in their participation.
 - If Leary is primarily intrinsically motivated, she is likely to persist in swimming no matter what the level of external reward and/or recognition.
 - The intrinsically motivated athlete is a “self-motivator” because they find the key elements for their involvement in sport – security (belonging), power (influence/recognition) and love (approval, acceptance and admiration) – being provided from within themselves.
 - They feel good about themselves and their place in the world, their opinions and ability are valued by others, and they are accepted whether they win, lose or draw.

TOTAL 3 marks

Question 13 – Criterion 4

a. **List two Motivational Techniques** Fagan could use to increase individual player motivation.

1. goal setting
2. using extrinsic Rewards
3. motivational music/videos.

Others may be utilised where relevant.

½ mark each - TOTAL 1 mark

b. **Explain how two competition strategies may impact team**

½ mark for correct theory and ½ mark for correct application from Fagan to football.

Examples

- **Your personal / team’s game plan** (½ mark) – Answers could relate to any of the following, answers will vary: Fagan would create attacking and defensive strategies needed that work well for an individual and/or team (½ mark)
- **Key statistics / Performance reference points / checks** (½ mark) – Fagan may identify the ten-minute mark in the first quarter of play as the point at which performance to that time is assessed (½ mark). At this time the game plan will be maintained or altered. Subsequent “fine tuning” points will be identified for the contest’s duration.
- **Monitoring Key Performance Indicators (KPI’s)/Task relevant factors** (½ mark) - KPI’s tend to focus more on the physical performance

- **Key Performance Indicators (KPI)** are indicative of successful performance which ultimately defines every athlete or team. Give an AFL specific KPI (½ mark)

Other options may include:

Task Relevant Factors (½ mark) – Task relevant factors enhance mental rehearsal and visualisation by identifying those technique/performance components which are essential for quality performance. During competition they serve to reinforce the technique and/or effort required, especially during times of fatigue, anxiety, boredom and/or loss of concentration.

Mood/Cue Words (1/2 mark) – may be the words we say or think when attempting a particular physical task in order to maximise our effort and/or refine our movement. During competition, mood or cue words can provide the impetus for renewed and/or maximum effort, especially during times of fatigue and/or times of necessary, massive exertion.

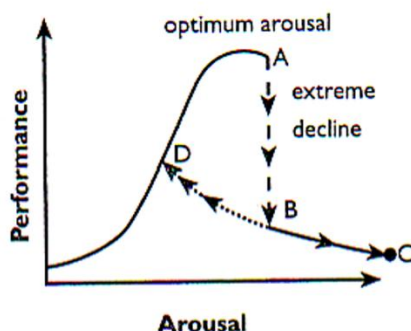
Any two above for 1 ½ marks each (½ mark for term, 1 for explanation) - **TOTAL 3 marks**

Key is explanation of the impact on the Team – not just general explanation.

- c. **The catastrophe theory** is a model that explains the relationship between physiological arousal and performance (Inverted U), (½ mark) plus cognitive anxiety (trait and state anxiety acting together) (½ mark)

Increases in arousal will benefit performance as long as cognitive anxiety is relatively low. (1 mark)

OR but NOT required (if diagram only maximum of 1 mark)



Other possible option: students may refer to the above graph and below explanation for up to 2 marks.

At point A, cognitive anxiety (worrying) and physiological arousal (somatic) are high – reaching this threshold creates a catastrophic effect (½ mark)

At point B, the performer either continues with their extreme over arousal causing performance to decline further to C (catastrophic decline in performance) (½ mark) **OR**

The athlete gets to grips with their problem, taking serious steps to calm down and re-focus – performance will gradually improve to point D when arousal levels can return to the optimum levels: performance may once again reach the maximum effective level (½ mark)

More recent research states that it is possible to recover back to a more manageable arousal level as in 'D' above (½ mark)

List 2 actions Fagan could use to assist a player to return to optimal arousal (from):

Each of the following for ½ mark, so can be quite brief but need to be coach directed. If not coach directed, a maximum of ½ mark can be awarded for x2 actions.

- Tell them they can accept that some tension or anxiety is usual prior to competition.
- Offer preferred rapid relaxation technique such as controlled breathing, centering, progressive relaxation techniques, imagery, visualisation, massage, meditation.
- Tell the player to engage in mental rehearsal.
- Focus on task relevant factors. (If over aroused during performance.)
- Tell the player to seek out others who are calm.
- Inform them to listen to their favourite calming music.
- Offer a preferred distracting activity.
- Downplay the importance of the contest and the result. (Bit hard in the GF?)
- Provide time for relaxation (on the bench).
- Direct athletes' attention to the process required to perform well.
- Present a calm presence themselves.
- Remind the athletes of their thorough and appropriate preparation.
- Provide a pre-competition strategy which provides the necessary control and direction to limit anxiety.
- Tell player to keep sport in perspective.

2 marks for explanation of catastrophe theory in the grand final and ½ mark for each action Fagan could use to assist

TOTAL 3 marks

d. Four Guidelines for de-briefing: (½ mark each)

- as soon after performance as possible
- identify performance factors which were omitted
- identify positive and negative aspects of performance
- involve the athlete.

TOTAL 2 marks

e. Any two types of anxiety and impact on player from:

State Anxiety (½ mark): The anxiety inherent in a situation such as a Grand Final as perceived by a participant (1 mark)

Trait Anxiety (½ mark): Anxiety that occurs as a feature of one's personality; i.e., a player's general anxiety level thus the player is generally a nervous person (1 mark)

Competitive Anxiety (½ mark): Competition such as a GF can cause athletes to react both physically (somatic) and mentally (cognitive) in a manner which can negatively affect their performance abilities. Stress, arousal and anxiety are terms used to describe this condition (1 mark)

TOTAL 3 marks

Question 14 – Criterion 4

- a. **Verbal persuasion:** Patterson's coach would convince her she is capable of completing the jump.

Performance accomplishments: If Patterson has succeeded in a certain activity in the past, she will be confident she can do it again or she can tell herself she has jumped this height and been successful before and therefore can do it again.

Physiological states (Arousal control): This relates to the way Patterson feels physiologically as an indication of how confident she would be **OR** If Patterson is aware of having butterflies in her stomach (for example), she may lose confidence, so she needs to tell herself this is a good sign that she is ready to go.

1 mark each – TOTAL 3 marks – answers need application to Patterson. Definition only is ½ mark per antecedent.

- b. **How Patterson explicitly uses the** mental rehearsal technique. This is an application of theory question; **therefore, answers must relate to Patterson doing high jump.**

Instant Preplay:

Answers should relate to: taking a few moments prior to executing your skill (½ mark) to rehearse the skill/movement in your mind (½ mark)

Example:

EP would stand looking at the bar in the 2 mins before her jump, going through the performance in her mind, resulting in successful execution of the subroutines, etc (½ mark)

Performance Review: Patterson will use mental rehearsal involving the visual review of an entire performance (½ mark) by 'playing over' in her mind the event, which may happen sometime after performance (½ mark)

Example:

It is used to assist evaluation of her performance as a whole or specific aspects of it (½ mark)

OR when used effectively provides meaningful information to assist preparation for her next performance (½ mark)

1 ½ marks each – TOTAL 3 marks

- c. **Narrow Internal – when and how**

NI used when focusing on only one or two cues internally (½ mark) i.e. when Patterson is focused on a single thought or subroutine i.e. concentrating on driving her leg up and pushing off the ground during the take-off stage (1 mark). Can have two cues.

Narrow External – when and how

Patterson's ability to focus on one or a few external cues (½ mark). Patterson is concentrating on the line of the run up and take off point (may be other example but relating to similar concepts in event) (1 mark)

1 ½ marks each – TOTAL 3 marks (½ mark for theory and 1 for application).

d. **Two attentional error reasons from:**

(Answers with some application to high jump are needed.)

- **Attentional mismatch** (½ mark) (due to dominant attentional style) under stressful conditions which may be inappropriate like clearing an important height (½ mark)
- **Inability to adopt or maintain appropriate attentional focus** (½ mark): Thus, a reduced ability to shift concentration along both dimensions as the competition is close (½ mark)
- **Internal and external overloads (or information overload)** (½ mark): Concentrating on too many stimuli which results in an overload of information – thinking of her run-up, the amount of power required in the take-off, the crowd cheering her... (½ mark)
- **Involuntary internal narrowing** (½ mark): Attention narrows as arousal and/or fatigue increases **OR** This narrowing can be so much that an athlete can develop tunnel vision. **OR** This narrowing of attention can cause an athlete to have difficulty attending to task-relevant cues, such as late in the evening towards the end of the HJ comp as it goes for many hours (½ mark for the example)

1 mark each – **TOTAL 2 marks**

e. **Two specific SMARTER goal setting examples from:**

1 mark for each correct application of the goal acronym including specific, measurable and time framed **OR**

If just listed the guideline i.e. Specific and Measurable = ½ mark in total, if only listed 1 correct i.e. Specific = 0 marks)

Listing guidelines and give a specific correct example (1 mark)

Specific

Only Examples needed

For example, “I want to jump higher” could be a goal for Patterson. A better goal might be, “I want to improve my technique in the arching of my back whilst over the bar (1 mark)”. This goal provides focus and a quantifiable measure and, importantly, is process-based. It provides the player/coach with a structured goal to which strategies can be applied.

Measurable

An example for Patterson may be to “make 10 successful attempts in a training session”.

Needs a previous standard for measurable. “Increase my successful attempts in training from 8 to 10.” Otherwise, it is just a specific goal. *Although I feel including an actual number is still measurable i.e. something to measure your goal against.*

Achievable or Action oriented or Agreed or Accepted

Goals should be accepted by all parties involved in preparing the athlete (coach, family, etc.). The goals you set for yourself must be your goals. One of the primary motivations for athletes is that they achieve something they have strived for. In a team sport many individuals in the team will have similar goals but at the same time will have goals that only apply to them or only they can achieve.

Most goals we set rely on input from, or agreement with others. The *coach, teammates and parents* are all part of the goal setting equation. We often need the support and expertise of others to achieve our goals.

Specific e.g. needed: coach and Patterson agree to work on spending more time on plyometrics on Wednesdays.

Realistic

Goals should extend the athlete but be achievable within their ability.

There is little benefit in setting goals which are unattainable. To do so is to compromise motivation and self-image and, ultimately, involvement. At the same time goals should present a challenge which can be met with persistence, improvement and strategy. Achieving a challenging goal provides a sense of achievement and fuels motivation to strive for further goals.

Eg: to aim to hit her pb height of 2.02 next jump.

Time framed or phased

It is important to place your goals along a timeline. "This is what I want to achieve, and I want to achieve it in a particular time." ...and determine a strategy to get there. "This is how I am going to achieve it."

This process ensures you have goals which can be monitored/reviewed and strategies which can be maintained or changed depending on progress. The inclusion of time into the goal setting process provides a measurable reference point for progress. The strategies provide a reference point for the process.

E.g.: use the next event (time frame) ...in the specific example.

Evaluate or Exciting

The athlete needs to be challenged and inspired; therefore, the goal needs to be one which will **excite** the athlete.

Feedback about performance progress is essential if goals are going to effectively change performance and behaviour. **Evaluation strategies** should be initiated at the start of the goal-setting program and continually implemented as the program progresses.

Recorded or Reviewed

Goals should be **written down**; for example, in a training diary. Goals which are written down are goals which are not forgotten, can be reassessed and are a constant motivation.

Failure to attain a goal may be due to several factors which will only be identified if an effective **review** process is in place. Without review an athlete is likely to lose motivation to continue (must be before her next event).

1 mark each – TOTAL 2 marks

Question 15 – Criterion 5

No units: ½ mark off for each time units were not included with a maximum of 1 ½ marks in total.

- a. Player A - State anxiety 9, Trait anxiety 8, (both highest) OR moderate/lowest of all players Self-Confidence (5) OR concentration is low (5)

½ mark for player, ½ mark for use of one of the pieces of valid data – TOTAL 1 mark

- b. Can rank from high to low OR low to high

	Player Ranking	Prep for Comp rating	Goal Setting	OR TOTAL
1	A	10	10	20
2	C	8	8	16
3	D	6	6	12
4	B	5	3	8

1 mark for players correctly ranked and 1 mark for showing data (the data in the bold is needed) – TOTAL 2 marks

- c. Athlete D should work on visualisation (½ mark)

Visualisation low, scored 3 (lowest), vs Self Confidence high, scored 8 (½ mark)

½ mark for player, ½ mark for data evidence – TOTAL 1 mark

- d. ½ mark for player, ½ mark for stating high/low, 1 mark for data evidence (2 bits for each side)
–

Most correct E.g. **Best Player** = Player C (½ mark)

Relatively high key profiles that relate to performance and low in anxiety (state and trait).

Profile: Scored high in: Prep for Comp 8 (2nd highest of the 4 players), Motivation 8 (2nd highest, Goal Set 8 (2nd highest, Visual 8 (highest), Conc 6 (2nd highest) and Self-Conf 7 (3rd highest all on the higher side whilst anxiety is low with state anxiety 4 (2nd lowest and trait anxiety 5 (2nd lowest).

However, two other potential options if provided with appropriate information:

Best Player = Player B (½ mark)

Top score in some key profiles while also having the lowest anxiety of any player (state and trait).

Profile: high in concentration (8 – 1st) and confidence (10 – 1st) low in state (3 – lowest) and trait (2 – lowest) anxiety.

Or

Best player: Player A (½ Mark)

Highest in three factors but has high anxiety but could be supported via strong visualisation score.

Profile: high in Preparation (10 – highest), Motivation (9 – highest) and goal setting (10 – highest) but has high state (9) and trait (8) anxiety but is second highest in visualisation (6).

e. **Compare/Contrast four (4) distinct areas for each player – 1 mark each**

Example: Where Player A has a strength, player B is either average or has a low score (½ mark) E.g. Prep for Comp player A is 10 and Player B is 5. (½ mark).

- Other options: Where Player B has a strength, Player A scores average or has a weakness (Conc, Self-Conf, State Anxiety and Trait Anxiety).
- The similarity they have is that they are both average/similar in Visualisation.

	Player A	Player B
Prep for Comp	10 (high/strength)	5 (average)
Motivation	9 (high/strength)	6 (average)
Goal Setting	10 (high/strength)	3 (low/weakness)
Visualisation	6 (average)	5 (average)
State Anxiety	9 (high/weakness)	3 (strength)
Trait Anxiety	8 (high/weakness)	2 (strength)
Concentration	5 (average)	8 (high/strength)
Self-Confidence	5 (average)	10 (high/strength)

1 mark for each compare and contrast – in **each four areas** (½ mark for comparison and ½ mark for support with relevant data – **TOTAL 4 marks**

Section D – Cross-Discipline Links (CDL's)

Question 16 – Criterion 6

Links between: Exercise Physiology and Sport Psychology

- Answers need to relate to the Sport = Marathon and Athlete = Jess Stenson.
- Looking at longevity in the sport, recent PB/success.
- Exercise physiology theory needs to relate to aerobic exercise. Although resistance training (anaerobic is suitable to use).
- Link can be either direction.
- Perspective is positive: Jess is achieving high performances, PB's.

Examples of links between:

- Self-efficacy – increased VO₂ max.
- Intrinsic motivation – training methods (lactate threshold training).
- SMARTER goal setting – progressive overload.
- The use of specific, realistic and measurable short and long-term goals enabled JS to focus of the specific energy systems, fitness components, muscle groups and skills to achieve a recent PB.

- JS is driven by intrinsic and extrinsic factors to undertake the appropriate recovery after every training session and match so she can maintain high-level performances (PB).
- JS's high self-efficacy traits, built up from the four antecedents, will allow her to correctly implement the appropriate training methods to lead her to a PB.
- Using positive performance practice imagery – quality of each training session (as she is getting older, she may not be able to train as frequently as when she was younger).
- Develop coping strategies for pain – improve intensity, duration of training sessions.
- Self-efficacy – progressive overload in her training.

Exemplar 'A Standard' Answer example

Jess Stenson's (JS) high level of intrinsic and extrinsic motivation has led to her undertaking continuous training, allowing her to produce her PB performance.

Motivation is the direction and intensity of one's effort. JS would possess an intrinsic motivation, which is her internal drive to give her best in the marathon run due to her love for sport over her years of competing. JS would also possess extrinsic motivation to achieve tangible rewards, such as an Olympic gold medal and cash prizes and intangible rewards such as TV interviews and fan support. JS would also be self-determined, which has her being in control of her life through the concepts of autonomy, competence and relatedness that is developed through her high internal motivation.

These high levels of motivation would drive JS to undertake continuous training methods to develop her aerobic energy system which is essential for a marathon. This development would elicit chronic adaptations. JS strong desire to and satisfaction gained from doing something well, and enjoying the activity for what it is motivates her to follow the F.I.T.T (frequency, intensity, time and type) principle for her continuous training. She would perform long, slow distance training by running (type) five times per week (frequency) for 1 to 1.5 hours in duration (time) at 75% maximum heart rate (intensity). This would help JS increase her heart's ability to deliver oxygen to her working muscles and thus improve her aerobic capacity to achieve PB's at the Commonwealth and Olympic Games.

JS would be highly intrinsically motivated to try her best in training for the marathon, predominantly due to her love for sport and for the fact that she is in control of her own life by being self-determined. This motivates and drives JS to undertake uncomfortable, gruelling training sessions including lactate threshold training (continuous training) at 85% MHR repeated 4 times for 8 mins with 2 mins rest. Lactate threshold training helps JS run at or below her lactate inflection point, helping her gain chronic aerobic adaptations which allow her to use her aerobic energy system at higher intensities without fatiguing as a result of a rise in lactate and H⁺ ions and helping her set her personal best.

Even though Jess is 37, she is still extrinsically motivated by tangible rewards such as an Olympic Medal and sponsorship deals, and this influences her to undertake long slow-distance training with 30 km runs in her neighbourhood at 70% MHR. This can be monotonous and needs to be completed early in the morning. This helps JS run the marathon and smoothly hit her PB.

Question 17 – Criterion 6

Link between: Skill Acquisition and Exercise Physiology

- Answers need to relate to the Sport = Basketball and Athlete = Taran Armstrong.
- Exercise physiology theory can relate to anaerobic or aerobic due to intermittent sport.
- Link can be either direction.
- Perspective is positive: Taran is achieving outstanding success i.e. at high levels locally, nationally and globally.
- Young athlete.

Examples of links between:

- Taran's chronic training muscular adaptations will improve the execution of his motor programs/sub-routines.
- Taran's chronic training muscular adaptations will reduce his overall response time.
- Principles of training (specificity) – practising skills (schema).
- Variety of training methods/exercises/etc. – schema development.
- Energy systems (lactic acid) – reaction time and decision making.
- Autonomous stage of learning – the training session (skill development).
- TA's high LIP/well-developed O₂ capacity enabled him to effectively utilise his Information Processing (IP) system to execute high-level skills for longer than others before being affected by fatigue.
- TA's explosive power enabled him to have better response times than those around him, making him a stand-out player.
- TA's strength program enabled him to execute gross motor skills such as dunking and fast breaks more effectively than other players.
- TA sought FB from a variety of sources to identify the changes needed to his training session (skills part) to achieve consistently outstanding performances.

Exemplar 'A Standard' Answer example

For Taran Armstrong to achieve the outstanding success in basketball his high level of chronic muscular training adaptations contributed to the outstanding execution of his basketball motor skill.

Chronic training muscular adaptations result from undertaking a long-term training program, a minimum of six weeks but for elite athletes to achieve outstanding adaptations this will be over several months. Taran's training involves some anaerobic training which contribute to long-term changes resulting in muscular adaptations. These chronic muscular adaptations improve Taran's execution of his motor skills in basketball.

A motor skill is an activity that involves voluntary muscular movement with the correct degree of muscular control, to complete a reasonably complex predetermined task. Motor skills are made up of smaller components or parts called sub-routines. Due to the various anaerobic training sessions such as sprinting, strength and resistance training 5-6 times per week, Taran has developed many non-endurance muscular training adaptations which improve his ability to execute various motor skills in basketball.

Taran's increased muscular stores of ATP and PC enable him to have greater capacity to utilise his ATP-PC system. The increased fuel supply will mean he will be able to execute the motor skills

such as dribbling, sprinting and jumping for longer durations at higher intensities. This will help him to evade the opposition players and make interceptions due to his increased speed.

Another chronic non-endurance training adaptation that Taran will experience as a result of his strength and resistance training is the increased speed and force of his muscle contractions of his fast-twitch muscle fibres and increased size of his FT muscle fibres (muscle hypertrophy). These adaptations cause his basketball passes (execution of motor skills) to be thrown with greater strength and at greater distances making him a better player. These adaptations will also enable Taran to execute the motor skill of a lay-up and in particular, the sub-routine of the jumping/launching phase, with greater power. As he pushes down on the ground, due to these chronic anaerobic muscular adaptations, the ground will push back and launch him into the air with greater power and height causing the lay-up to be more successful by being closer to the ring.

Question 18 – Criterion 6

Sport Psychology and Skill Acquisition

- Answers need to relate to the Sport = Football (AFL) and Athlete = Alex Pearce.
- Link can be either direction.
- Perspective is positive: Alex producing high performance even due to experiencing injuries.

Examples of links between:

- Alex effectively uses goal setting to ensure his motor skills are performed at a high level.
- Alex's high level of motivation ensures his motor skills are executed at an outstanding level.
- S and M goals to practice.
- Information processing (receiving information) – concentration (BE/BI/NE).
- AP was motivated to use effective practice.
- AP was motivated to seek augmented feedback.
- AP's autonomous attributes enhanced his self-efficacy.
- AP's ability to control his arousal/anxiety levels allowed him to better selectively attend and make better decisions.
- The development of schema helped develop self-efficacy.

Exemplar 'A Standard' Answer example

Alex Pearce (AP) would set specific process goals and measurable performance goals, which then drive him to undertake appropriate practice and perform exceptionally for his team as a player and a captain.

Goals are aims or targets that give AP's effort direction and purpose. AP would set short-term goals that are SMARTER (specific, measurable, agreed, realistic, time-bound, exciting and recorded) to act as stepping stones to help him achieve his long-term goal targets. AP would also set process goals that act as actions that AP has to perform to excel in his various practice types as a player and captain.

Due to elite goal setting, AP would set a performance SMARTER goal to improve his goal kicking accuracy from 70% to 75% by the end of the month (specific and time bound). In doing so he undertook massed practice. AP would practice his goal kicking from 40m consistently and continuously without breaks for 30 minutes from a different angle, 3 times per week. In doing so he would record his goal scoring percentage (KPI's) and review the progress of his performance goal.

AP would set a specific process goal with his coach: “I want to conduct 20 minutes of goal kicking, focusing on the follow-through of my kicking leg with back-line players defending.” This goal is specific as it provides a clear direction and goal with all parties involved in AP’s playing career. AP would then use varied practice, as this allows him to execute and repeat practice at goal kicks in different simulated environments and improve his schema with goal kicking. Kicking goals from different parts of the ground under differing amounts of pressure. Through meaningful practice, this helps AP develop schema, a set of rules that allow him to perform well and execute skills in different environments fluently. This means in AFL with different match-ups, AP can kick goals for his team, helping them play well.

AP would set a measurable goal of “I want to perform 35 handballs in a single training session, as I was able to do 30 in the previous session.” This goal is measurable as it can be compared against previous performance. Moreover, this goal leads AP to undertake drill/fixed practice sessions when AP repeats handballs with short breaks. This helps him maintain his neural pathways as an autonomous athlete. AP would be able to execute fluent passes with minimal conscious thought as the concept is stored in memory. Hence, these repeated and fluent passes help AP execute and perform well in an AFL match.