

ASSESSMENT REPORT 2020

SPT315118 – Sport Science

This section will be comprised of **General Comments** – regarding the paper as a whole, followed by specific **Examiner's Comments** – with regard to each Section of the paper, followed by **Solutions** for each Section.

General Comments

The 2020 paper was generally considered by the Marking Panel to be a fair paper that would allow candidates to achieve a performance in line with their internal ratings; if they had revised appropriately and were versed in the specific knowledge of how to complete an exam – knowledge that would be gained by reading the comments contained within previous versions of this Report. Those who managed their time effectively seemed to have completed the paper within the time limits.

Once again, several common and recurring issues continue to be evident in relation to candidates' lack of experience and/or unfamiliarity with exam technique. Throughout all sections of the paper, a number of matters for concern were raised by Markers, where those who obviously had some knowledge of what they were writing about, lost marks due to some simple mistakes that those with more experience tend not to make. Such mistakes included:

- failure to fully read the question and understand exactly what it is asking (particularly evident in Question 15 where the direction of the scoring system was the opposite to how many interpreted them)
- not explaining, when questions ask for that level of detail
- not providing examples, or providing examples not relevant to the question (particularly evident in CDL's where, for example, the sub routines for an AFL kick are cited in a question about cricket)
- not justifying their responses when asked to
- not using required units in the Criterion 5 data questions (particularly evident in Question 7, eg bpm; mL/kg/min, etc)
- an inability to effectively manage their time, especially when the time allocation for the booklets varies from 30 to 45 to 60 minutes.

If candidates can be aware of these matters and do their best to address them, it is hoped they will achieve greater success.

In addition to the annual problem of candidates writing in pencil (an issue that has been warned against every year but still seems to be an issue), another interesting issue arose this year. Several candidates are starting to use erasable pens, which it seems are susceptible to having the ink disappear if exposed to excessive heat. As this is a distinct possibility due to the time of the year when exams are marked, it is advised that candidates do **not** use such pens.

There continues to be an issue raised from Markers, complaining about the legibility of candidates' handwriting. With an ever-increasing number of assignments throughout the year being typed and/or submitted electronically, many candidates are losing the ability to write at speed, in a clear and legible manner, for prolonged periods of time. Without any diagnosed justification for such an issue, candidates are running the risk that their marks will be negatively affected if the Marker cannot clearly read the writing in front of them. This becomes an even bigger issue when candidates have two exams in the one day, and/or write in blunt pencil. It is strongly recommended that in preparation for the exam, candidates spend more time practicing their handwriting, hopefully while doing previous exams, for durations up to as long as their exams will be.

Another aspect noted again by several Markers is where candidates take a “stab in the dark” by offering many more options than are asked for in a question; in the hope that the correct answer is contained somewhere within their answers. Candidates should be aware that if, for example, two pieces of information are asked for, and they give four, *the Marker will mark the first two and disregard the last two, even if the first two are incorrect and the last two are correct!*

Candidates aiming for higher grades are reminded to ensure that the language they use is of a more technical and specialised nature 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. CHO's, bpm, RHR, MHR, SMARTER, FITT, VO₂ Max, a-v O₂ diff, etc). Consequently, acronyms and abbreviations developed by individuals or classes to assist in learning and recall, may not be suitable and may cause marks to be deducted if they are unknown to the Marker (e.g. HIPS; VAMP).

On the topic of specialised terms, it is not expected that candidates will know all things about all sports, however, a reasonable level of general knowledge would be expected. Thus, many Markers expressed frustration with the use of terms such as the “ball” in badminton and the “bat” in hockey and tennis, or worse still, the “puck” in hockey for an Australian representative at the Olympics. Can Teachers and Candidates alike try to consider a wider range of sports throughout the year so they are better equipped to provide meaningful answers to the range of sports that may be presented to them in the exam.

The Criterion which continues to consistently cause the most issues and greatest variability between internal and external ratings is Criterion 6, Cross-Discipline Links (CDL).

Candidates seem to have grasped the notion that they must only complete two out of the three questions listed here; although, despite having more time to complete their links the slightly higher standard of answer expected in comparison to previous years is not as evident.

Having said that, the rate of candidates failing to attempt either of the questions was exceptionally low, and it seemed that a greater number of candidates did attempt to answer both links in both questions, which is pleasing to see. However, given that 4 out of the 7.5 marks for each link are allocated for the relevance and application of the theory to the specifics of the question – the sport, the athlete, the situation, etc, which includes the use of examples – many candidates continue to score quite poorly on each link. Consequently, when candidates provide little more than vague or general theory with little relevance to the scenario, their mark for that link is usually no more than 3-3.5 out of 7.5, which is usually only equivalent to a “t” rating.

It does still seem that some candidates enter the exam with the specific plan of only doing the minimal work required to gain a “t” on this criterion. Such a plan can come unstuck if candidates do not do as well on other sections as they hoped to do and end up needing a “C” on criterion 6 to gain the award they are after! Therefore, ALL candidates would be encouraged to ensure they have the ability and the time to complete this section to a satisfactory standard. Others, it seems, enter the exam with “pre-prepared, generic links” for their two preferred links. While such a method can be effective for stronger candidates with the knowledge and understanding to adapt and adjust these links to the specifics of the question, it seems to catch out those who lack that ability, especially when they cannot adjust the link to work equally effectively in either direction, or their knowledge of the required sports is limited.

Overall, only about 10% of candidates were able to provide answers for CDL's which addressed the standards at the highest level, across all four of the required links. Such a result should prompt those candidates with aspirations to achieve at this level to familiarise themselves more with the actual criterion standards and make greater use of the exemplars for each question provided in the solutions. Invariably, candidates who can write good quality CDL's also do well on other criteria, as they need the breadth and depth of knowledge in order to provide detailed answers in the first place.

SECTION A – EXERCISE PHYSIOLOGY

Question 1 – Criterion 1

- (a) Generally answered well. A common error made by candidates was describing the ATP-PC (Phosphagen) system and saying that “creatine releases a phosphate group” and this lasts for up to 10 seconds of high intensity energy. Candidates who read the question correctly should have identified that “immediately” relates to stored ATP, which only lasts for up to 2 seconds.
- (b)
 - (i) Generally quite well answered although it was quite common to see candidates listing muscular or cardiac responses. These were marked incorrect as the question clearly asked for “respiratory” responses.
 - (ii) Generally answered well. Better answers recognised the anaerobic nature of the expected adaptations as well as focussing on the specific benefit the adaptations gave to Simone’s gymnastic performance.

Question 2 – Criterion 1

- (a)
 - (i) A seemingly straight-forward question but many candidates provided adaptations that would be observed either at rest or during submaximal exercise. Decreased *resting* heart rate, for example, would **not** be evident at *maximal*/intensity.
 - (ii) Generally, quite well answered.
- (b)
 - (i) Generally well answered.
 - (ii) Overall, well answered but there was a trend of candidates correctly identifying the fibre type, i.e. slow twitch/type 1, in b i), but saying that it is white in colour. Candidates and teachers alike should consider the high blood supply, capillarisation and myoglobin content that give the muscle its colour.
- (c) Most candidates grasped the concept of both terms and explained its relevance to an endurance event. A number of candidates showed a misunderstanding that glycogen sparing allows athletes to “switch” to using fats/triglycerides first and then glycogen when, in actual fact, glycogen sparing allows a higher percentage or ratio of fat to be consumed simultaneously to glycogen.

Question 3 – Criterion 1

- (a) The structure of this question allowed for a range of possible answers that would have been considered correct. However, the basis for the correct answer for all three events should be based on the notion that the predominant energy system is the **aerobic**. Any ambiguity is dispelled by the notion that the aerobic system is generally considered to be the dominant system after 60 seconds. Research suggests this could be even earlier for elite athletes, of which McSweyn is clearly one. Some candidates tackled this question by providing a description of the interplay between the three energy systems and how this is affected by intensity and duration. Others answered with a thorough description of the breakdown of glycogen by the aerobic system. Either interpretation was considered appropriate.
- (b) The wording of this question also allowed for a range of acceptable answers. Some candidates answered by describing the process of EPOC, others listed the fates of lactic acid, while others talked about the effect of active recovery compared to passive. Marks were awarded for detail and accuracy for any of these three approaches.
- (c) Many candidates answered the absolute VO_2max question incorrectly which was surprising given that the answer is provided within the question. Generally, those who identified absolute VO_2max correctly were able to successfully calculate relative VO_2max .

- (d) The question was generally answered quite well although some candidates described McSweyn's high LIP in detail without referring to the athlete who performed poorly in the same event. Some candidates correctly stated that the athlete with a poor LIP would fatigue earlier in the race without mentioning lactate and hydrogen ions, others mentioned these by-products without explaining their effect on running performance. A comprehensive answer should have included by-products and their resultant effect on performance.

Question 4 – Criterion 2

- (a) Most candidates correctly identified relevant components of fitness. Better answers focussed on a description of the component, as required by the question.
- (b) Mostly answered to a satisfactory standard, although many answers were general and not related to the cyclist. For example, some candidates mentioned "game specific drills".

Question 5 – Criterion 2

- (a) Again, the wording of the question allowed for a wide range of responses; from mentioning a range of applications, to a detailed explanation of a single method. Either way, in order to obtain full marks, the answer needed to relate specifically to how it would be of benefit to Jessica in her sport.
- (b) Generally answered well, although for full marks candidates needed to provide an example of how volume and/or intensity could be manipulated to achieve an appropriate taper.
- (c) Generally, well answered, with better responses recognising the focus of the question related to the rapid recovery/alactacid phase of EPOC and the use of oxygen in helping to replenish haemoglobin and myoglobin; rather than talking about food intake.

Question 6 – Criterion 2

- (a) Generally answered quite well, although some candidates attempted to paraphrase the question without really explaining how either of the two concepts would be utilised.
- (b) This question was generally well answered, although there was some confusion between cold-water immersion (CWI) and contrast water therapy (CWT).
- (c) Generally, very well answered with appropriate nutritional strategies and accompanying explanations.
- (d) Many candidates answered this question with detailed definitions of "DOMS" and "intensity", while overlooking that the questions asks for the *relationship* between the two, that is, the higher the intensity, the more likely and severe the DOMS. Another common misconception was stating that lactic acid causes DOMS, when the most accepted cause is microtrauma or microtears in the muscles.

Question 7 – Criterion 5

- (a) (i) A straightforward question and consistently well answered.
- (ii) Again, consistently well answered but straight forward as Subject C is the "fittest" by all of the measurements included in the table.
- (b) Generally, well answered although it was quite common to see an explanation of Subject D's results without including any specific measurements. This failure to provide supportive data continues to cause too many candidates to lose marks.

- (c) Generally answered very well. Some candidates, albeit very few, argued that Subject C, rather than Subject A improved the most as they had a higher base fitness level and hence overcame diminishing returns. This case was potentially awarded full marks, provided the description and data evidence in support was sufficient.

SECTION B – SKILL ACQUISITION

Question 8 – Criterion 3

- (a) Better answers recognised that while Brooke was a projectile, they also understood that she was projecting herself and not being projected by another force. They also explained the factors chosen, rather than simply listing or briefly outlining. Most answered related to the angle of take-off (including best angle of 45°), speed of take-off (velocity), aerodynamic shape through the air and air resistance.
- (b) Mostly well answered. Candidates demonstrated solid understanding of force and how it applied. Repeating the law was not necessary as it was stated in the question and did not receive any marks.
- (c) Well answered. Candidates stated that the PRP would not have an impact and related to the type of stimulus (simple RT) and fact that long jump is a closed skill. Some candidates explained that PRP would not affect Brooke as long jump is not a team sport. This is an incorrect explanation as PRP can affect both individual and team sports.
- (d) Most candidates could refer to a correct Skill Acquisition type of feedback and provide an explanation. However, a number of candidates used positive, negative and other 'psychology' feedback types. Terminal feedback was, at times, described as being during the event rather than after it.

Question 9 – Criterion 3

- (a) Generally, well answered. However, full marks were only rewarded if candidates referred to small muscle groups used e.g fingers/toes for grip and/or the precision of the movements
- (b) Most candidates could easily identify 2 characteristics correctly. However, it was common that candidates did not provide a brief explanation. A number of candidates did use self-efficacy and other psychological terms here which were not rewarded.
- (c) Most candidates could give a correct factor; however, some did find it difficult to explain their chosen factor. Anticipation was well represented but not all related it to the start of the climb. Many used combinations of simple and choice reaction time. Candidates most commonly related the reaction time to the 'Go' signal. Some interpreted the question as relating to the initial 'Go' signal whilst others interpreted it as the climber making quick reactions during the climb ie which path to take. Both interpretations were acceptable.
- (d) Mostly well answered. Some very good definitions were of schema and varied practice were provided but many failed to relate them to the situation of rock climbing. Some candidates used an example from another sport, when the question clearly states to refer to sport climbing.
- (e) Many candidates used a lot of rambling with the key words 'thrown in', but not always explained well. The question specifically asked for focus on the Input and Processing phases of the Info Processing (IP) model paired with their relationship (influence) to the short-term memory that the climber would need to utilise. Some candidates simply explained the IP model with a diagram, which was not what the question was asking for.

Question 10 – Criterion 3

- (a) Most candidates recognised or related their answer to the PRP. Some candidates used answers which were psychology based rather than skill acquisition based. Better answers referred to the PRP, explained the PRP in relation to the situation and were able to say it can take approx. 0.5 secs to process the fake or successive stimuli presented with minimal time lag delay the response. Hick's Law is not a plausible answer.
- (b) A lot of candidates just stated, 'experience and autonomous stage of learning'. Lack of detail was the main issue with responses. In response to 'training' was not rewarded.
- (c) Poorly answered. Candidates had to apply the terminology to the badminton context. When candidates really understood this question, answers were brilliant. However, many struggled to tie it altogether and simply tried to rewrite the question, including the relevant terms, to no effect.
- (d) Most candidates understood spatial anticipation correctly but quite a few had temporal as 'where'. Several simply stated predicting what and when without connecting each to the relevant form of anticipation. The prediction of what and when the event was going to occur was critical as was relating it to a badminton scenario.
- (e) Poorly answered. Interestingly, many candidates were unclear as to how to succinctly explain the badminton player's base of support and how this would be impacted during a game. Many candidates spoke about the centre of gravity instead. A lot of candidates referred to the badminton player needing a 'good' base of support, which was not rewarded

Question 11 – Criterion 5

- (a) (b) and (c). Most candidates appeared to have little trouble with these questions. The main issues were with inconsistencies in providing the **full** answer e.g. the team name, the specific player where necessary and the score (data). Quite a few candidates seemed to read individual results, not team results and consistently failed to provide data across all 3 questions.
- (d) Most provided accurate justification for either Emus (most popular choice), Swifts (second most popular) or the Magpies (the odd choice thrown in). The key as to whether the answer was accepted was determined by the candidate's ability to **justify** their choice using data from the table.
- (e) Candidates were able to provide plenty of data but not many conclusions were made about the two teams' performances. Weaker responses provided conclusions such as 'Wren's are the worst team' and 'Rosella's are the better team'.

SECTION C – SPORT PSYCHOLOGY

Question 12 – Criterion 4

- (a) This was generally understood and answered quite well. It is important that candidates relate to the question not just write down definitions. It was important to note that in the vicarious experiences explanation, reference needed to be made to riders of similar ability giving Dakota confidence. Not just watching other pro surfers "surf" as this could have the opposite effect.
- (b) Better answers related performance goals to comparisons with one's own previous performances, as comparing to the past can help to monitor improvement rather than worrying about other competitors. There was a lot of general goal setting answers with some reference to sub-routines thrown in.

- (c) Many candidates simply re-stated the question that for goals to be effective they need to be specific and achievable. This did not score any marks. Better answers referred to the goals influencing their training and competition efforts and included examples to demonstrate their understanding.
- (d) Generally answered quite well. Better answers linked the key terms to relevant theories, such as the “Inverted-U Hypothesis”, or the “Catastrophe Theory”, while clearly explaining what occurs in a “choke”. Some also referred to the jump up from juniors to seniors helping to create the potentially stressful situation.

Question 13 – Criterion 4

- (a) Most candidates recognised the type of anxiety as “state”, but many forgot to give the required description of what state anxiety is. The majority of strategies provided showed good understanding of the concept.
- (b) Most candidates did this well and the marks on offer for the question helped boost their results considerably. Repetition was not rewarded; such as listing the checking of equipment in both lists; and, undertaking visualisation at both venues.
- (c) Candidates were better at applying their knowledge of Pre-play visualisation although some still confused it with replay. Problem solving was generically answered by many. With candidates stating that visualisation could be used to solve a problem, which was not considered to be enough depth.
- (d) Most candidates answered this quite well. There were some references to the Autonomous performer, but it was not a link expected in the explanation.

Question 14 – Criterion 4

- (a) Some candidates confused Broad External with Broad Internal (BI) saying that Lisa needs to be able to think about and plan a lot of information. Perhaps because candidates are often taught that coaching usually requires a strength in BI in their daily practices. However, this does not mean that they wouldn't also need to use all other styles at appropriate times.
- (b) Many candidates were led by the question to suggest that the GS needs to be **Internal** when they shoot a netball. However, the predominant style when shooting is still **External**. The shooter attends to the ball, the ring and their immediate defender. They may correctly use go internal PRIOR to shooting to get a ‘feel’ for the force needed, or to visualize the shot; or incorrectly because they are stressed (what if I miss?) but the mismatch comes mostly from being too **Broad** in this specific scenario.
- (c) Candidates answered this quite well overall.
- (d) Candidates need to remember which booklet they are answering, and the content they need to discuss. Several candidates said she will tell her players where to ‘orient’ and to what they should ‘selectively attend’ – both of which are Skill concepts and not appropriate for a Psychology question.
- (e) Candidates were quite clear on the KPI's and examples of these. Better answers said why they are developed. However, the “performance reference check points” detail was lacking in relation to either maintaining, or adjusting their plan at a pre-determined time, based on how performance was going. Many just restated further KPI's and that these will need to be checked at ¼ time to see how the GS was playing. They needed to relate this to the GS and the Competition Strategy.

Question 15 – Criterion 5

- (a) If candidates had not noticed the scoring system on the table being backwards then they generally scored 0 for this question. Candidates either got this or didn't. There were approximately 18 % of candidates who made this error and scored 0/10.
- (b) If candidates had not noticed the scoring system on the table being backwards then they generally scored 0 for this question. Candidates either got this or didn't. Better answers included a statement of how the data they used related to being stressed.
- (c) If candidates had not noticed the scoring system on the table being backwards then they generally scored 0 for this question. Candidates either got this or didn't. Better answers included a statement of how the data they used related to the player being a beginner (CDL).

SECTION D – CROSS DISCIPLINARY LINKS (CDL)

General Comments on CDL

Despite the anecdotal evidence that fewer candidates made no attempt to answer the questions on this criterion, there was still the recurrence of some familiar errors, against which a warning is given every year. These errors included:

- only attempting one link per question, resulting in a *maximum* score of 7.5 marks out of a total of 15 marks per question
- giving links between the incorrect core unit/s, resulting in a *maximum* of 2 marks out of 7.5 marks for any such link
- giving Intra-relationship links between aspects from the same core unit, resulting in a score of 0 out of 7.5 marks for any such link
- giving negative links and/or examples in response to a positive stimulus scenario; such as stating that if Eddie wasn't optimally aroused, he would focus on x, y, and z; all of which were the things he should NOT be focussing on. Instead candidates should be stating that by being optimally aroused, Eddie was able to focus on a, b, and c; which were the things on which he should be focussed. Such responses addressed from the wrong perspective result in a *maximum* of 3.5 marks out of 7.5 marks per link
- re-writing info from the stimulus...at the expense of addressing the question
- not understanding that providing a definition doesn't satisfy the background theory requirement
- the provision of examples to support their theory descriptions that were from a completely different sport to the one in the question – eg- how to kick in a crosswind as an example of schema for a question on a hockey player.

Candidates would be reminded to examine the exemplar answers in the Solutions provided to act as a guide on how to set out their answers, in order to make it easier for Markers to determine what the actual links are and where the first one ends and the second one starts.

Due to the nature of many answers, the better answers clearly stand out, mainly because they tend to demonstrate the following characteristics:

- are well structured
- strike a balance between succinctness and breadth and depth of detail
- demonstrate thorough application of concepts, reflecting depth of understanding and specific CDL preparation where links are 'in the bank', or prepared BUT understanding is at a level that offers the flexibility to tackle ANY 2 of the 3 CDL questions on the day, depending on question structure and the candidate's knowledge and understanding of the sports involved
- make reference to the specific stimulus details throughout, including in background theory, or as a combination of theory and examples blended into one.

It was noted by the Markers of this section that a number of factual errors were included, where the understanding of the theory being referred to was not as it is taught. Such examples of this included:

- The training principle of "variety" is a physiological consideration which encourages variety in training *method* to achieve the same end of developing the same energy systems; muscle groups and components of fitness. Far too many candidates used this only in relation to changing the environment in order to develop schema.
- Traits of Self-Efficacy were frequently attributed to being those of Self-confidence
- Memory referred to as an aspect of Psychology, rather than Skill concept, which lead to intra links and a mark of 0 for that link.
- LIP was being described as the point where the sudden accumulation of blood lactate occurs, rather than the last point where lactate entry and removal are in balance. Some candidates also failed to mention that LIP is last or highest point where this balance occurs and simply stated it was where they were in balance.
- The explanations for concentration and attention were mixed up/confused.
- Flow state was linked to arousal, rather than motivation or attention.
- Self Determination Theory (SDT) being linked to part of Self-confidence when it is part of Motivation.

2020 SOLUTIONS

SECTION A – EXERCISE PHYSIOLOGY A

Question 1 – Criterion 1

- (a) ATP = Adenosine TriPhosphate – One Adenosine molecule and 3 phosphate molecules. ATP splits to release energy – when the third phosphate molecules' energy bond is broken, it splits off, releasing energy and leaving ADP (Adenosine Di Phosphate) and Pi (an inorganic phosphate).
- (b) (i) Any two of the following for ½ mark each: Increased respiratory rate, increased tidal volume, increased ventilation, increased oxygen uptake, increased minute volume, increases gas exchange, increased CO₂ exhalation/expiration, increased diffusion/perfusion
- (ii) Any two of the following for 2 marks each:

Chronic Muscular response (Anaerobic / resistance training)	How this benefits Biles' performance
Increased muscle stores ATP / PC	Increased stores of ATP-PC to 'fuel' Biles during her performance.
Increased capacity ATP-PC system	Increased ability to break down ATP and replenish PC / resynthesis
Increased Muscle Glycogen stores and glycolytic enzymes	Therefore, increasing capacity of ATP-PC system to operate efficiently
Increased size of fast twitch (type II) muscle fibres (Muscle Hypertrophy)	Muscle Hypertrophy – to enable Biles to perform faster, stronger and more powerful moves with control and precision.
Increased speed and force of contraction	More powerful, quick contractions in muscles – needed for quick actions / manoeuvres
Increased number of muscle capillaries	Improvements in efficiency due to increased capillary network servicing the muscles.
Increased length of muscles, tendons and ligaments due to flexibility	Increased range of joint movement. Increased flexibility allows for greater range of movements Biles can perform.
Increase muscular endurance.	Improved ability of muscles to contract under fatigue, resulting in more powerful movements later in the floor routine.
Increases O ₂ uptake	Improved ability to utilise oxygen would delay lactic acid accumulation and therefore allow Biles to maintain performance longer into floor or bar routines without fatigue.

Question 2 – Criterion 1

- (a) (i) Any two of the following. The list is not exhaustive; however, adaptations must be relevant to “maximal” exercise: Cardiac Hypertrophy; Increased SV; Increased Blood Volume and Haemoglobin; Increased capillarisation of heart muscle; Increased capillarisation of skeletal muscle; Increased LIP; Increased VO_2max ; Increased Cardiac output; Increased stroke volume; Increased $a\text{-vO}_2$ diff; Increased blood flow to working muscles; Increased lung volumes, etc.
- (ii) The explanations for each of the above must relate to how they benefit Wurf physiologically.
- (b) (i) Slow Twitch Muscle Fibres OR Type I Muscle Fibre
- (ii) Any four of the following: red in colour; aerobic characteristics; slow speed of action; low force production; high resistance to fatigue; small fibre diameter; high capillary supply; high stores of mitochondria; low glycolytic capacity; high oxidative capacity; motor nerves small; major storage fuel= triglycerides.
- (c) Glycogen sparing is the process whereby glycogen stores are not used early in exercise due to the increased ability of the trained body to utilise triglycerides to produce energy. Wurf’s body would have physiologically adapted to be able to ‘spare’ his glycogen. This delays depletion of CHO stores and thus delays Wurf potentially ‘hitting the wall’ (where liver and muscle glycogen stores are depleted, resulting in fats becoming the primary fuel source to produce ATP). As fats take longer to oxidise than CHO’s, ATP production is slowed thus the term ‘hitting the wall’.

Question 3 – Criterion 1

- (a) The predominant energy system for all three events would be aerobic; with varying contributions from the two anaerobic systems depending on duration and circumstances; such as when bursts are made to start, overtake or finish the race.

For example – the 1500m event: Initial ATP energy for first couple of seconds produced using stored ATP in muscles. Stored CHO’s are then utilised by the body in the form of Glycogen and Glucose and sent through the process of glycolysis. This process generates pyruvic acid. Lactic acid will begin to accumulate in McSweyn’s body and hydrogen ions begin to accumulate due to the high intensity effort. From around the 1-2 minute mark of his race, the aerobic system (aerobic glycolysis) now comes largely into play to help break down and remove lactic acid and supply energy through the Krebs Cycle and Electron Transport System (ETS). The Krebs Cycle takes in the Pyruvic Acid (in the presence of oxygen) to create CO_2 and ATP energy. The ETS continues to produce high amounts of ATP energy, H_2O and Heat.

- (b) Either:

- 65% oxidised to form CO_2 and H_2O
- 20% converted back into glucose by liver
- 10% converted in liver to form protein
- 5% converted into glucose

OR,

Lactic Acid would be cleared from the body following McSweyn’s race more rapidly if he were to use an active recovery. This would ensure blood flow remains higher and removal of LA from the muscles would be quicker (than passive recovery). Lactic Acid is converted by the body into CO_2 , H_2O , Glucose, Glycogen and Protein.

OR,

Oxygen consumption remains elevated to remove lactic acid from the blood. Lactic acid leaves the muscles and is taken up by the bloodstream. It is converted back to pyruvic acid and processed in the liver. The majority of this lactic acid is converted to CO₂ and H₂O with some remaining as glycogen, protein and glucose.

(c) Absolute VO₂ max = 5.5 litres per minute OR 5.5L/min

Relative VO₂ max = Convert 5.5 litres to millilitres = 5500 millilitres, then

5500 / 70 = 78.57 mL/kg/min

Their LIP may be at a lower point (e.g. they reach and then cross their LIP sooner and therefore accumulate LA at an earlier point in intensity). They may build up more LA at a lower intensity of exercise, thus inhibiting their performance. McSweyn may also have a superior tolerance to LA in this example.

SECTION A – EXERCISE PHYSIOLOGY B

Question 4 – Criterion 2

Any three of the following for 1 mark each:

Component of fitness	Description
Cardiovascular endurance or Aerobic capacity	The heart's ability to deliver blood to the working muscles and their ability to use it. Aerobic system use paramount for 6-hour endurance cycling event.
Local Muscular endurance	The muscles' capacity to continue to contract for a long period of time without experiencing fatigue. Cyclist pedalling for 244km requires muscular endurance.
Balance	Maintenance of equilibrium whilst dynamically cycling – able to balance on turns, hills, etc.
Muscular Power	Ability to produce maximal force quickly eg. quick burst of speed or short hill climb.
Speed	Move quickly from one position to another. Faster in sprint finish and changing from one position to another quickly.
Muscular Strength	The ability to generate force. Allows the athlete to turn a bigger gear and recruit more power.
Body Composition	Body size, lever size, distribution of muscle to body fat will all impact the cyclist
Flexibility	Range of motion around a joint impacts the application of force. Can impact levers used by cyclist and power output.
Co-ordination	Motor skill performed fluently and effectively. Co-ordination between eyes, pedalling and steering bike.

Phase of training year - Identification	Primary focus for endurance cyclist
PREPARATORY (Pre-Season)	<ul style="list-style-type: none"> • Develop general fitness as solid base • Development of aerobic energy system • Work on weaknesses • Volume of training high • Intensity begins low gradually increasing
COMPETITIVE (In Season)	<ul style="list-style-type: none"> • Maintain pre-season fitness • Tailor to specific event preparation • Peak and taper according to events
TRANSITION (Off Season)	<ul style="list-style-type: none"> • Psychological and physical break • Remain reasonably active • Low intensity participation in different sport • Specialised weight training or programs to remedy weaknesses • Utilise continuous, cross and resistance training

Question 5 – Criterion 2

- (a)
- Using Isotonic weight training to develop muscular strength and power – especially in her core and arms.
 - Manipulating weights, repetitions and sets to gain muscle strength.
 - Use isometric resistance training, contracting muscles against an immovable force to increase and improve Jess' grip on her paddle.
 - Using bodyweight resistance training to increase core body strength.
 - Exercise ball training to help Jess develop her core stability and strength.
- (b) In order to be in her best physical and psychological condition for the Olympics, Jess would need to **taper** before the event. Tapering involves a decrease in either the **volume** or **intensity** or **both** of workload in her program as the event approaches. Jess would aim to be at her peak or in the best form possible for the day of the event.
- (c)
- Restoration of oxymyoglobin stores in muscles and oxyhaemoglobin in the blood
 - Replenishment of phosphagen stores (ATP + PC)

Question 6 – Criterion 2

- (a)
- The **specificity** principle states that in order for Fyfe to improve performance, he must stress the appropriate physiological systems (fitness components, energy systems and body parts/muscles) to achieve the adaptations required to improve.

OR,

- For Fyfe's training program to be a success, he must train specifically, selecting specific training methods that will develop specific fitness required. Within each training method, he must choose exercises that will develop specific body-part fitness required.

Progressive overload states if Fyfe wants to improve, he will need to exercise at an exercise intensity greater than his existing capacity, moving towards his ultimate performance goals. If his training load exceeds that to which his body is accustomed, his body will adapt physiologically (thus a higher load will be required for further improvement).

- (b) To decrease temperature of the muscles, decrease blood flow which helps to reduce bruising and swelling, decrease inflammation and decrease soreness gained through injuries during the game.
- (c) During the game:
- Water every 20 minutes
 - High GI foods e.g. gels for quick energy replacement (especially during half time break)
 - Sports drinks to maintain electrolytes
 - Glucose tablets to maintain energy, preserve glycogen stores
 - Low GI for sustained energy
- After the game:
- Rehydration
 - CHO rich (High GI) snack / meal within 1st hour of game finish
 - Consume 15-25g high quality protein within 1st hour of game finish
 - Weigh himself to monitor fluid loss (compare to before game) MUST DRINK 1-1.5X that amount. Weighing is not a nutritional strategy unless the athlete drinks water/sports drink.
 - Consume sodium rich foods to replace sodium or electrolytes lost in sweat.
- (d) DOMS is more likely to occur when exercise has been higher than normal in intensity. As the intensity of exercise increases, so does the likelihood and severity of DOMS.

Question 7 – Criterion 5

- (a) (i) Athlete C
- (ii) Any two of the following for 1 mark each:
- Resting HR lower @50 / 45 bpm (lower than anyone else's – showing increased capacity of CV system).
 - VO_2 max is the highest – 63 / 65 mL/kg/min – everyone else's figures are in the 40's and 30's. Shows higher capacity of oxygen system.
 - Max a- vO_2 difference is higher 16 / 18 mL O_2 per 100mL blood - more O_2 is being extracted from the arteries – more efficient system.
 - Stroke Volume higher – 140 / 155 mL / beat much higher than anyone else's – greater volume of blood pumped from heart each beat (more efficient).
 - Sub-maximal HR lower 130 / 125 bpm demonstrating that the athlete is very 'comfortable' in this sub max intensity. Other athletes' sub max readings are higher (125 – 160bpm) showing greater effort at this intensity of exercise.
- (b) Any three pieces of information, such as the following, that contain BOTH data and reasons and compare the pre and post results:
- Only subject to actually increase Resting HR after training program (59 – 65bpm)
 - VO_2 max decreased from 42 to 39 mL/kg/min showing decrease in overall fitness

- Stroke volume decreased (115 – 110 mL / beat) showing decreased capacity of heart
 - a-vO₂ remains low (13 to 12 mL O₂ per 100mL blood)
 - These results demonstrate that Subject D's performance actually decreased during the training program – perhaps injury hampered performance? Maybe lacked motivation and didn't put in full effort? Key is to acknowledge Subject D deteriorated in performance and what could have been contributing factors to this.
 - Athlete D may have already been training hard and the experiment was actually a DECREASE in training volume.
 - Athlete D may have been over trained by the program i.e. the overload was not progressive.
- (c) Subject A has shown greatest overall improvement. Evidence for this includes:
- Resting HR – has improved 5 bpm (60 – 55 bpm). Subject C also improved 5 bpm. This shows increased capacity of CV system.
 - Sub-max HR has decreased from 140 – 130 bpm showing less stress at lower level of intensity (body coping more efficiently). This is the biggest improvement among the 4 subjects.
 - Stroke Volume has increased substantially from 110 – 135 mL / beat, a 25mL improvement, next closest was C with a 15mL improvement. Improvements in efficiency of the heart.
 - a-vO₂ difference improved by 4mL O₂ per 100mL. Biggest improvement in efficiency of O₂ extraction. Next closest improvement was 2mL O₂.
 - VO₂max improved 2mL/kg/min (from 43 to 45). Subject C also improved 2mL/kg/min. This shows improved efficiency of O₂ transport system.

SECTION B – SKILL ACQUISITION

Question 8 – Criterion 3

- (a) Any two of the following:
- Angle of take-off – 45° is optimal for best distance. Too high or low an angle will decrease distance covered.
 - Speed/velocity at take-off – the greater the speed, the greater momentum and therefore greater distance covered.
 - Shape during the jump – Brooke leans forward to attempt to minimise drag and create a more streamlined, aerodynamic shape, thus minimising air resistance.
 - Air resistance – when Brooke's body travels through the air, it creates a drag force behind it, which decreases the distance travelled.
- (b) When Brooke's take off foot pushes against the ground, downward and backward forces are applied against the ground, pushing her upwards and forwards. The equal and opposite reaction from the ground, propels Brooke upwards and forwards through the air and into the long jump pit.

- (c) No, it will not have an impact. The PRP will not come into play as LJ is a predominantly closed skill and performance should be consistent and much the same each time she jumps. There is no need to react to an outside stimulus (as occurs in PRP) as Brooke is in control of the timing and has no direct opponent to impact this timing.
- (d) Any three of the following:
- Knowledge of Results – Information about the outcome of the performance – eg. how far she jumped.
 - Knowledge of Performance – Information about the technical correctness and movement pattern / sub-routines performed. This could be from Brooke herself (internal / intrinsic) or her coach (external/ extrinsic).
 - Internal / Intrinsic / Sensory – sensory or inherent feedback from Brooke's own senses during and after the jump.
 - External / Extrinsic / Augmented – Any information provided to Brooke from an outside source eg. scoreboard lights up her distance, coach feedback, replay on TV.
 - Continuous / Concurrent – Any information Brooke gains DURING the long jump execution eg. she is off balance in her flight.
 - Terminal / Discrete / Delayed – Any information Brooke receives AFTER the performance eg. her jump was a foul.

Question 9 – Criterion 3

- (a) Small, precise movements of fingers and toes to hold onto the blocks and grip using small muscle groups to maintain balance and hold on to the wall.
- (b) Any two of the following:
- can perform the skill without thinking
 - has automatic timing of subroutines
 - effortless movements
 - performer can carry out another skill simultaneously
 - repeatable and consistent performance
 - high speed and high efficiency
 - little 'thinking' about the skill is required
 - performer identifies and corrects their own errors
 - further information can be processed without detriment to the skill
 - improvements are subtle.
- (c) Any of the following factors explained:
- Simple Reaction time of the climber to the 'Go' stimulus will be critical.
 - Intensity of stimulus 'Go' signal will need to be clearly heard by the climber.
 - Choice reaction time/Hick's Law – the greater number of alternatives selection of which block to hold next will be especially important as it could potentially increase RT.
 - Presence or absence of warning signals (before the 'Go' stimulus).

- Previous experience will help to decrease reaction time during the climb in selecting appropriate holds.
 - Ability to block out irrelevant cues and information e.g. crowd will decrease reaction time – (selective attention).
 - Stimulus – response compatibility to the ‘Go’ signal.
 - Signal detection through use of senses.
 - Anticipation.
- (d) Schema is a set of rules developed through practice of a motor skills under a range of environmental conditions. Schema is developed through variety of practice in a wide range of conditions and for a climber, on a wide range of walls. The climber who had practiced or competed on a wide range of walls will have an advantage over a climber who has had limited practice on differing walls. Climbing is an open skill in this competition as the climber has not seen the wall configuration before, therefore it is unpredictable. The more experience (varied practice) one has in these ‘new’ (wide range of conditions) situations, the greater schema they would have developed and the better they will cope with the competition.
- (e) The climber would need to use their short term memory to recall information immediately after being exposed to it – the climber would see (using sense of sight – **input**) the wall, selectively attend (input) to the information to plan their route and then remember and recall the route chosen (using short term memory). The climber would need to minimise distractions during this time as this could interfere with their ability to remember. As time is limited, this is the main memory they would utilise. The climber will be able to remember the course as long as they continue to give it their attention. To **process**, the climber needs to identify the course they would like to take and recall the motor program they would require from their long term memory.

Question 10 – Criterion 3

- (a) The most appropriate response to the given situation is: Psychological Refractory Period (PRP) – a player can only process one piece of information at a time. It takes approx. 0.5 seconds to process a fake or false movement before the player can then respond and reprogram the correct action, therefore delaying the response – this is the PRP. Other answers such as the following were considered, depending on the detail in the explanation:
- poor Selective Attention – failing to pick up the correct cues that a drop shot was about to occur
 - probability of stimulus occurring is low – therefore this shot was not predicted at that point in time
 - low stimulus intensity – not obvious and well disguised by the more experienced opponent therefore catching the player off guard
 - cue abbreviation.
- (b) Any of the following would be appropriate:
- An elite player can anticipate due to varied practice, experience and knowledge of their opponents’ game.
 - An elite player would have the advantage of schema development – ability to execute skills in differing environments – this would have led to their adapted ability to predict what may happen in a passage of play.
 - Elite player would have more developed stimulus identification – being able to see the players cues for the drop shot early.
 - Ability of the elite player to predict future events based on early signals or previous experience relies on information from the senses paired with long term memory and anticipation.
- (c) Long term memory holds information that has been repeated or rehearsed – for example, if a player has played this opponent before, they should have in their memory, the types of preferred shots and style of play that they are likely to expect. If a player has had this strategy used against them in a match, they should attempt to encode

the information to be able to anticipate when it may happen in the future, therefore giving them an advantage. If a player can identify a stimulus (stimulus identification) is about to occur (their opponent is about to play a drop shot) through seeing the cues (sensory cues) they perform (recalling this from their LTM), then they will be able to better position themselves earlier and thus make a better return.

- (d) Spatial (event) anticipation involves predicting WHAT will happen. Temporal anticipation involves predicting *when* the event will occur. By playing an opponent previously, one can build up a knowledge of the types of shots they may play, and their game style plus the cues they may be able to detect to gain early information about a specific shot coming up. This enables a player to better predict both *what* will occur and *when* it is more likely to happen, thus providing them with an advantage.
- (e) BOS is the area supporting the base of an object, in this case the badminton player and is directly related to their stability. During a serve for example, the player will have a wider than shoulder width BOS to remain stable whilst during the point, BOS will vary greatly from being in midair (no BOS) to stretching wide for a shot (wide and stable BOS). BOS will vary greatly from very stable to unstable during any game.

Question 11 – Criterion 5

- (a) (i) Emus GS with 308 goals
(ii) Emus GA with 127 goals
- (b) (i) Parrots (93% & 88%)
(ii) Rosellas (59% & 59%)
- (c) (i) Brolgas, GA with 41 assists
(ii) Swifts, GS with 10 rebounds
- (d) EITHER
 - Emus with the highest total number of goals at 435. 2nd highest number of attempts (557), 34 assists (7th) with 77.5% accuracy (6th best)
 OR
 - Swifts with the 2nd highest number of goals (420), 2nd top in rebounds (12), 5th top in assists (38) and 4th top in accuracy (84.5%).
- (e) The comparison can be seen in the table below: (*at least two expected*)

	Rosellas	Wrens
Total Goals (rank)	351 (7 th)	347 (8 th)
GS goals, attempts & % accuracy	176 goals from 300 attempts @59% accuracy	182 goals from 304 attempts @60% accuracy
GA goals, attempts & % accuracy	175 goals from 298 attempts @59% accuracy	165 goals from 187 attempts @88% accuracy
Total team attempts	598 (most attempts of any team)	491 attempts
Assists GA / GS	14 / 9 (total 23)	7 / 33 (total 40)
Rebounds GA / GS	6 / 0	6 / 0

Conclusions to make about their performances include the following: (*at least two expected*)

- The difference between the two teams lay largely with the accuracy of the Wrens GA.
- Rosellas had 107 more attempts at goal than Wrens.
- Rosellas achieved only 4 more successful goals in total.
- Wrens had 17 more assists.
- Wrens GS, Rosella GS and Rosella GA all very similar shooting statistics.
- Same number of rebounds for both teams.
- Probably end up around similar place on the ladder.

SECTION C – SPORT PSYCHOLOGY

Question 12 – Criterion 4

- (a) **Performance accomplishments:** As Dakota has succeeded in surfing competitions in the past, he is now confident (he has his successful results on the board) he can do it again. His previous success in Junior ranks gives him confidence in this situation.

Vicarious experiences (or modelling): This relates to when we see someone succeed and we think 'If they can do that, I can too'. For Dakota, he would have seen previous champion surfers perform a specific manoeuvre and therefore model his performance to theirs – if they can, I can too! People he surfs with being successful helps him believe he can do it too.

- (b) To set performance goals, Dakota should focus on achieving standards or performance objectives independent of other competitors, usually based on comparisons with his own previous performances.

The setting of performance goals has been shown to decrease anxiety and increase self-confidence as the athlete has control over their behaviour, unlike outcome goals which can be stressful. This reduction in anxiety and increase in self-confidence will enable Dakota to focus on and therefore improve skill execution.

- (c) Dakota should use specific goals which are as clear as possible to focus his attention. They should be specific to skills, muscles and energy systems. These specific goals should also be achievable by Dakota.

Achievable goals should be something to aim for as they are challenging but also realistic. Goals that are achievable can enhance performance by providing motivation and confidence.

- (d) **Over arousal** inhibits performance often causing high stress level which negatively influence performance; these influences can range from butterflies in the stomach to a panic attack and prevent an athlete from performing to their best.

Choking seems to happen very suddenly. When the pressure builds and the importance of the situation makes it hard to control one's emotions, a sportsperson can become physically unable to execute sporting skills they would normally have no problem with.

Question 13 – Criterion 4

(a) **State anxiety** – which is the anxiety inherent in a situation as perceived by Dylan – in this situation, Dylan's perceived extra pressure came from the live broadcast event or situation.

Strategies to decrease this anxiety could include any of the following, if explained:

- Accept that some tension or anxiety is usual prior to competition.
- Engage in preferred relaxation technique such as controlled breathing, centering, progressive relaxation techniques, imagery, visualisation, massage, meditation and yoga.
- Engage in mental rehearsal.
- Focus on task relevant factors (if over aroused during performance).
- Seek out others who are calm.
- Listen to his favourite music.
- Engage in his preferred distracting activity.
- Downplay the importance of the contest and the result.
- Provide time for relaxation.
- Direct his attention to the process required to perform well.
- Present a calm presence.
- Remind himself of their thorough and appropriate preparation.
- Have a pre-competition strategy which provides the necessary control and direction to limit anxiety.
- Keep sport in perspective.

(b) (i) In the **lead up** to the event (i.e. at his hotel or home):

- rest
- diet
- equipment checks
- spare time
- travel
- mental preparation

(ii) **Once arriving** at the Australian Open venue:

- arrival time
- who to report to
- physical preparation
- mental preparation
- dressing for the contest

- team meetings/individual discussion with the coach
 - who to spend time with
 - final personal preparation.
- (c) (i) **instant preplay:** involves taking a few moments prior to executing your skill to rehearse the process. Dylan could do this, for example, in rehearsing his serve. The rehearsal is generally short and includes all major components of the activity. How Dylan uses it to his advantage is the final part of this.
- (ii) **problem solving:** assists athletes to visualise to work out how a specific problem can be solved – looking at alternatives and anticipating that things will not always go your way, leading to a greater number of choices. Dylan could, during the match, utilise problem solving when he realises that his stats on returning a specific opponent's serve have not been going well. He could look at alternatives and decide to play this shot differently in the future to turn it around.
- (d) Achieving flow state is difficult, the athlete feels “at one” with the activity, totally immersed within it. The individual is caught up in his or her thoughts and ideas, interacting with these, rather than the environment.

When in flow state, the focus is almost exclusively internal. It is often described as the highest form of Intrinsic motivation.

When experiencing it, the athlete may feel a distorted perception of time, either feeling like things are in slow motion and they have all the time in the world, or that time passes quickly, and hours seem like minutes.

Question 14 – Criterion 4

- (a) Lisa would need to be strong in this dimension *during the game* so she can quickly read complex situations and respond to them. As a coach she would need to “see” everything that is happening and potentially process a lot of information quickly. A coach needs to have great court awareness and ‘scanning’ ability and respond to it quickly. E.g. They would read the fast-paced action at training to know when to change drills. (externally paced)
- (b) Lisa’s GS suffers attentional mismatch (due to dominant attentional style) under stressful conditions which may be inappropriate. For example, if the GS’s attention becomes more “Broad External”, she may have issues blocking out the crowd during a shot which requires a “Narrow External” focus. If the GS is in the incorrect attentional style, she might miss the shot.
- (c) Lisa could use *extrinsic* rewards to motivate a specific player by having a one to one conversation with this player.
Tangible extrinsic rewards are rewards which can be measured or are definite such as money or medals.
Intangible extrinsic rewards are rewards which are unquantifiable or that can't see touched such as TV interviews or support or attention from fans.
- (d) Any two of the following could be described:
- Lisa will encourage her players to focus on their game plan as the most important task. She will ask them to learn to refocus when you get away from your game/ event plan. When you become increasingly aware of the crowd, say to yourself, “Not right now” then ask yourself: What’s my mission right now?
 - She will encourage them to bring their thoughts back to KPIs/ Task Relevant Factors and using mood/ cue words which can help athletes to focus back on their game/ event plan.
 - Lisa may ask her team to practice in a similar situation – e.g. with loud music, many distractions, etc. to simulate the hostile and distracting environment, thus minimising the impact on the players. She will

acknowledge that the crowd could be hostile and talk about this with her players beforehand to pre-prepare them mentally for this. (train for the pain)

- Accept, expect and train for the pain, use it as motivation, develop coping strategies.

(e) *KPI's* tend to focus more on the physical performance. The indicators are analysed by coaches and athletes and these can be to measure performance.

- E.g. GS: Aiming to achieve a 90% accuracy rate
- Create/limit the Number of turnovers
- Number of rebounds made
- Number of times the ball enters the attacking/shooting ½/circle

They can be a good way to control arousal/anxiety.

Throughout a contest athletes/teams/coaches must be able to monitor their performance and adapt their game plan and/or personnel to meet challenges put before them. This relates to *Performance Reference Check Points*.

Lisa may identify the ten-minute mark in the first period of play (or ¼ time) as the point at which performance to that time is assessed. At this time the game plan will be maintained or altered. Subsequent “fine tuning” points will be identified for the contest’s duration.

For the GS, this may be a strategy used to evade their opponent in the 1st ¼ of the game which will be reassessed at ¼ time. Did it work? Should the GS change their strategy?

The GS may be attempting a slight change to their shooting motor program which they have practiced during training. Reassessment will occur at ¼ time to determine if it is working.

Question 15 – Criterion 5

- (a) (i) Athlete A (9)
 (ii) Athlete C (20)
 (iii) Athlete B (16)

(b)

	Self-Control (rank)	Concentration (rank)	Goal Setting (rank)
Athlete A	9 (2 nd)	12 (2 nd)	12 (1 st)
Athlete B	22 (3 rd)	21 (3 rd)	16 (3 rd)
Athlete C	7 (1 st)	8 (1 st)	14 (2 nd)

Athlete C would most likely be better suited to perform in highly stressful environment as they ranked best in their ability of Self Control and Concentration and second in Goal Setting. The Self-Control and Concentration categories would be paramount to coping in highly stressful environment.

- (c) Athlete B is the beginner. This is indicated by the fact that they scored in the “above 18” range, indicating the need to develop further, in the following categories:
- Self Confidence (19)
 - Concentration (21)
 - Pre-Comp Prep (19)
 - Self-Control (22)

These are all skills a beginner would need to continue to develop.

SECTION D – CROSS DISCIPLINE LINKS (CDL'S)

*It should be noted that the following exemplars represent **the upper level for each rating** and are meant to act as a guide for candidates who aspire to achieve at the respective rating levels.*

Question 16 – Criterion 6

Eddie Ockenden (EO)

The two core units for this question were **Sport Psychology** and **Skill Acquisition**.

Links could be made in **either** direction, that is, from Sport Psychology to Skill Acquisition, OR from Skill Acquisition to Sport Psychology.

Links must be made from a **positive** perspective – that is, what Psychological strategies did EO use and how did these positively impact on Skilled performances over such a long career; or what/how did EO's superior skill level enhance his ability to utilise effective Psychological strategies?

Two links need to be made. Each link is assessed out of 7.5 marks, according to an agreed Guide.

Possible links:

- The use of effective feedback enabled the employment of effective goal setting.
- Effective arousal control enabled the ability to selectively attend.
- Effective use of goal setting enabled the development of skilled output.
- The development of schema helped develop self-confidence and self-efficacy.
- Well-developed schema helped EO achieve “flow” state.
- High levels of motivation allowed EO to undertake effective practice.
- The ability to effectively shift between attentional styles ensured EO was able to selectively attend.

Exemplars

“C” standard

The following is an example of a link that could have been made. If two links of a similar standard were written, the candidate would have received a “C” rating.

Feedback → Goal Setting

Feedback is the information received about a performance. It can come from different people (yourself, coach) and at different times (during or after the game). It can tell you different things (what happened and why it happened).

Goal setting is important as it gives direction to your efforts and helps increase motivation. Goals can be set for the short, medium or long term and they should be set according to the SMART guidelines. Goals can be based around your performance, a process, or an outcome.

Throughout his career, EO has always worked closely with his coaches, trainers and team mates to ensure their individual and team goals were agreed on by everyone concerned. By focussing on individual goals that were about the processes involved in hockey, like how to place a shot on goal with extra power, EO had control over achieving his goals and was able to sustain his success over a long period of time.

“B” standard

The following is an example of a link that could have been made. If two links of a similar standard were written, the candidate would have received a “B” rating.

The use of effective feedback enabled the employment of effective goal setting

Feedback (FB) is the information received about a performance. Extrinsic FB comes from external sources, such as a coach; whereas Intrinsic FB is the information you can detect yourself. FB can be received at different times, such as concurrently during the execution of the skill, or terminally once it is completed. FB provides information about what was the outcome of the skill – this is the Knowledge of Results (KR), such as a goal was scored; or about why something happened – this is called Knowledge of Performance (KP), such as you missed the goal because you swung across your body too much.

EO knows the value in setting goals and always having something that he is striving to achieve. It keeps him motivated and focussed on the task at hand; while keeping an eye on what is also being worked towards. EO ensures his goals adhere to the SMARTER guidelines and that it is better to focus on performance and process goals over which he has more control; rather than an outcome, like winning or scoring lots of goals.

He may have had a specific, agreed, individual, process goal, such as developing the precision and power in his shots on goals, based on FB from the coach that his % of shots on target and conversion rate was too low.

“A” standard

The following is an example of a link that could have been made. If two links of a similar standard were written, the candidate would have received an “A” rating.

EO's ability to seek and act on appropriate FB enabled the employment of effective goal setting strategies

EO understands that as an individual player in a team sport he cannot control the achievement of outcome goals such as winning gold medals, that rely on the efforts of others, such as teammates and opponents. While the achievement of such goals may be agreed long term goals for all the members of the team, EO focusses on individual process goals, identified by himself and the coach, such as maintaining dynamic balance while dribbling through the midfield (as determined by his concurrent, intrinsic FB) and the speed of his stick work in trying to beat opponents. He knows that working on these process goals will assist in achieving performance goals, such as not being dispossessed in a tackle during the game or getting 80% of shots on target; forcing a save from the opposition, or scoring. The review of his % accuracy (KR) would be determined after the match (terminally) and then adjusted based on how easy it was for EO to achieve. EO and his coach may identify some KP that shows he is missing too many shots to the left of the post as he is swinging too far across his body. Thus, a new process goal on his shooting technique would be developed. This constant cycle of utilising effective FB to set SMARTER goals ensured that EO has continued to produce outstanding performances over a long career.

Question 17 – Criterion 6

Ellyse Perry (EP)

The two core units for this question were **Skill Acquisition** and **Exercise Physiology**.

Links could be made in **either** direction, that is, from Skill Acquisition to Exercise Physiology, OR from Exercise Physiology to Skill Acquisition.

Links must be made from a **positive** perspective – that is, what Physiological strategies did OE use and how did these contribute to her outstanding Skilled performances over many years; or what/how did OP's superior skill level enhance her ability to utilise effective Physiological strategies?

Two links need to be made. Each link is assessed out of 7.5 marks, according to an agreed Guide.
Possible links:

- Increasing speed and power allowed for a decrease in movement and response times.
- Effective recovery techniques enabled EP to undertake effective practice regimes.
- Through developing her LIP, EP was able to delay fatigue and selectively attend for longer periods of time.
- Through accessing effective feedback, EP was able to ensure she used the correct training principles and methods.
- EP continually refined the muscle memory in her LTM to cope with the chronic adaptations from training.

Exemplars

“C” standard

The following is an example of a link that could have been made. If two links of a similar standard were written, the candidate would have received a “C” rating.

↑ speed/power → ↓ mov't/resp time

Speed is how fast you can move from one point to another and when combined with strength, it forms power. Speed is used in cricket to run when batting and fielding and power is used to hit the ball hard and throw the ball fast.

Movement time is how long it takes to complete a response once it has started. Response time is a combination of reaction and movement time. Movement time could be how long it takes to chase the ball down in the field once you see it has been hit near you and you push against the ground to start chasing it down.

By improving her power by doing box jumps, EP will be quicker at starting to run between the wickets when batting, and by improving her speed by running intervals of the same length as the cricket pitch, EP will be able to score more runs every time she bats.

“B” standard

The following is an example of a link that could have been made. If two links of a similar standard were written, the candidate would have received a “B” rating.

By increasing her speed and power, EP will be able to reduce her movement and response times

Speed is how fast you can either move your whole body from one point to another, such as when running from one end of the wickets to the other end when batting, or when chasing the ball in the field. When speed and strength are combined, it creates power, which can be used to move the arm explosively when throwing a ball at the wickets, or when hitting the ball a long way when batting.

Movement time is how long it takes to complete a response once it has started. Response time is a combination of reaction and movement time. Movement time could be how long it takes to chase the ball down in the field once you see it has been hit near you and you push against the ground to start chasing it down.

EP can improve the power in her legs by doing box jumps, or clap push ups for her upper body. This will enable EP to explode out of the crease quicker when batting and throw the ball faster to generate more run outs when fielding. EP can also improve her speed by running 4 sets of 6 reps of intervals of the same length as the cricket pitch. This means EP will be able to score more runs every time she bats; which helped her to be the first to score 1000 runs.

“A” standard

The following is an example of a link that could have been made. If two links of a similar standard were written, the candidate would have received a “A” rating.

By increasing her speed and power, EP will be able to reduce her movement and response times

As an allrounder in cricket, EP will gain great benefits from improving her speed and power. She can improve her speed by doing short interval training where she could do 4 sets of 6 sprints over 20 metres at 100% MHR with 30 seconds between reps and 90 seconds between sets, in order to replicate the distances she would run when batting in T20 matches. She could also use plyometric activities to improve the power in her lower body by doing low hurdle bounding and box jumps, which would enable her (once she has detected the ball and started pushing into the ground, signifying the end of her reaction time and the beginning of her movement time) to explode out of the crease when going for a run or chasing down a ball in the field; thus reducing both the movement time to complete the action and consequently the overall response time. Or, by doing clap push ups, she can improve her upper body power, which she can use to generate greater arm speed in her bowling action, and the power with which she can swing the bat when batting to score more boundaries. Both actions enhance EP's chances of success by giving her opponents less time to react to the stimulus of the ball being bowled or hit at them, as well as enabling her to complete her actions with a quicker overall response time (combination of reaction and movement time).

This ability to decrease her movement and response times through appropriate training methods has allowed EP to experience sustained success in all forms of cricket and take 100 wickets and score 1000 runs.

Question 18 – Criterion 6

The Olyroos (Oly's)

The two core units for this question were **Exercise Physiology** and **Sport Psychology**.

Links could be made in **either** direction, that is, from Sport Psychology to Exercise Physiology, OR from Exercise Physiology to Sport Psychology.

Links must be made from a **positive** perspective – that is, what Psychological strategies did the Oly's employ and how did these work with their Physiological strategies to see them qualify for the Tokyo Olympics; or what/how did the Oly's superior Physiological levels enhance their ability to utilise effective Psychological strategies?

Two links need to be made. Each link is assessed out of 7.5 marks, according to an agreed Guide.

Possible links:

- Oly's were motivated to undertake effective recovery.
- Effective goal setting enabled the Oly's to effectively periodise their training year.
- The Oly's were motivated to improve their LIP/VO₂max/aerobic capacity.
- Ability to delay fatigue allowed the Oly's to more effectively control their arousal/shift their attention.
- The use of effective periodisation enhanced the self-confidence/efficacy of the Oly's.

Exemplars

“C” standard

The following is an example of a link that could have been made. If two links of a similar standard were written, the candidate would have received a “C” rating.

Motivation → Recovery

Motivation is the direction of a person’s efforts. In this case it is for the Olyroos as a team and not just a person. Motivation explains why we do the things we do, and it could be for extrinsic reasons, such as trophies and money or intrinsic reasons, such as feelings of pride and the joy one gets from simply taking part. In most instances, it is usually a combination of both.

Recovery is the returning of the body to its pre-exercise state. It involves completing many processes to ensure that athletes are ready to train and compete again as quickly as possible. The processes are determined by the nature of the activity and begin as soon as the session/game is over.

By undertaking the right recovery after each training session and match, the Olyroos were in peak fitness to qualify for the Olympics. Their recovery included a light jog to prevent blood being stuck at the extremities; some static stretching to realign their muscle fibres and eating some CHO’s and protein to replenish their muscle stores. Despite being worn out and tired after each session, the Olyroos were extrinsically driven by their desire to beat Uzbekistan and qualify for Tokyo so they correctly undertook all of these processes.

“B” standard

The following is an example of a link that could have been made. If two links of a similar standard were written, the candidate would have received a “B” rating.

The Olyroos were motivated to undertake the correct recovery

Motivation explains why we do the things we do. The Olyroos would be motivated both by their extrinsic desire to represent their country at the Tokyo Olympics and possibly win a medal; or by the pride and joy they feel in proving to themselves that they are worthy of playing at the Olympics for the first time in 12 years. Most likely it is a combination of both reasons as there are many individuals involved in the team.

Recovery is the returning of the body to its pre-exercise state, while allowing for chronic adaptations to occur. It involves completing physiological and regenerative processes to ensure that athletes are ready to train and compete again as quickly as possible. The processes are determined by the nature of the activity and begin as soon as the session/game is over.

By undertaking the right recovery after each training session and match, the Olyroos were in peak fitness to qualify for the Olympics. As a soccer match can last up to 120 minutes and will use all three energy systems, depending on the position played, members of the Olyroos will need to undertake an active recovery. This included a light jog to prevent venous pooling; some static stretching focussing on the legs and held for up to 30 seconds each to realign their muscle fibres; and eating some CHO’s and protein within 30-60 minutes to replenish their muscle glycogen stores and help with muscle repair. Despite being worn out and tired after each training/game, and how boring and monotonous some of the tasks are, the Olyroos were extrinsically driven by their desire to beat Uzbekistan and qualify for Tokyo so they correctly undertook all of these processes.

“A” standard

The following is an example of a link that could have been made. If two links of a similar standard were written, the candidate would have received an “A” rating.

The Olyroos were motivated to undertake effective recovery strategies

Motivation explains why we do the things we do. D’Agostino’s (D’A) comments about how the moment made him feel could have suggested some intrinsic forces at play by the pride and joy he felt in proving to himself that he is worthy

of playing at the Olympics for the first time in 12 years; however in saying that being part of a great team performance, and doing it for Australia, it also suggest some extrinsic motivation at the chance to win Olympic glory. His comments could also be reflective of the Self Determination aspects of competence and relatedness. Most likely it is a combination of all these reasons, with one being more prominent than the others at varying times throughout their campaign.

Recovery is the returning of the body to its pre-exercise state, while allowing for chronic adaptations to occur. It involves completing physiological and regenerative processes to ensure that athletes are ready to train and compete again as quickly as possible. The processes are determined by the nature of the activity and begin as soon as the session/game is over.

As a midfielder, D'A would do a lot of running, at varying intensities over the 90-120 minutes of a soccer match, utilising all three energy systems; which would necessitate an active recovery of a light jog, static stretching and rehydration along with nutritional replenishment, involving CHO's to replenish glycogen stores and some protein to aid in muscle repair. Adhering to such a rigid set of protocols can be a challenge for some athletes, but not for the motivated Olyroos. In addition, due to the jarring from all the running, and the body on body clashes during tackling and in the penalty box, D'A would have used an ice bath to reduce swelling/inflammation and allow for speedier recovery. He may have followed up with some CWT to repeatedly vasodilate and constrict the blood vessels and speed up the removal of LA. Neither of these regenerative techniques are very pleasant/enjoyable, but D'A and his Olyroo teammates would have gladly undertaken them in order to be fresh enough to "fight right until the end" in order to beat Uzbekistan and qualify for the Tokyo Olympics.