

2024 ASSESSMENT REPORT

SPT315118 SPORT SCIENCE

General Comments

The 2024 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 report will help provide guidance on what can be done to increase the likelihood of such an outcome.

The first hurdle for candidates is entering the exam with a specific plan on the order in which they will tackle each section of the paper. Is it best to start with your strongest section, or leave that until last, or simply go through the sections in the order they are written?

The next is to know exactly how to use the reading time now that it can no longer be used for starting the actual exam. Some use it to note down their own mental notes so they will not forget them once the exam has begun; some use it for reading the CDL questions and deciding which ones they will do and planning the links they will use for each question; some use it for gaining a clear understanding of what the data questions are asking as this can be misinterpreted under pressure, and; others use it to read through the paper as a whole. There is no correct way to use the time; however, it is strongly advised that candidates have a plan, determined as the year has unfolded and based on specific, individual needs.

Every year there are several recurring themes. This year was no exception. However, it is hoped that the message is slowly getting through on some matters.

Several candidates are still writing in pencil, although it does seem as if the number is decreasing each year. To be clear – it is strongly recommended that students do not write exam answers in pencil as there is a risk answers can be rubbed out and thick pencil can become very difficult for Markers to read and understand. Also, some colours of pen are very difficult for Markers to read, so avoid using green, pink, or purple and stick to using black or blue pen.

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 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 and 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 – even if they are incorrect and the last two are correct.

Finally, in the interests of being fully prepared for the exam, candidates should ensure they have a dictionary with them so that they can understand what certain words mean.

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 this year included cricket, basketball, golf, skateboarding, athletics, CrossFit and water polo to name just a few. This, coupled with carefully reading questions, would have prevented errors which detract from the quality of the answer provided by referring to athletes by the incorrect gender, sporting context or use of inappropriate terms. It is strongly recommended that teachers and candidates alike try to expose themselves to a wide range of sports throughout the year so they are better equipped to provide meaningful answers to the sports that may be presented to them in future exams.

With an increasing emphasis in some spaces for the online submission of assignments throughout the year, it is critical that candidates remember the need to practice their handwriting in preparation for exams. In addition, few lessons last for a 3-hour duration, so they must also practice being able to both concentrate and write for extended periods of time, so that the 3-hour exam period is not a new condition to them. If not, mental and physical fatigue can cause errors which impact overall performance and make it difficult for markers to read and understand the work in front of them.

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 (eg: ATP, VO₂ 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 (CDLs). With the change to the External Assessment Specifications (EAS) for 2024, it seemed that a higher percentage of candidates attempted and answered the questions which was pleasing. Even though candidates had to answer all questions, the change to only writing one link instead of two seemed to make it more achievable for candidates as very few left the booklets blank.

In general, the answers were better set out than in previous years, with many following the structure of the marking guide. Better answers mentioned the athlete and the sport multiple times, and included specific, relevant examples of the relationship between the concepts and how one can impact/improve the other.

Criterion 6 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. As the 2024 questions were one directional, it was obvious that many candidates tried to use these links to fit the question. There seems to be a rise in the

number of candidates trying to rely on the exemplar answers from previous years to prepare their own generic responses. Such a tactic has risk as these answers are carefully constructed by experienced teachers to show the development and transition of the same link from a “C” to a “B” to an “A” standard, primarily for teaching purposes. They also represent the highest standard for each rating. Candidates would be better served to learn how to answer the questions themselves and create their own answers. Invariably, candidates who write good quality CDLs 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 must also be noted that just because a link works in one direction, it does not mean that it works in reverse. For example: goal setting to feedback works for the right question but feedback to goal setting is very difficult to construct and is incorrect if the question is directional. Using theory as examples was another reason that scores were lower as theory and examples were often indistinguishable. Not referring to the sport at all was another factor. It would be advisable that teachers spend time in distinguishing the difference for students between a specific example and theory. Learning different sports and being able to adapt to the question is important. It did seem also 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.
 - i. Candidates generally gained full marks on this question. Most were able to indicate Adenosine Triphosphate or ATP.
 - ii. Candidates generally gained full marks on this question. Most were able to indicate the appropriate high energy bond within ATP or reference high energy bonds. Some candidates indicated incorrectly that the phosphates themselves were the source of energy or repeated ATP as the source of energy.
- b.
 - i. Most students suggested the appropriate fibre type. However, others added information that contradicted their first answer, such as saying Type IIB, Slow Twitch. Others got the fibre type completely wrong or only suggested Fast twitch with inappropriate explanation.
 - ii. Generally answered with appropriately regarding muscle fibre type characteristics for Type IIB. Some answers were not in alignment with choice of muscle fibre in b)i.
 - iii. Candidates had a wide range of answers for this question. Answers were generally sufficient detail in support of chosen chronic adaptations. Many candidates listed relevant

chronic adaptation but added other categories (i.e. cardiovascular) or acute responses. Some candidates referenced fitness and health components in place of chronic adaptations.

- c.
 - i. Few candidates received full marks for this question. Most candidates lacked reference to a point(s) in exercise where an oxygen deficit is likely to occur, rather stating that there was only an indication that O₂ supply does not meet O₂ demand.
 - ii. Candidates provided a broad range of answers to this question. Many were general in their reference to duration, intensity and predominant energy system and the impact on O₂ deficit. Candidates with stronger answers provide reference to all three concepts and applied to the sport example.

Question 2 – Criterion 1

- a. Candidates generally gained full marks on this question. Most were able to indicate aerobic energy system.
- b.
 - i. Candidates generally were able to provide a basic definition of VO₂ but a limited number were able to provide a complete definition including exhaustive or maximal exercise.
 - ii. Candidates generally gained full marks on this question.
 - iii. A broad range of answers for this question. Many candidates had issues with placement of answers within the appropriate column and/or incorrect interpretation of when the respiratory and circulatory difference would be observed (i.e. during exercise as opposed to at rest as the question is seeking).
- c.
 - i. A broad range of answer styles for this question. Most candidates provided a blended answer with a description and a drawing to supplement their answer. Most candidates were able to provide the appropriate stages of aerobic energy production with indicated by-products for each stage.
 - ii. Generally well answered by candidates. Many candidates provided an appropriate by-product and stated the outcome, but there was limited explanation of the process of each by-product across candidate answers.

Question 3 – Criterion 1

- a.
 - i. A broad range of answers for this question. Many candidates missed key concepts for supplementation through an endurance. There was a consistent confusion in the application of the terms glycogen and glucose which, when applied to this situation, impacted on the capacity of candidates to demonstrate comprehensive understanding of this concept.
 - ii. Most candidates generally gained full marks on this question. Most were able to indicate appropriate GI food.
- b. Most candidates generally gained full marks on this question.
- c.
 - i. Most candidates gained full marks for this question. However, some candidates stated that LIP is the point where lactate production exceeds removal.

- ii. Generally well answered with most candidates able to communicate understanding that above LIP fatiguing by-products (i.e. H^+ ions) will increase, leading to increase acidity in the muscles (acidosis) and fatigue. Many candidates did not then bring the question back to the situation which impacted on gaining full marks.
 - iii. Most candidates answered this question comprehensively with an appropriate training method for improving LIP. Chronic adaptations were generally appropriate and connected back to LIP. Some candidates confusing HRmax and %LIP HR.
- d.
- i. Most candidates gave an appropriate definition for aerobic steady state.
 - ii. Many candidates achieved part marks for this question due to listing only two stages of the race that a steady state would not be indicated by acute responses. Candidates who achieved full marks provided an explanation for each stage using relevant exercise physiology theory to support their decisions.

Question 4 – Criterion 2

- a.
- i. Generally well answered with most candidates giving an appropriate definition for recovery.
 - ii. Generally well answered with most candidates able to provide two appropriate nutritional strategies, timeframe and appropriate macronutrients to support their answer. Stronger responses included clear guidelines for their nutritional strategies.
- b.
- i. Generally well answered with most candidates able to provide an appropriate answer for EPOC/Excess Post Exercise Oxygen Consumption.
 - ii. Most candidates could indicate a basic understanding of the two phases of EPOC, but many provided a very general focus for each stage. Stronger examples indicated comprehensive responses for each stage (alacticid and lacticid) including timeframes, full process and the role of oxygen.

Question 5 – Criterion 2

- a.
- i. Few candidates provided an appropriate definition for fatigue.
 - ii. Generally answered well by candidates. Most candidates able to outline an appropriate reason for physiological fatigue. Many candidates received full marks for this question.
 - iii. Candidates had a mixed response to this question with many gaining full marks, whereas others struggled to demonstrate adequate knowledge. Although a wide range of factors could be accepted, many candidates listed factors but did not go into detail, which impacted on their capacity to meet the requirements of the question leading to reduced marks.
- b.
- i. Candidates had a mixed response to this question with many gaining full marks, whereas others struggled to demonstrate adequate knowledge. Most were able to identify two appropriate components of fitness. Candidates who achieved full marks were able to clearly explain why the chosen components were appropriate to the chosen sport using relevant theory to support their response.

- ii. This question was generally poorly answered by candidates. Most candidates were able to list/identify relevant training methods (e.g. interval, continuous, Fartlek, resistance, plyometric, etc); however, very few were able to provide accurate descriptions of the stated methods, or accurately/appropriately apply these to the chosen sporting context. There were several candidates confusing training methods with principles of training.

Question 6 – Criterion 2

- a. Many candidates struggled to achieve a full mark for this question due to mixing up the fitness components of strength and power or providing inappropriate examples.
- b.
 - i. Many candidates provided clear and concise answers including all elements of a training session leading to a full mark.
 - ii. Generally well answered by candidates with appropriate differences in volume and intensity across the preparatory and competition phases of the year.
 - iii. A generally well answered question by candidates as a wide range of examples for the off season/transition phase could be accepted.
- c.
 - i. Many candidates received full marks for this question. Some candidates missed providing a definition of the terms and rather expanded on the term 1 RM.
 - ii. Most candidates were able to provide a relevant example.
 - iii. Candidates had a mixed response to this question with many gaining full marks, whereas others struggled to demonstrate adequate knowledge of variables, requiring modification to achieve progressive overload in a strength context.
- d. Candidates had a mixed response to this question with few gaining full marks. Answers generally included either a definition of the key terms of Individuality and Specificity but included limited relevant examples to the situation, or vice versa. Weaker responses simply described the concepts with neither a definition nor a relevant application example.

Question 7 – Criterion 5

- a. Generally mixed answers with many candidates indicating the appropriate half of the marathon but few candidates were able to demonstrate appropriate answers for the range of speed.
- b. Many candidates were able to demonstrate a relevant and accurate response to this question. However, some candidates were inconsistent in their use of accurate and appropriate data in support of their choices.
- c. This question was well answered, and many candidates achieved full marks.
- d. A mixed range of responses. The stronger responses included supporting data with appropriate units for their answer.
- e. Generally answered with appropriate point to indicate a steady decline. Stronger responses supported the time point with appropriate data. Generally well answered by candidates with appropriate data being selected to support the relationship between “hitting the wall” and decreased blood volume with athlete performance during the events. Stronger answers had comprehensive information on hitting the wall and correlation between a decrease in blood volume and increase heart rate (with appropriate and accurate data to support).

Section B – Skill Acquisition

Question 8 – Criterion 3

- a.
 - i. Mostly answered well by students. Full marks for using terms such as ‘cue, stimuli, senses’.
 - ii. Answered well. Most students using examples relevant to water polo. Weaker answers used examples such as ‘seeing the goalie kick the ball’.
- b.
 - i. This question caused some confusion but generally answered well. Some students misinterpreted the term ‘model’ and used information processing model instead.
 - ii. For those who answered the previous component of part b) correctly, most were able to identify that practice improves reaction time or plyometrics can improve movement time.
- c.
 - i. Mostly answered well. Quite a few gave ‘anticipation’ as the answer, not the type.
 - ii. Many answers accepted here; therefore, answered well.
- d.
 - i. Stronger answers read question correctly and provided an outline for each stage. Weaker answers only labelled the 4 stages.
 - ii. Strongest answers mentioned choice reaction time or Hick’s Law and the implications. Quite a few students used psychological refractory period (PRP) which was incorrect use of the term. Points could still be awarded if they could explain the delay in decision making when many options/choices were available.
- e. A few students named sports but gave no context or explanation. Strongest answers gave the sport and scenario/context to explain the choices. Some students gave answers of sports that don’t have/limited choice reaction such as 100m sprinting.

Question 9 – Criterion 3

- a.
 - i. Mostly answered well – several definitions accepted.
 - ii. Many students were either unable to identify a winter sport or a discrete skill within the pictures on the exam. However, most could define a discrete skill.
- b. This was answered well but some students placed the sports in the incorrect order from most open to closed. Those who chose the correct answer of ice-skating routine easily answered the second part of the question in terms of timing, internally paced and competitors not being present on the ice.
- c.
 - i. Some students did not read/missed the comment relating that it was ‘from the judges’ and answered incorrectly. However, this was answered well.
 - ii. The part of the question ‘how it influenced the athlete’ was not always addressed by students; however, the first part was mostly correct.
- d. Most students answered this question well, or could at least name types of practice. Strongest answers included ice skating examples such as ‘jumps, landings and triple axel’.

- e.
 - i. A lot of correct 'textbook' answers. Some did have part definitions but failed to mention 'changes in environment' or 'adapting skills'.
 - ii. Varied and Problem Solving were the most common answer. Some points awarded to other types if explained well about how it may contribute to Schema, such as massed practice on different grounds/courts or distributed practice between offence and defence. A few students incorrectly used the term 'Random or Discrete practice'.

Question 10 – Criterion 3

- a. Most could give a definition of chunking but not a sporting example. Many students gave answers and examples of 'phone numbers and shopping lists' to be able to remember information.
- b. Most students could name the stages of memory and characteristics but not always in information required such as time limit and capacity. Some students did not include an AFL example.
- c. Naming the stages of learning was answered very well, with majority of students awarded full marks. The second part of the question that required a coaching consideration appeared more difficult/confusing as other characteristics were listed that were not relevant such as 'athlete makes many mistakes, or athlete can complete 2 skills at once.'
- d.
 - i. This question was not answered well. Most students answered the question but did not use biomechanical knowledge required. Many incorrect answers included 'because they are taller, they can see better or get more rebounds, the strongest answers included 'levers' and the correct use of 'momentum'.
 - ii. This question was answered well. Most identifying COG and stability. Some incorrect answers included that being 'shorter meant higher mass'.

Question 11 – Criterion 5

- a. Majority of students identified the correct athlete but did not include the length of time.
- b. Majority identified the correct numbers but not the difference.
- c. Majority identified the correct athlete and distance jumped.
- d. Answered well and correct ordered. Only a minimal number of students didn't included units.
- e. Many students incorrectly answered 'height of release' as a factor. All athletes jumped from same position and no difference in this factor.
- f. Many students tried to incorrectly prove a relationship between distance jumped and height of the athlete. Majority included data to support the relationship between years and velocity.

Section C – Sport Psychology

Question 12 – Criterion 4

- a.
 - i. Most candidates were good at applying the levels of arousal needed for shots in golf. Some students only spoke about situations like when they notice themselves feeling a bit tired, they should raise their arousal and then if feeling a bit stressed they should lower it. Better answers gave more detailed and specific answers like raising arousal when more force is required in long drives and lowering it when more precision is needed. Many definitions were less accurate. Lots of students referred to Arousal being a feeling of anxiety and readiness which results in energy. Many referred to energy and excitement. Better answers mentioned physiological and psychological readiness to perform.
 - ii. Students answered this question well. There was scope for them to repeat this answer in question b).
- b. Most candidates did well on this question. One of the key things for full marks was the combination of over-arousal, increased stressors and resulting cognitive anxiety causing the choke. Many students only mentioned over-arousal which is not full understanding of the choke scenario. Arousal lowering techniques were well documented.
- c. Many students had difficulty interpreting this question so only a few students were able to gain full marks. Better answers were able to say that Narrow Internal consists of thinking about the mental rehearsal of the shot while Broad Internal involves thinking about the plan for the shot, which club, how much force to apply, wind direction, etc. (several external variables to plan for). Some students just listed a list of external variables when making a golf shot which limited their capacity to meet the requirements of the question.
- d.
 - i. Great understanding of what visualisation was. Students should remember to avoid repeating words in the question as part of the answer, “process of visualising yourself performing a task”.
 - ii. Generally answered well but some students did not read the question and listed three methods or types of visualisations.

Question 13 – Criterion 4

- a.
 - i. Candidates generally gained full marks on this question. Most were able to list two strategies.
 - ii. Candidates generally gained full marks on this question. Most were able to indicate two statistics although some of those presented could be questionable in the true sense of the word KEY. Some students listed any statistic they could think of. The number of Innings played is an example of a random statistic rather than a key one. Similarly, the percentage number of 6 runs. Unfortunately, some students’ lack of knowledge of cricket meant statistics like “number of home runs” or “wickets before half-time” were listed.
- b.

- i. Most students suggested reasonable ideas for the batter waiting in the pavilion. Better answers referred to utilising the time waiting with visualisation, distracting activities, music and relaxation followed by an equipment check and physical activity to ensure they were ready if called in to bat. Some reference to psychological and physical readiness was required for full marks. Unfortunately, many students listed visualisation and mental rehearsal as their two things, which was only half of the marks.
 - ii. Students really struggled with this part of the question. Very few students received full marks. There needed to be a what and when part of the reference point for full marks. This was tricky with one line allowed for them to write their explanation. Example good answers were: the number of wickets taken in each hour of play; the run-rate required after the drinks break for victory; and the number of overs they need to get through before tea.
 - iii. Candidates had a wide range of answers for this question. There was potential for repetition of the key statistics they listed above and many efficiently did this. Perhaps confused by the repetition some students listed task relevant factors or the sub-routines of bowling in this question. Example indicators were bowling economy, wickets taken, extras bowled, run rate of opposition, runs per ball, number of maiden overs.
- c. Approximately half of the candidates answered this correctly. Better answers referred to the secondary (back-up) strategy for when a primary one has failed. Efficient responses included ones where 12th man was used for injury, or an allrounder was substituted for an injured bowler, an extra bat was packed in case main one broke, altering the fielding placements if a batsman was on top of the bowlers. Unfortunately, again understanding of cricket was needed. In the Australian team it would not be easy for a batsman to change to bowling to cover for an injured bowler.

Many students also interpreted this to mean coping with emotions and to reduce the stress cricket players should take deep breaths.

- d.
 - i. Candidates generally did well on this question. Most outlined the type of goal and provided an example. Better answers followed the SMARTER guidelines with their examples demonstrating their full understanding of goal setting.
 - ii. The option of choosing an R from the SMARTER acronym meant there were a variety of answers given here. Better candidates efficiently chose their R to be Recorded/Reviewed. They only had to say how and when they would review their measurable goal. There were some concerns about the 'Realistic' goals students referred to. Realistic was hard to decipher unless a student explained how/why; for example, it was slightly more than a previous performance or was clearly within the capabilities of an international cricketer. Something isn't realistic just because we say it is. Many goals offered were dependent on the opposition so difficult to ascertain if realistic. Students could have used behavioural goals more easily like attendance at trainings, extra fitness sessions.

Question 14 – Criterion 4

- a.
 - i. There were various definitions for motivation with the best answers being those that used terminology from the course and not slang terms. "hyped up" or "razzed up" are

not Sport Science terms. Students were better at providing examples of what could motivate Claire extrinsically.

- ii. Students did quite well on this question with most able to suggest an applicable way a coach could motivate Claire and when it was most appropriate. Some understanding of elite athletes and particularly in the fitness industry was lacking when students suggested that a coach could motivate Claire by giving her a training session off. It was surprising to see many students thinking the best way to motivate her would have been to use punishment or ridicule. Better answers suggested goal setting, extrinsic rewards like praise and encouragement, motivating music, a pep-talk.
 - iii. Students generally understood Flow state motivation better than they did Amotivation. Better answers didn't just define each but stated how they were different.
- b.
- i. 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 doesn't help explain. Belief in ability to perform the required task was a better definition.
 - ii. Students could list the three innate needs mostly but applying it to the scenario was a challenge for many. Lots of examples were from other sports like basketball.
 - iii. Most students answered this well. Unfortunately, some students confused terminology substituting previous experience for performance accomplishments. Also, some doubt around the understanding of vicarious experiences. Better answers related the vicarious experience to Claire. Athletes with similar ability to her achieving, gave her confidence in her ability to perform. Or other mothers returning to elite sport gave her confidence to return. Vicarious experiences aren't just watching another athlete and waving a wand that magically says that you can now do that too.

Question 15 – Criterion 5

Students appeared to enjoy this question, often providing extra pieces of information showing they were engaged with the content.

- a. Some students forgot data and other students included one player from each team.
- b. Some students didn't say from which team and included data only.
- c. Many full mark answers for this question.
- d. Stronger responses included a confirmation as to why data was selected. Weaker answers provided simpler information such as a name and two pieces of data without justification.
- e. Two players were accepted as best answers with supporting data/reasoning. Again, it was important for full marks to say why one player was chosen, not just select three pieces of data for that player. Stronger examples included support with great offensive and defensive effort inclusive of data.
- f. Was answered well. Most people included three pieces of data, and one area Melbourne could have improved on. Some Basketball knowledge would have helped students as some students did not understand what a turnover was. Melbourne only had 8 and Tasmania had 9 so this is something that Melbourne could get more of, to win the game. There were occasional papers where part f) was left blank.

Section D – Cross-Discipline Links (CDLs)

Candidates seemed to attempt the questions at a higher rate to previous years with only a very small number making no attempt at either of the questions.

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.
- Writing examples that are very general; for example, for goal setting, many students stated that an "athlete would set a process goal" without giving an example of a goal that was specific to the sport and the athlete.
- Not mentioning the athlete or the situation at all, meaning they could have been referring to any sport.
- 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 extrinsic rewards) which makes the athlete do more varied practice which in turn develops schema.
- Little explanation of theory. While there were many students who showed a strong knowledge of theory components and suffered from poor applications, there was also a common issue of students diving straight into applications/examples without any explanation of theory. This can be done but there must be some explanation of what the key terms mean embedded in the application if the student chooses to write this way.
- Links that didn't work i.e. feedback to goal setting (wrong way around for Q16). Seemed like quite a few had a pre-prepared link that didn't work for this scenario.
- Using the wrong core areas or answered with intra-relationships (skill to skill) 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 "to lose weight: AT may punish herself by flicking herself with a rubber band if she eats too much". "MH coach would use verbal and physical abuse." Focusing on inappropriate and negative aspects of motivation in a positively directed question.
- Not reading the question carefully for the relevant scenario and then adding inappropriate context to application i.e. it was about building or maintaining skills at international standards not "being an old player".
- Directional changes in the answer. Stating a specific link direction and then responding to it in the other direction in the detail.
- 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 negative perspective or spending too long in discussion on negative perspective before flipping to positive.
- Including examples that are not from the same sport when attempting to show sport specific knowledge to the question; for example, referring to MH playing on a court and AT would use different types of continuous running training for skateboarding.
- 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.
- Indicating that reaction time can be improved, with no mention of anticipation.

Better responses included the following elements:

- are well set out with inclusion of a relevant linking statement
- have clear handwriting
- 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 theory inter-related and not just happened 'side by side'
- related to the scenario set out in the question
- used relevant examples to show deeper understanding
- comprehensively demonstrated how one core area affected the other.

2024 Exam Solutions

Section A – Exercise Physiology A/B

Question 1 – Criterion 1

- a.
- i. Adenosine tri phosphate/ ATP ($\frac{1}{2}$).
 - ii. ATP splits at the high energy bond releasing energy and then there is adenosine diphosphate (ADP), and an inorganic phosphate (Pi) left.
- b.
- i. Type IIb, with one additional reason for worth $\frac{1}{2}$ mark:
 - because it is a maximal effort (which is less than 10 sec)
 - larger fibre with more forceful contraction to throw further
 - speed of contraction is fast also helping with the power for throws (high firing speed)
 - anerobic nature of the muscle fibre due to lack of O₂ (i.e. white fibre).
 - ii. Any two for $\frac{1}{2}$ mark each:
 - white
 - fast to fatigue
 - large size
 - high force production
 - low resistance to fatigue
 - low capillary supply
 - low mitochondria
 - high glycolytic capacity
 - low oxidative
 - very large motor nerve.
 - iii. Any three for 1 mark:
 - increased muscles stores of ATP stores
 - increased muscles stores of PC stores
 - increased levels of enzymes
 - increased muscle glycogen stores
 - increased glycolytic enzymes
 - increased glycolytic capacity
 - increased storage of glycogen
 - increased size of fast twitch muscle fibres
 - muscular Hypertrophy
 - increased speed of contraction
 - increased force of contraction
 - increased strength amounts of connective tissue
 - increased numbers of muscle capillaries.
- c.
- i. Is the shortfall in oxygen needed to work aerobically at any given intensity OR when there is a sudden increase in intensity when O₂ cannot be supplied for aerobic energy production.

- ii. A single shot-put takes (any 3 of the following):
 - less than 10 sec due to its explosive nature i.e. maximal intensity
 - utilises the ATP-PC system
 - ATP-PC is anerobic
 - duration is not long enough to create a large O₂ deficit.

Question 2 – Criterion 1

- a. Aerobic system OR aerobic glycolysis/oxygen system OR aerobic lipolysis.
- b.
 - i. The maximum amount of oxygen that the body can consume and utilise during exhaustive exercise.
 - ii. Any two of the following for ½ mark each:
 - age
 - gender
 - body size
 - aerobic fitness (chronic adaptations)
 - heredity
 - training history.
 - iii. Could refer to any of the following - AT REST for 1 mark (see table below for exemplar):
 - decreased resting heart rate (HR)
 - cardiac hypertrophy
 - increased stroke volume (SV)
 - unchanged or decreased cardiac output
 - increased blood volume and haemoglobin
 - decreased blood pressure
 - increased capillarisation of the heart muscle
 - increased capillarisation of skeletal muscle
 - decreased lung ventilation (improved oxygen extraction).

	Respiratory	Circulatory
Athlete	E.g. Lower breathing rate,	E.g. Lower heart rate,
Sedentary	E.g. Higher breathing rate	E.g. Higher heart rate

- c.
 - i. Answers will include each of the stages below for 1 mark per stage:
 1. **Glycolysis:** glycogen to pyruvic acid (glycolysis) in the presence of oxygen and ATP re-synthesis
 2. **Citric acid/Kreb cycle:** producing ATP and CO₂ as by product
 3. **Electron Transport Chain:** hydrogen ions go to the electron transport chain. By-products: ATP produced and heat and water (H₂O).
 - ii. Any two of the following for 1.5 marks:
 - CO₂ – diffuses into the blood and carried away by the lungs and eliminated
 - heat – transferred into surrounding tissues, including blood, body temp rises, and blood gets directed to the skin, heat can escape
 - water (H₂O) – diffuses into tissue and blood, sweated and urinated out, or breathed as water vapour.

Question 3 – Criterion 1

- a.
- i. To maintain blood glucose as an energy source and prevent running out of stored glycogen within the body and so delay/avoid the chance of hitting the wall (delaying time to switching to predominant fat lipolysis).
 - ii. High glycaemic index to provide instant/quick energy and/or so lots of glucose enters the blood quickly.
- b. Hitting the wall/bonking is where the athlete has run out of glycogen and has to use fat metabolism/lipolysis to produce energy for muscle contractions. Fat metabolism needs a much larger oxygen supply to break down the molecules, so the athlete has to slow down. This will lead to Sinead losing places in the race due to a significant decrease in running speed and/or potentially not finishing the event.
- c.
- i. The last point where lactate production and removal are equal. The highest aerobic steady state.
 - ii. If Sinead continued to run above her LIP there would be a rapid accumulation of lactate and a resulting increase of hydrogen ions. This increased acidity/acidosis causes an inefficiency in energy production and she would have to slow down or stop.
 - iii. Any of the following training methods for ½ mark:
 - Interval LIP training, 95 to 105 LIP HR
 - Continuous LIP training 95 to 105 of LIP HR
 - Lactate Threshold Training (LT training) @ approximately 85% HrMax.
- Chronic adaptations (any that are aerobic rest, submax, maximal) - ½ mark each for the two appropriate chronic adaptations. Examples are:
- increased LIP
 - increased removal of ions
 - increased tolerance to Lactate
 - increase VO_2 max
 - increase stroke volume
 - increased cardiac hypertrophy
 - increased cardiac output at maximal exercise
 - decreased resting HR
 - improved heart rate recovery rates
 - increased capillarisation of skeletal muscle
 - decreased blood pressure at sub maximal intensities
 - decreased lung ventilation at rest.
- d.
- i. Steady state is when all energy requirements are supplied aerobically. Balance between energy needed and energy supplied aerobically.
 - ii. Any two for 1 mark and list/state any two acute responses for 1 mark:
 - anytime in the race where she has not settled into a steady pace so after the start due to increased anaerobic energy contributions (oxygen deficit)
 - when there is an incline, and her intensity adjusts to the new speed - due to increased anaerobic energy contributions (oxygen deficit)
 - when overtaking – due to increased anaerobic energy contributions (oxygen deficit)

- when sprinting to finish – due to increased anaerobic energy contributions (oxygen deficit)
- potential acute responses could include increased heart rate, SV, Q, systolic BP, blood flow and an increased breathing rate, a-VO₂ diff, increased lactate level, redistribution of blood flow. Blood plasma volume and blood pH both decrease (list not exhaustive).

Question 4 – Criterion 2

- a.
- The process of returning the body to pre-exercise state.
 - Any two for 2 marks:
 - consumption of CHO – Carb rich snack (1.1-1.2g/kg body weight of CHO) with the first hour of finishing event. Fat avoidance – reduces glycogen replenishment rates
 - consumption of protein (15-25g) within the first hour in combination with CHO – enhances glycogen storage
 - water/ electrolytes (rehydration) – CHO replacement drinks for events lasting for more than 1 hour.
- b.
- Excess post exercise oxygen consumption (EPOC).
 - Alactacid/fast phase:
 - re-saturation of myoglobin ($\frac{1}{2}$) and haemoglobin with oxygen
 - replenishment of phosphagens (stored ATP and PC)
 - the whole process uses between 2-4 litres of oxygen and is usually fully completed within 2-3 minutes.

Lactacid/slow stage:

 - O₂ is used for oxidation of lactic acid
 - time from a few hours up to 48hrs dependent on intensity of activity.

Question 5 – Criterion 2

- a.
- State of discomfort and decrease in efficiency resulting from prolonged or excessive exercise.
 - Any for 1 mark:
 - **Fuel depletion** for ATP-PC system, aerobic wall hit ...when fuel source changes
 - **Metabolic by products** ...Lactic system...hydrogen ions increased acidity etc.
 - **Dehydration and increased body temperature**...loss of body fluids due to sweating, increased core temperature sweating ...more common in hot climates or humid climates.
 - $\frac{1}{2}$ mark for each outlined factor:
 - type – forehand vs backhand surfing, conditions, board size, tide running
 - intensity – headwinds, swell size increasing, tide direction and intensity will lead to changes in paddle power and cadence
 - duration of activity – activities over 2 hours may lead to glycogen fuel depletion if incorrect fuelling occurs, or ATP-PC stores for paddling

- fitness of athlete – athlete with a higher VO₂ max/LIP will have a higher potential aerobic steady state and so can paddle for longer durations at a higher intensity
- mental state of athlete – lack of sleep from travel, previous experience leading to anxiety, back-to-back rounds against significant competitors, long wait between sets
- nutritional state of athlete – fuel stores, time of competition.

b.

i. Relevant fitness components could include based on sport choice:

- cardiovascular endurance, muscular strength, local muscular endurance, flexibility, body composition, agility, speed, muscular power, balance, coordination, reaction time.

Exemplar Response:

Sport of Choice: Basketball.

Muscle Power: Need to produce maximal force quickly to jump high when shooting or intercepting a pass.

Agility: Need to change direction quickly and accurately when evading defenders.

ii. Answers to this question could include a range of potential appropriate answers based on choices. Must be relevant to sport above and have an example.

Exemplar response:

Training Method: Plyometrics.

Definition: Plyometric exercises invoke a rapid eccentric (lengthening) contraction followed immediately by a forceful concentric (shortening) contraction.

It is designed to improve muscular power where an explosive powerful movement is demanded.

Example: 3 sets of 20 reps of box jumps at 3 different heights: 40cm, 60cm and 80cm. 30 secs recovery between each set (1.5 marks).

If the candidate selects:

Interval Training: examples should include detail about sets, reps, RI, WI

Continuous Training: state type and refer to FITT

Resistance: sets and reps

Plyometrics, resistance, etc. List not exhaustive.

Question 6 – Criterion 2

a. Power: applying force or strength with speed; for example, sprinting through a tackle with a ball.

Strength: applying force without time frame; for example, strength holding position in a scrum.

b.

i. Warm up, skills/conditioning, cool down.

ii. Preparatory season will have a higher volume and lower intensity (building base fitness and base set plays). The competition season, in contrast, will have a lower volume but higher intensity.

iii. Any three for 1/2 mark each:

- resting
- recreational sport/activities
- rehabilitation, surgery
- cross training to maintain some base level aerobic fitness
- working on a weakness.

- c.
- i. 1 RM: the maximum amount a person can lift in one movement.
Set: a number of repetitions lifted followed by a rest.
 - ii. Any of the following for ½ mark:
 - barbell squats, lunges, heel raises, etc.
 - iii. Any for ½ mark each:
 - increase the number of sets
 - increase the weight on bar
 - decrease in reps (with a corresponding increase in weight)
 - increase with repetitions up to a certain point (i.e. 6-7 repetitions)
 - change in tempo
 - reduction in rest time between sets.

d. **Specificity** means targeting the right muscle groups so all athletes would be completing the same squat exercise or based on players needs; for example, front row player will work on strength focus for barbell work (lower repetitions and higher weight) for the legs).

Individualising (Individuality) the program means each athlete would work off their individual 1 RM and work to a percentage of that or based on the needs of the athlete at that time (e.g. an athlete returning from injury will have a lower Barbell weight or focus compared to a teammate who is at peak fitness).

Question 7 – Criterion 5

- a. The first half: 14.2km/hr and 14.8 km/hr (range is 0.6 km/hr).
- b. 14.2 km/hr and 160 bpm.
- c. HR dropped to 145 bpm and 14.8km/hr. This could be due to one of the following reasons which effectively contributed to the athletes moving at a faster speed with a lower exertion rate (heart rate):
 - there was probably a downhill section
 - there was possibly a tailwind.
- d. Between 27km and 32 km/hr with a heart rate of 165-67 bpm.
- e. 16km at 14.8km/hr.
- f. Hitting the wall is when athlete switches from glycogen to fats and can be seen in an increase in HR due to additional O₂ requirements. As blood volume decreases HR also has to stay high to maintain the amount of O₂ getting to the working muscle. HR is rising while speed is dropping. Any relevant data to support this information.
Data Exemplar: Second half of the race with an overall increased HR from 155bpm at 21km, finishes at 163bpm (1 mark) despite an overall speed decrease (14.2km/hr-11.4km/hr) (1 mark).

Section B – Skill Acquisition

Question 8

- a.
 - i. Signal detection is deciding whether a cue is present or not. A cue being a stimuli from the environment that the athlete may have to respond to OR
Signal detection is the determination of whether or not a cue or stimulus is present by using the senses.

- ii. Any three of the following for 1 mark:
 - umpire
 - whistle
 - movement from the other team
 - ball being thrown at them
 - calls from teammates
 - list not exhaustive.
- b.
 - i. Reaction time and movement time.
 - ii. Any one of the following for 1 mark:

Movement Time: movement time may be reduced by decreasing the distance to be moved i.e. shorter back swing. Another pathway to reducing Movement Time is via improving the fast twitch fibres via appropriate training methods (e.g. plyometrics).

Reaction Time: reduced via anticipation and the choice of appropriate practice.
- c.
 - i. Spatial anticipation.
 - ii. Any one of the following factors for ½ mark:
 - recognise traits in opponents' responses e.g. video replay/repetition
 - past experience: well-developed schema e.g. knowledge of the other team or player and their preferred actions
 - regularity of events
 - presence of early signals
 - detection of early signals (stage of learning/experience)
 - practice of the skill (doing some problem-solving practise).
- d.
 - i. Any four of the following for ½ mark each:
 - input/signal detection (signal detection of cues from the environment)
 - information processing/decision making (choosing a response)
 - output (the response that is chosen)
 - feedback (whether the response was successful).
 - ii. (Hick's Law states that) there is a linear relationship between the number of stimulus and reaction time. The more signals that the player must analyse the slower their reaction time. e.g. 3 players moving down the court unmarked with the ball as opposed to one player with the ball, is a defender coming to assist etc. and so the analysis of the situation takes longer. Then deciding what is the correct response (deciding output takes longer): take the player with the ball, move between the players move out and close angle, hang on goal line.
- e. Any relevant sporting example with explicit reference to multiple stimuli

Exemplar answer:

Choice reaction time examples in sport activities include the situations where the player has to respond to the movement of the ball, position of the other players and the situation of the game, and come up with a response that would be the best for the team. For example, defending a corner kick from opposition who have been using different set plays throughout the game.

Question 9

- a.
- A learnt skill which requires voluntary muscle contraction to complete a pre-determined task with control OR
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 OR
a task that involves sequences of movements that are reasonably complex to the individual performing them.
 - $\frac{1}{2}$ mark for relevant winter Olympics sporting choice, $\frac{1}{2}$ mark for distinct beginning and end.

Possible sporting examples: Ski jump, ice hockey shot, one part within an ice-skating routine, curling push (list not exhaustive).

Reason: chosen sport skill has a distinct beginning and end.
- b. 1 mark for the following order: **ice skating routine, ski jump, short course speed race, ice hockey match**
1 mark justification:
- Individual skating routine only has the music and the ice there are no external variables/internally paced/no competitors on the ice, etc.
- c.
- Any two of the following for $\frac{1}{2}$ mark each:
 - knowledge of results, extrinsic or augmented, terminal.
 - Intrinsic feedback comes from within the athlete, so how hard she/he was breathing during the performance whether they felt their arms were in exactly the right place, whether they wobbled on landing. This feedback could make them feel good or bad, depending on their performance (1 mark).

Extrinsic come from external source, this could be the audience clapping, words from the coach, video of performance, which could also make them feel pleased or upset about their performance (1 mark).
- d. Any two of the following for 1 mark each:
- Whole practice is completing the sequence of skill and/or routine in its entirety. This would be completing a whole skill on the ice in its entirety or the whole routine to see all parts together.
 - Part practice is where they just concentrate on one part of routine to refine components of the skill.
 - Fixed or drill practice is when the same movement skill is practiced repeatedly, and the environment doesn't change. This could be applied to a particular component/skill within the sequence/routine to ensure that the component is refined to a high degree.
 - Progressive part method involves breaking down the routine/skill into segments and then putting different element of the skill/routine together. Ice skating would use to construct a new routine, with drill of difficult element, then putting difficult with the other simpler skills to construct the whole routine.
 - Others: massed practice, distributed practice.
- e.
- Schema are the rules or guidelines to performing a skill in a different environment.

ii. 1 mark for each of the following options:

- Variable practice: involves practicing skills in varying situations. This helps to build up schema to use in game situations (game sense approach). Example: training for AFL football in varying weather conditions, surface conditions, opponents and locations to prepare athletes for a range of situations.
- Problem solving: involves learning through discovery and investigation. It develops thinking players who have a good understanding of strategies and game plans. Teaching games for understanding or the Game Sense Approach is often used to assist this. Example: a soccer team training with open game style activities with a range of differing match ups.

Question 10

a. 1 mark for an explanation of chunking: the process of organising objects into meaningful wholes. These wholes are then remembered as a unit rather than separate objects.

1 mark for two relevant sporting examples:

- In NFL the players need to know all the defensive and offensives set plays.
 - Chunking many sub-routines together to form a motor program; for example, learning all the individual subroutines in a roundoff flic.
- b. Stage 1 – **short term sensory store**, unlimited, lasts one second, scanning field to see where players are.
Stage 2 – **short term memory**, 5-9 pieces of information, 60 seconds, focussing on the player that they are going defend.
Stage 3 – **long term memory**, unlimited capacity, permanent, the set plays in AFL.
- c. ½ mark for each stage of learning and ½ mark for one consideration for each stage of learning relevant to the sport chosen.
- **Cognitive stage** – accurate demonstrations, time to practice, clear simple instructions, cue words.
 - **Associative stage** – provide more specific feedback related to the skill, put practice in more open environment, game like situations, more variables, increase challenges or stress. e.g. speed of skills.
 - **Autonomous stage** – more chunking of knowledge, skill refinement, player does more self-analysis of game or skill, over correction can cause drop in performance of skills as a reflexive action is analysed.
- d.
- i. 1 mark for each one of the following with relevant explanation to basketball:
- due to being taller, there will be a higher release of ball (projectile motion) allowing for an advantage when shooting
 - players who have longer arms will have longer levers. This will provide an advantage when laying up or dunking as long levers will increase momentum.
- ii. 1 mark for appropriate biomechanical advantage; 1 mark for relevant example:
- on the beam, lower centre of gravity (CoG) means easier to maintain balance on the beam
 - centre of gravity stays closer to base of support, when doing inverted balances on floor easier to maintain CoG over hands (BoS)
 - when landing on vault or dismount from bars or beam, CoG is closer to BoS

- smaller diameter for rotating in air, spin faster allowing for greater number of possible rotations.

Question 11

- Athlete D for one year only.
- 381 cm to 506 cm so range is 125 cm.
- Athlete C, 506 cm.
- (Fastest) Athlete A 8.125 m/s, Athlete C 8.105 m/s, Athlete B 7.938 m/s, (Slowest) Athlete D 6.37 m/s.
- Relevant factors: angle of release, shape, air resistance.

Exemplar answer: Athlete C had a slower maximum velocity for their longest jump (8.42 m/s with a distance of 506 cm compared to Athlete A 8.43m/s with a distance of 500 cm). This could be due to Athlete C having a better angle of release when jumping leading the athlete to better utilise their velocity to gain maximal distance.

- By comparing the data, the years competing has a greater effect with D who is the less experienced athlete (1 year) (may be cognitive stage of learning) achieved the slowest velocity (6.37m/s) and the least distance (407 cm).

Athlete C is the second tallest(172 cm) and has the same amount of experience as A (4 years). They achieved the greatest distance (506 cm) but not the greatest velocity, which could indicate the higher centre of gravity may have an influence.

Athlete B is the tallest (175cm) but only has 2 years competitive experience, but they have the second slowest max velocity (8.05m/s) and second shortest distance (491 cm) which tends to indicate that years of experience has greater influence than just height.

Athlete A achieved the greatest velocity (8.43m/s) but had the second longest jump (500 cm). They have the same experience as C, 4 years, but are 4 cm shorter.

Section C – Sport Psychology

Question 12 – Criterion 4

- Arousal is the state of readiness: physiological and psychological readiness for action, state of alertness and readiness (1 mark).
When approaching a putt which is a fine small movement he would need to be in a lower state of arousal (1 mark).
When driving off the tee when he wants to produce a high amount of power in a controlled manner and therefore in a higher state of arousal (1 mark).
 - Any relevant stated technique for 1 mark (list is not exhaustive):
 - deep breathing
 - self-talk
 - focus on task relevant factors
 - listen to calming music.
- High perceived importance of event and high level of stress, high levels of cognitive anxiety. They can try all techniques to calm or lower arousal like focus on task-relevant factors, restate ST goals, use visualisation, centred-breathing between holes, thoughts-stopping self-affirmations (list not exhaustive).

- c. **Narrow Internal:** Focussing on the shot they are going to play e.g. going through the putt in their head, the force needed or mentally rehearsing the shot
Broad Internal: Approaching the green **planning** and **thinking** about the putt, after looking at the grass, wind and slope and distance thinking how they will play the shot. Could consider line to play, force required, etc.
- d. Watching or seeing yourself in your mind's eye (1 mark)
- i. List any 3 of the following for 1 mark:
 - start with relaxation
 - stay alert
 - enjoy it
 - use the present tense
 - set realistic and specific goals
 - visualise at the correct speed
 - relaxed but aware
 - use all your senses
 - successful outcome
 - practice regularly.

Question 13 - Criterion 4

- a.
- i. List any two of the following for 1 mark:
 - diet – food availability
 - rest – adjusting to different time zone, ensuring adequate sleep, accommodation
 - spare time
 - equipment checks – organising gear
 - travel – finding things to do on the plane
 - mental preparation
 - list not exhaustive.
 - ii. List two of the following for 1 mark:
 - runs made
 - wickets taken
 - number of overs bowled
 - run rate
 - strike rate
 - list not exhaustive.
- b.
- i. Stating any two of the following covering a physical and a psychological focus for 1 mark:
 - spending time with the right people
 - mentally going over their shots
 - keeping hydrated and well fed
 - making sure they get their pads on etc. in time to go
 - stretching/warm-up.

- ii. A **performance reference point** is something the bowlers will amend about their performance after checking it.
E.g. at the end of 10 overs, the bowler might change their strategy with amending the field placements to try to reduce the number of runs scored. Or at the lunch break review their line and length to the left-handed batsman. Or after 5 overs assessing which spin ball is working best for their bowling economy.
- c. List any two of the following for 1 mark each
- wickets taken
 - maiden overs
 - no balls, wides
 - runs per wicket (efficiency)
 - bowling rate
 - list not exhaustive but must correspond to a bowler in cricket.
- d. A coping strategy is a backup strategy, so if something goes wrong this strategy is used OR a coping strategy can be thought of as a secondary plan or behaviour which in place for each primary or preferred behaviour should it fail or be inappropriate (½ mark).
E.g. In cricket using a night watchman towards the end of a day where they change the batting order and put in a lower order batsmen instead of the top order, or if the batter is injured the use of a runner. If the fast bowler is not working changing to a spinner or having spare equipment to cover for breakage, use a 12th man to cover injuries. (½ mark for a relevant example to context of sport).
- e.
- i. Performance goals focus on achieving standards or performance objectives that are independent of other competitors (1 mark). E.g. to improve their batting average from 20 to 30 runs over the season, run rate, strike rate, speed between wickets, etc. (½ mark). Process goals focus on improving actions (such as a physical movement and game strategies) that must be performed during a competition (1 mark) E.g. a skill or part of a skill, so it could be to improve their footwork on their forward defensive shot. Or keeping their elbow high. (½ mark).
- ii. 1 mark for each application from the list below in a goal statement relevant to cricket. Maximum 2 marks.
- Measurable, Realistic, Recorded/ Reviewed.
- Example:** To score 20 runs (measurable) in three overs by the lunch break with previous game scoring 18 runs in this time (realistic).

Question 14 - Criterion 4

- a.
- i. Direction and intensity of one's effort OR a force that drives athletes in all behaviours (1 mark), and list any 2 extrinsic motivators (tangible or intangible) ½ mark each. List below is not exhaustive.
- Tangible extrinsic motivators:
- money
 - medals.
- Intangible extrinsic motivators
- TV interviews
 - fame
 - support from fans
 - praise from parents.

- ii. ½ mark for one technique and ½ mark for relevant timing of when the technique would be implemented:

- Goal Setting: give her achievable goals in training in every training session in the short-term leading to a long-term goal.
- Motivational Music: choose music that Tia-Clair enjoys and play the music **during warm up**.

Other answer may include but not limited to:

- using extrinsic rewards with a time frame.

- iii. Flow state is considered the highest level of (intrinsic) motivation or engagement in an activity where the athlete is at one with the event and it is fully immersed. (1 mark). While amotivation is neither intrinsically nor extrinsically motivated, therefore no intention to engage in the activity. (1 mark). This suggests that they are approximate opposites in their impact and observed behaviours on athlete motivation. (1 mark)

b.

- i. Self-confidence is belief in your own ability and yourself (½ mark). While self-efficacy is situational self-confidence (½ mark).
- ii. **Autonomy** means that she has choice and control over what she is doing so she makes decisions on what she does in training (1 mark) e.g. the focus in training methods used based on her goals or the time of the day that she is training.
Competence is being a master of the skills involved. So, as CrossFit has many skills from handstand walking to rope climbing, as well as many different weightlifting techniques, Tia would make sure she has mastered all the skills involved (1 mark).
Relatedness is the universal need to form bonds with others (connect and care), Tia has formed relationships with all the elite CrossFit athletes as well as her coach. She is an inspiration to many and now wants to lead the way for her daughter. (1 mark)
- iii. Two of the listed antecedents for 1 mark. 1 mark for each relevant example for Tai-Clair aligned with the chosen antecedents:
- **Performance accomplishment.** Example: her previous result would motivate her and provide the knowledge that she has the fitness and skills to succeed.
 - **Vicarious experience.** Example: seeing someone else of a similar ability succeed. So, seeing other mothers return to elite competition after the birth of their children e.g. Serena Williams and tennis. Seeing other CrossFit athletes in her training group performing well.
 - **Verbal Persuasion.** Example: having her coach encourage her and tell her she is back to her best at the end of a training cycle.
 - **Physiological States.** Example: using that nervous excitement driving her forward to succeed. Knowing she has controlled these feeling before to win.

Question 15 - Criterion 5

- a. M Dellavedova, Melbourne, 21 points.
- b. M Deng, Jack Jumpers, 15 points.
- c. Jack Jumpers, 17 fouls and J Crawford, M Doyle, 4 points each.
- d. L travers, Melbourne, 7 DREB and 4 blocked, Next best A Hukporti 7 and 2. A total of 11 defensive efforts which was the most of all players.
- e. Jack Mc Veigh 80% 3 points, 100% free throw, 12 rebounds 18 points, his team won, second highest scorer for the match.

OR

M Delladov who was the highest scorer 21 pts, most assists (8) and equal highest steals (3).

f. Any three for 2 marks:

- better field goal %, 40% to 47%
- better free throw conversion 11-16 to 10-13, (76.9% compared to 68.8%)
- more assists 18 to 16, more steals 7 to 5
- Melbourne had 8 blocks compared to 2
- list not exhaustive.

Include one area in Melbourne's statistics for 1 mark:

- *Exemplar:* Improve three-point throw percentage (current 37.9%) suggest closer to 50% to ensure greater opportunity for follow up scoring opportunity.

Section D – Cross Discipline Links (CDLs)

Question 16 – Criterion 6

The two core units are Sport Psychology and Skill Acquisition. A link must be made in the direction of Sport Psychology to Skill Acquisition. The link must be made from a positive perspective; for example, what Sport Psychology aspects did Michelle Heyman (MH) use and how might these positively impact on her ability to execute her skills at the international standard? Examples of possible links could include (list not exhaustive):

- MH can use visualisation to improve her execution of subroutines
- if MH set goals, then this would allow her to partake in correct types of practice
- MH's ability to be in the correct attentional style will enhance her selective attention
- MH's ability to effectively control arousal allows her to selective attend and perform
- MH's motivation allowed her to undertake effective practice methods.

A Standard

Michelle Heyman (MH) will utilise high levels of intrinsic and extrinsic motivation to enable her to complete appropriate practice types to build her skills to international standards.

Motivation is the direction and intensity of one's efforts. It can be positive or negative, intrinsic or extrinsic, and tangible (a physical property) or intangible (not a material object). Intrinsic motivation is the strongest form of motivation as it comes from within the athlete, while extrinsic motivation is that derived from an external source. The Self Determination Theory (SDT) is the degree to which one's behaviours are chosen and self-initiated and involves competence, autonomy and relatedness.

Practice types are the actions needed to achieve improvement in a motor skill. They need to be suited to the type of sport and level of performance. Types include massed and distributed, whole and part, fixed and varied as well as drill and problem solving. They also relate to schema which are the rules by which we learn to execute skills in differing environments and situations.

MH would be intrinsically motivated to seek mastery in soccer (competence), therefore driving her to complete massed practice. She could complete 20-minutes of soccer ball dribbling using the whole pitch at 70% MHR three times a week, improving her performance to international standards.

She would be extrinsically motivated to win the tangible reward of the Golden Boot again, spurring her on to complete varied practice such as 3 x 10 shots on goal under different practice match

conditions (1:1, 1v3) and from varied spots on the pitch, allowing her to develop her schema and improving her performance.

MH would also be extrinsically motivated for the intangible reward of fame if they won the league, encouraging her to complete distributed practice. She could complete 4 x 400m runs at 85% MHR, interspersed with dribbling the ball around some cones during her rest periods, to improve her aerobic capacity and motor skills.

She would be intrinsically motivated to break her record of most goals, driving her on to complete problem-solving practice. This could be a 3 v 3 mini game followed by a shot on goal to help improve her decision making and therefore her performance.

MH would be intrinsically motivated by the drive to be her best self to maintain her shot making skills. This would drive her to complete drill practices of kicking goal shots 30 times during training.

B Standard:

If Michelle Heyman (MH) is motivated, she will complete the appropriate practice types to keep her skill at international levels.

Motivation is the direction and intensity of one's efforts. It can be intrinsic or extrinsic and tangible (a physical property) or intangible (not a material object). Intrinsic motivation is the strongest form of motivation as it comes from within the athlete, while extrinsic motivation is that derived from an external source.

Practice types are needed to achieve improvement in a motor skill. They need to be suited to the type of sport and level of performance. Types include massed and distributed, whole and part, fixed and varied as well as drill and problem solving.

MH would also be extrinsically motivated for rewards of fame, sponsorship and trophies if they won the league, which would lead her to complete distributed practice. She could complete shuttle runs, dribbling drills and passing sequences with rest periods, to improve her motor skills.

She would be intrinsically motivated to improve herself by again being in the highest female team in Australia, driving her on to complete massed practice. This could be 20 mins of continual shots on goal to help improve her subroutines and therefore her performance.

MH would be intrinsically and extrinsically motivated to use different forms of practice to maintain and build her skills.

C Standard:

If Michelle Heyman (MH) is intrinsically motivated, => practice types to keep her skill high.

Intrinsic motivation comes from within providing direction to the athlete to complete training and achieve highly on the field. It comes from the individual wanting to do their best. MH would need to be intrinsically motivated after not playing for the Matilda's for a while to get back into the side.

Many different practice types are used. Distributed practice is short sessions with breaks. Massed practice is practising without breaks until the skill is learnt. Varied practice involves changing the skill practice to maintain motivation and avoid boredom and helps develop schema.

MH would most likely keep going during massed practice such as penalty shots that might get tiring/boring due to her intrinsic motivation. She would want to do her best and would not worry about getting exhausted after 30 mins of penalties. Distributed practice would be lots of different soccer skills practiced with rests and she would be motivated to do this also as she loves soccer.

Question 17 – Criterion 6

The two core units are: Exercise Physiology and Skill Acquisition. The link was one directional from Exercise Physiology to Skill Acquisition. The link must be made from a positive perspective; for example, what aspects of Physiology did North Melbourne use and how might these positively impact on their ability to execute improve their skills?

Examples of possible links could include (list not exhaustive):

- if North Melb/coach periodised the training year, then this would lead to the correct types of practice
- if North Melb/coach used appropriate recovery strategies, then this would enable the execution of elite level motor skills
- if North Melb/coach led a structured warm up, then this would increase the team's ability to selectively attend
- if North Melb/coach increased team strength, then this would influence gross motor skill execution
- if North Melb/coach increased the LIP of the appropriate players, then this would lead to greater selective attention.

A Standard:

The coach would plan a more effective warmup which would allow the players to better selectively attend and improve their performance.

The warm-up is the first phase of the training session which prepares the body for competition and minimises muscle and joint injury. It involves low intensity aerobic exercise (running) followed by dynamic stretches (hamstrings sweeps) light resistance exercises (banded shoulder work) and sport specific drills (handballing).

Selective attention is the ability to filter out irrelevant information (sledding) and focus attention on relevant cues (player position). Selective attention reduces processing times by reducing the amount of incoming information, hence better decisions can be made quickly.

The coach would instruct the players to complete 1 x 10-20 min jog at 60% MHR around the field to increase muscle temperature and heart rate. This would be followed by 15 mins of dynamic stretching (walking lunges, leg swings, arm/shoulder circles for 30 sec x 5). This could be accompanied with light resistance band lunges, push up and squats. This would further improve motor unit activation and increase the number of muscle contractions to propel the body. This would be followed by specific skill drills for 15 mins e.g. sprints with handballing, tackling drills with the coaching staff and drop punt drills.

This would lead to the team's ability to selectively attend as they can focus solely on their performance. They would effectively cut out crowd cheers and jeers, negative thoughts on current social media/commentary, trash talk from their opponents and thoughts of poor past performances. This aids their concentration on the release of their handballs to the correct teammate due to enhanced vision so they can follow the moving projectile. This also improves the accuracy of goal shooting due to increased proprioception (mind muscle connection) and improved hearing ability to listen out for the umpire's whistle for infringements from the opposing team. This allows them to position themselves quickly for a ruck contest. They will have an improved sense of equilibrium when kicking the ball, allowing for increased power output due to improved dynamic balance.

This effective and appropriate warm up guided by the coach would allow for improved selective attention from North Melbourne, thus allowing for considerable improvement of the whole team.

B Standard:

Nth Melb would complete an effective warmup which would allow them to improve their selectively attention.

The warm-up is the first phase of the training session which prepares the body for competition and minimises muscle and joint injury. It involves low intensity aerobic exercise, followed by dynamic stretches/resistance exercises and sport specific drills.

Selective attention is the ability to filter out irrelevant information and focus attention on relevant cues. Selective attention allows for better decision making.

The coach would instruct the players to complete a 10 min jog around the field. This would be followed by 15 mins of dynamic stretching of hamstring sweeps, lunges and leg swings. This could be accompanied by resistance band work to activate muscles. This would be followed by skill drills of handballing, tackling and drop punt drills.

This would lead to the team's ability to selectively attend as they can focus solely on their performance. They would effectively cut out jeers and trash talk. This aids their concentration on the task at hand of intercepting handballs and accurate kicking. Goal kicking would also be more accurate due to focusing on the goal posts and not the player on the mark. A thorough warm up guided by the coach allows Nth Melb to be at their best as they would be concentrating on all the correct cues and perform better.

C Standard:

If Nth Melb warmed up => selectively attention.

The warm-up has 4 parts. Jog, stretches, band work and skills. This helps the body be activated and ready for the competition of AFL.

Selective attention means the players can notice what they are meant to and not be distracted by other things. This helps them play better.

Nth Melb would go for a jog and then do different skills and drills and arm circles, leg work, push ups, pullups and then some work with the footy. This would make them ready for the game as they'd be warm.

They would then be able to concentrate on the game more as they would be ready to see the ball better for marking and be able to focus on kicking goals rather than points. They would hear their team-mates call out also and read the play. This would help them win their next game.

Question 18 – Criterion 6

The two core units are: Sport Psychology and Exercise Physiology.

The link is in the direction from Sport Psychology to Exercise Physiology. The link must be made from a positive perspective; for example, what Sport Psychology aspects did Arisa Trew (AT) use and how might these positively impact on her ability to improve her physiology so she could perform the skill.

Examples of possible links could include (list not exhaustive):

- if AT set goals, then this would increase her specific components of fitness (dynamic balance, coordination, speed, power)

- if AT was highly motivated then this would enable her to use correct methods of training (interval, resistance, plyometric, circuit)
- if AT used visualisation strategies, then she would improve the skills component of her training session
- if AT used goal setting, then she would excel in the competition phase of her training year.

A standard:

Arisa Trew's (AT) ability to set appropriate goals enabled her to effectively taper and peak for competition.

Goal setting can provide benefits such as increasing levels of intrinsic motivation, building a positive mindset and enhancing perseverance. Goals can be categorised through the SMARTER model, the stepping stone model and are made up of performance, process and outcome goals. Goals give athletes focus.

The training year consists of three key phases, preparatory, competition and transition. These phases enable athletes to understand when they need to taper to peak so they recover fully and can optimally perform due to reducing fatigue and maximising strength or endurance. Peaking and tapering occurs in the competition phase and is either whole season or in season.

During the preparatory phase, AT would focus on developing aerobic fitness and strength. Furthermore, AT can set process goals to provide her efforts with direction to increase her strength e.g. to focus on isometric squat hold technique of "knees out, chest up". She may also decide to set the process goal of consolidating her technique on the basic skills such as an "ollie" by adding an extra 20 minutes of skating after each session. This can enable her to understand if her timing/technique is correct whilst increasing her strength.

In the competition phase, AT may set short term goals that are more directed towards the 720 spin by first perfecting the 360 spin with optimal technique with focus on the landing. This can also demonstrate the use of the stepping stone model, where her long-term goal of performing a 720 can be achieved through the setting up of multiple short-term goals. She would also have set a performance goal to ensure this occurs of having a greater consistency of score over the three runs. This would allow AT, in the competition phase, to focus on tapering due to her goal of reducing intensity and volume in training sessions. This would be in season peaking as AT would have had qualifier events to peak for also.

This phase would lead AT to set goals which focus on technique and being at optimal fitness levels to ensure she can perform at her best. During the competition phase, AT may set SMARTER and performance goals. A SMARTER goal AT may have put in place could be: I would like to ensure consistency in my 720 flip by lowering centre of gravity through bending my knees during training two times a week leading into the competition. This focuses on the guidelines of 'S', 'A', 'R' and 'T'. 'S' (Specific) is seen through the focus on the specific flip. 'A' (Achievable) can be implemented through discussion with significant people such as family members and coaches to ensure this goal is not unattainable. 'R' (Realistic) can be seen through use of AT reflecting on whether this is attainable as she has done it before, and 'T' (Time-Framed) is seen through doing this before the Olympics. This leads her to strive to ensure that she 'in season peaks.'

During transition, she would focus on recovery through both physical and physiological recovery goals.

B Standard:

Arisa Trew's (AT) ability to set goals enabled her to taper and peak.

Goals can be categorised through the SMARTER model, the stepping stone model and are made up of performance, process and outcome goals. Goals can provide many benefits including increasing performance and improving skills.

The training year consists of three key phases: preparatory, competition and transition. Peaking and tapering occurs in the competition phase so that the athlete is recovered and fresh.

AT can set process goals in the preparatory phase to increase her strength e.g. do isometric leg exercises every night before dinner. She may also set the process goal of working on her technique on basic skills of dynamic balance and coordination by starting each training session with a warm-up concentrating on these areas.

In the competition phase, AT may use of the stepping stone model, where her long-term goal of performing a 720 can be achieved through the setting up of multiple short-term goals. She would also have set a performance goal of improving her score on a specific run, by using process goals of breaking the routine up in parts during training to allow for a decrease in volume. This would allow AT, in the competition phase, to focus on tapering due to her goal of reducing volume in training sessions and keeping intensity the same. During the competition phase, AT may set a SMARTER goal which could focus on the S and M: I want to get a score of 91 for a run by the end of the qualifying period (in season peaking). This is specific and measurable. Focusing on setting goals allows for peaking so that AT can master the 720.

C Standard:

Arisa Trew's (AT) will set goals => taper and peak.

Goals give us direction for our efforts. They can be process, performance and short term. Goals make focus points for the year.

The training year is made up of the pre-competition, competition and off season. Peaking occurs when you taper in the competition season so you can peak for best results and be fresh and recovered.

AT can set process and performance goals in the off season that allow her to taper in the competitive season. AT would set goals so that she can work on her components of fitness early on and skills later in the year so that she will be fresh and more likely to perform a 720. A process goal might be to work on getting up early 3 mornings a week and do mobility work during the pre-season so that she can be healthy and absorb a higher volume of work before she starts to taper.