

## Sport Science

Course Code: SPT315113

### General Comments

The overall assessment of the Marking Panel was that, despite the exam being written in a slightly different style, it was a fair paper, with language reflecting the terminology as taught in the course. The move in recent years has been towards expecting that candidates are able to do more than regurgitate facts as learned by rote, but apply the knowledge gained to a range of varying situations that should not be unfamiliar to those who have studied the course. Given this, it was expected that better candidates would be able to appropriately apply their knowledge to the specifics of the questions and achieve a strong outcome; while also giving other candidates an equal chance to gain a satisfactory outcome, based on the knowledge they had learned. While time management remains a perennial issue, it was pleasing to note comments made, particularly from those marked Part 3, that there appeared to be fewer questions left unattempted.

On the theme of pleasing trends, there were fewer complaints made about the legibility of handwriting than in previous years; although the number of candidates still writing in pencil remains a concern, given the potential for alterations to be made to answers. This potential becomes more of an issue when a number of Markers express concern at candidates making marks on or within their scripts (such as numbering; asterisks; using specific lines such as “clearly there is a link between...”, etc) which could be interpreted as indicators of where they come from, in a possible attempt to gain favourable treatment from a Marker if recognised. Such a practise places Markers in a potentially compromising position and is to be discouraged in the strongest possible terms for all candidates!

Candidates wishing to achieve at higher levels are again reminded to ensure they use the appropriate, relevant and specialised terminology whenever the opportunity presents itself. Conversely, candidates are reminded that there is a limited range of acceptable abbreviations and acronyms suitable for exam use (eg: bpm, RHR, MHR, SMARTER, FITT, etc) where the use is related to the specifics of the question. However, individual acronyms and abbreviations developed by individuals or classes to help prompt memory, may not be suitable and may cause marks to be deducted if they are unknown to the Marker.

As noted last year, it appears that many candidates enter the exam with a clear strategy in mind which will afford them the best opportunity to achieve the highest award their internal ratings will allow. This becomes most evident in the standard of criterion 5 answers (questions 5, 10 and 15), where the discrepancy between internal and external performance is often the most pronounced. However, it is known, for example, that a ‘satisfactory’ or ‘commendable’ achievement can be obtained while still getting a ‘t’ on this criterion, if the performance on other criteria is sufficient.

While such a practice is understandable, candidates must be cautioned that the minimum marks needed for achieving a specific rating are not fixed and there is the potential for them to miscalculate and have their strategy backfire on them; particularly if aiming for an upper level award. Candidates would be strongly encouraged to attempt to answer ALL questions, even if only to a minimal standard. It should be noted that simply re-writing the question is not making a genuine effort to attempt to **answer** the question.

Concerns are still being expressed by Markers at the general lack of experience and understanding of the “techniques” needed for performance in an exam setting. These have all been noted previously but will be stated again, from a positive perspective. For those wishing to perform well, they would be advised to understand and address the following issues:

- write **legibly**, using appropriate **terminology**, in black or blue **pen**.
- possess the ability to **manage time** effectively, knowing how much time is to be allocated to each question/booklet.

- demonstrate an ability to **carefully read** and **correctly interpret** a question, which includes understanding the different requirements of cue words such as identify, outline, discuss, explain, compare and contrast, to name just a few; as well as the context against which the answer is to be framed.
  - In the case of criterion 4 questions (4, 9, 14) it means using data, and references to it, in support of your answers; making answers as accurate as they can be, and; using units where they are stated.
  - In the case of criterion 5 questions (5, 10, 15) it means knowing basic things such as: the relevant core areas to be addressed; the required direction and perspective of the question; the specifics of the athlete involved and their sport. It also means understanding how such questions are marked, which will be set out below.

Continuing with the theme of performance on criterion 5 questions, more Markers are expressing a concern at the number of candidates who use 'generic', or pre-prepared links to answer such questions, which may turn out to be inappropriate as they fail to, or are unable to adapt them to the specifics of the questions, which this year covered the sports of hurdling, golf and netball. Suggestions that elite world-class athletes who have some time off from their sport drop back to the associative, or even the cognitive stage of learning, have virtually no basis for inclusion in such answers. In addition, to avoid confusion about which core unit is being discussed, candidates are encouraged to use the term "training" when referring to aspects to Exercise Physiology, and "practice" when referring to aspects related to Skill Acquisition.

There are a number of ways to address these issues, which include: have candidates understand the concept of interrelating better, so they can select the most appropriate links for any given scenario; have candidates have a wider range of prepared links, so they can select the most appropriate ones to suit the given scenarios and/or to ensure that throughout the course of the year, candidates are exposed to, and encouraged to familiarise themselves with, as many different sports as possible, so situations such as referring to golf clubs as "sticks, and referring to "dribbling" in netball are avoided.

Of course, the most important way for performance to be addressed in this area is to ensure that all teachers are fully conversant with the requirements for and ability to teach, answer and assess such questions; which they can gain by engaging fully in the QA and Exam Marking processes, and ensuring close links with fellow teachers of the subject across the range of college environments across the state.

In the interests of ensuring a greater understanding and consistency on criterion 5 questions, the Guide used for marking is as follows:

- The 6 marks for each link be allocated along the lines of up to 1 mark for an appropriate and relevant link; up to 2 marks for appropriate theory (1 mark for each core), and up to 3 marks for the application and relevance of the link and theory to the specifics of the question.
- 0 marks be awarded for an INTRAreationship link, ie – where a link goes from one aspect of Phys/Skill/Psych to another from Phys/Skill/Psych.
- 0 marks be awarded when there is no clear establishment of any link/connection/interrelationship between the given theory from the two chosen core units; despite the theory for each core being appropriate to that aspect.
- A *maximum* of 1.5 marks be allocated for an Interrelationship between the WRONG CORE areas (eg- Phys and Psych, when it should be Phys and Skill).
- A *maximum* of 3 marks be allocated for links not answered from the correct PERSPECTIVE ie should have been answered in a positive sense but has been done negatively, or vice versa. (*This is especially relevant for Questions 5 and 10, which may have been interpreted as negative, when the answer calls for a positive link*)
- A *maximum* of 3 marks be allocated for links which are written in the wrong DIRECTION ie the question expressly calls for links from one core to another eg from Phys to Skill, not Skill to Phys (*This is especially relevant for Question 5, which must go from Phys to Skill*)
- A *maximum* of 4 marks be allocated for a second link where the SAME THEORY that was used in the first link is repeated. (NOTE: you can repeat the area but with different theory, eg: SA goals in one link and MRT the other, or Int/Ext motivation in one link and SDT-C.A.R. in the other link).

These Guidelines should be used in conjunction with the *standards statement for criterion 5*.

## Part 1 – Exercise Physiology

### Question 1

- (a) Generally well answered, although some definitions provided were quite basic. Aerobic capacity explanations were often too brief and if a candidate did not mention aerobic capacity as being the ability to consume and utilize  $O_2$ , then their answer was incorrect! Some candidates made the mistake of confusing speed with power.
- (b) Too many candidates simply listed “pre-season” without any necessary qualification; such as “to establish baseline fitness levels”, or “to indicate areas for improvement throughout the pre-season”. Also, many candidates listed ALL broad phases hoping to get some marks.
- (c) Generally well answered, however full marks cannot be given without referral to whether the adaptation mentioned is either raised or lowered, and whether it is evident at rest or during exercise.
- (d) Generally well answered, although too many candidates used MHR, not BPM as the unit.
- (e) Better answers related the need for longer recovery to the accumulation of fatiguing by-products of LA and  $H^+$  ions at the higher intensity of 85%.
- (f) Too many candidates referred to regenerative techniques, rather than the required answer of an active recovery.

### Question 2

- (a) Generally well answered. While some candidates got confused and mentioned methods or parts of the training session, most were able to identify appropriate fitness components for their chosen sport. Despite the first three words of the question explicitly asking candidates to “Identify the sport...”, far too many failed to do and consequently only got credit for part of their answer.
- (b) Answered very well with most candidates addressing the relevant prompts and gaining full marks.
- (c) Some candidates failed to identify their fitness component at the start of the answer and/or used a method or type of training instead. There was difficulty in applying “specificity” in answers, with many just repeating that the training needed to be specific to the sport. Some candidates also mistakenly describing the training principle and not describing how it could be applied to the fitness component.
- (d) Most candidates successfully identified the aspects of the training session, although some confused it with periodization and the structure of the training year. When it came to giving examples some candidates gave examples of a training session rather than examples of the warm-up, conditioning etc. Similarly some were confused and wrote examples of sports and activities where a warm-up or cooldown would be an advantage, rather than examples of cool down activities. And cool down activities, as part of a training session, are not regeneration techniques like hot/cold, massage etc.

### Question 3

- (a) Most candidates were able to identify the aerobic system, although some failed to interpret the question properly and instantly thought a short distance rower and listed characteristics for the LA system.
- (b) Most candidates successfully identified the phosphagen (ATP-PC) system, although a number didn't address the first part of the question in their answer. Also a number of candidates failed to mention PC as the fuel for the ATP-PC system.
- (c) This question proved a challenge to many candidates, with a number choosing to leave it blank, which is disappointing for a question worth so many marks. Descriptors such as low, moderate, high were accepted rather than specific percentages, as candidates would not be expected to know these.
- (d) Generally answered well. Some candidates interpreted the timing part of the question as the timing of CHO consumption as opposed to how long CHO recovery actually takes. (Both are important.) Better answers linked the duration till full replenishment to the duration and intensity of the exercise bout. Some candidates asserted that any food would be recommended, suggesting athletes could get CHO from pizza. Many candidates forgot to give examples of foods, instead listing types of foods, such as high GI, or protein. Some candidates also discussed carbohydrate and fluid intake before and during training, rather than during recovery from training, as required.

## Question 4

General comment on Question 4 – Candidates must be reminded that one of the requirements for succeeding in analysing and interpreting questions is the need for using ‘accurate’ and ‘relevant’ data. Due to the time pressures, many candidates do not make sufficient efforts, using tools such as a ruler, to make accurate determinations for the answers they provide; instead giving “approximations”. Depending on the complexity of the question and the nature of the graph/scale; such approximations may not be sufficient for full marks.

- (a) While most candidates did well, some just used the ‘mixed venous oxygen content’ line to determine their answer. A number forgot to include the relevant unit! Gaining full marks was challenging, given the margin for error on 4 pieces of data.
- (b) The wording of the question allowed for a range of possible responses, depending on how it was interpreted. Either way, all relevant answers were considered if they satisfied the requirements.
- (c) Mostly answered well, although some forgot to provide the relevant unit. Also, many candidates said 19mmol/100ml which, if using a ruler for precision and accuracy, is clearly not correct.
- (d) Generally answered well.
- (e) Most identified the watts but a large number got the O<sub>2</sub> uptake wrong, with a lot of answers around 28 mL/kg/min (they read the LIP line rather than the VO<sub>2</sub> max line).
- (f) Generally well done although some still didn’t include the units to back up their statements of an increase in lactate levels. Some also confused the levels with the O<sub>2</sub> Uptake line.
- (g) It was evident that candidates confused the O<sub>2</sub> uptake line and the Blood lactate line which obviously had a negative effect on their answers.

## Question 5

It is acknowledged that many students have a “game plan” of knowing they can achieve the final award they want with either a “t” or a “C” on this criterion (questions 5, 10 and 15), so their efforts often reflect the lack of time/knowledge/effort required to write a good answer under exam conditions. It could also just reflect that the notion of interrelationships is simply not taught as well as it could/should be for proper understanding.

Generally candidates struggled on this question. Some candidates were able to write one good link but then struggled to back up with the second link which obviously dragged the combined mark down. Many candidates received a ‘t’ for this question, often due to only one link being given, with no attempt made at writing a second. The wording of the question meant that a specified direction, from Exercise Physiology to Skill Acquisition, was required. There were several WRONG DIRECTION links (max 3 marks) examples of how practise types may influence physiology.

Some WRONG CORE areas using Sport Psychology instead of Skill Acquisition. Example Goal setting will influence Periodisation. (Max 1.5marks)

Some repeated theory (max 4 marks) SUBROUTINES had been taught on a lot of occasions and therefore linked twice.

A few from the WRONG PERSPECTIVE, a negative spin on the scenario.

## Part 2 – Skill Acquisition

### Question 6

- (a)
  - (i) Answered well; no major issues.
  - (ii) Many candidates simply suggested the characteristics of each Stage of Learning, rather than stating what they would focus on. Also, many simply stated that the Autonomous performer didn’t have to focus on the task, without actually stating what else they would be focussing on instead.
- (b) Answered well; no major issues.
- (c) Many answers simply related to improving stimulus identification, without relating it to preparation for open environments.

- (d) Too many candidates simply stating what the environmental condition was, without actually stating the adjustment/s to the skill/motor program it necessitates.
- (e) Generally answered well, although many candidates only stated the strategy, without stating how it improves functioning of STM.

### Question 7

- (a) Generally answered well, although many candidates simply described what happened at each phase without relating it to a specific sporting example/situation.
- (b) Too many candidates could not clearly differentiate between orienting and selective attention well enough, and many place more emphasis on selective attention being about blocking out 'noise', rather than attending to the relevant cues.
- (c) Most candidates failed to make the connection between more choices and increasing RT, just that CRT involves more stimuli or response alternatives. Also, many confused the PRP with the single channel hypothesis, stating that we can only process one stimuli at a time, rather than referring to the delay in processing the second stimuli, when presented in quick succession. Others also failed to relate the impact of a poor PRP on performance.
- (d) Generally answered well, with the majority referring to anticipation. Better movement time connections were also suggested on how response time could be improved. Many still confusing the notion that an improved performance *decreases*, rather than increases the movement or response time.
- (e) Not generally answered that well. Many confused STSS with STM, and many candidates struggled to provide an appropriate example of STSS in practice.

### Question 8

- (a) Many candidates gave examples of each concept without actually providing an explanation as required. Suggesting that a demonstration be given is also not an explanation. Better answers for starter mechanisms included explaining why one would be used.
- (b) Most candidates recognised two main ways to increase stability, although far too many failed to relate their answers to a sporting example. Many also talked about increasing core strength, without showing how it was connected to either Base of Support or Centre of Gravity.
- (c) Answered well due to the range of answers accepted.
- (d) While most candidates recognised three influences, they were not always ones which could be changed, such as gravity or shape. In addition, many did not state **how** the influence needs to be changed to improve performance, as required, often focussing instead on what might be done incorrectly.
- (e)
  - (i) Most candidates recognised only one type of feedback, when there were more than one.
  - (ii) The examples provided were mostly general in nature and not necessarily ones specifically related to reasons gained from video.
  - (iii) As for ii) above many answers were not specific to video, and many candidates simply repeated the same reasons as for 8e) ii), which were not appropriate for this question.

### Question 9

General comments - As noted in the comments for question 4; while it is challenging for candidates to make/give accurate measurements in the pressure of an exam situation, especially with graphs that lack gridlines and have large markers; many failed to make much of an effort to ensure their data was as accurate as it should have been. Many candidates would seem to require more preparation to understand the differences between cue words used in exams, such as identify, describe and compare.

- (a) Many candidates only gave the relevant data OR made a comparison between the two groups without supportive data. Both bits of information were expected. Far too many candidates also included the "Intermediate" group in their answers, which was not required.
- (b) Many candidates failed to understand the requirements of the word "between", which meant that describing both increases and decreases from weeks 2, 3 and 4 were required. Instead, many compared the results from week 2 and 4.

- (c) Mostly answered well, although many candidates did not detect all instances of performance declines, and too many used the week in which the performance declined, rather than the week where the decline was noted from the previous week, as required in the question.
- (d) While there was one week where two scores were clearly the closest, as their markers overlapped, some candidates identified one of two other instances instead, where scores were close, but not as close.
- (e) A range of answers were accepted here, if appropriate reference to trends and supportive data was provided; which, on many occasions, it was not.
- (f) Generally answered well, although accuracy of measurements was an issue.

### Question 10

As noted for question 5, many of the usual issues arose in the answers to this question: the general standard of those who actually complete a single interrelationship is not terribly strong; the rate for those who can do it twice, to an equal standard is even lower; far too many instances of answers being written from a negative perspective when a positive one was required; too many instances of intrarelations, and; links made between the wrong cores with either Exercise Physiology and Skill Acquisition, or Exercise Physiology and Sport Psychology being used, and, incredibly, even an intrarelation between two Exercise Physiology aspects!

Better answers showed an understanding of the scenario and the sport, showed a clear ability to apply/relate the relevant theoretical aspects covered to the link to the specific of the question.

## Part 3 – Sport Psychology

### General comments

As the final paper in the exam, this section often has many unanswered questions as candidates run out of time. It was pleasing to note that, unlike previous years, most candidates appeared to have sufficient time to complete the paper, with most attempting even question 15, which often has a high rate of avoidance in this section.

### Question 11

- (a) Answered well; no major issues
- (b) Answered well. Most candidates were able to give two characteristics and state they would have a negative influence on overall performance. Marks were deducted where candidates failed to apply their answer back to the question.
- (c) Many candidates confused “vicarious experiences” with “performance “accomplishments”. In addition, there were a few instances of using acronyms such as "VAMP" or “PAVV” in answers without explaining them. Acronyms are fine to assist with recalling information but candidates need to be careful when using them in their answers as, unlike commonly accepted abbreviations, they are often individualised and unfamiliar to the markers.
- (d) Candidates could generally state that setting process goals would enhance an athlete’s self-confidence but their explanation of why and what a process goal is was not as strong. Better answers referred to smaller steps or the stepping stone model.
- (e) Candidates were able to describe two basic short term goals, although it was expected that those used would conform to the SMARTER guidelines. Those which did not had marks deducted.
- (f) Many candidates simply listed what each of the letters stood for, limiting the marks they could achieve. Better answers applied the three letters to a hypothetical goal relevant to the situation.

### Question 12

- (a) Many candidates could not differentiate between concentration and attention. Better answers were able to do this and then apply the concepts to the given stimulus.
- (b) Generally answered well.
- (c) The majority of candidates recognised that athletes in team sports require a broad external focus. Candidates were not rewarded with full marks if their explanation of the dimension and their chosen positive aspect for that dimension were the same.

- (d) Answered poorly overall. Candidates either didn't give an example like the question asked or they didn't relate their example back to assisting with concentration.
- (e) Most candidates could identify three guidelines for debriefing but many answers lacked the required discussion in relation to the guideline.

### Question 13

- (a) Most candidates could explain the Inverted-U Hypothesis theory, although many failed to relate it to the specific situation, as required, and done in the better answers. Some also wrote about the Catastrophe Theory, which was not relevant here.
- (b) Too many candidates stated that coaches should give "pep talks" or play motivational music, which are both inappropriate for helping to decrease state anxiety.
- (c) Answered well.
- (d) Answered poorly as candidates were either too general, making up their own guidelines, or; only listed three guidelines without explaining them. Also, some candidates got confused between the guidelines for mental rehearsal and the different types eg. During performance, instant pre-play etc.
- (e) Very well answered as candidates could propose a very wide range of strategies when answering this question and didn't necessarily need sport science specific knowledge. Marks were deducted if strategies were too vague.

### Question 14

General comments – Many candidates found this to be a straight forward question, which was easy to understand and interpret, with many achieving scores in excess of 10. When marks were deducted, it was usually for not using correct units (bpm) or misinterpreting the data (especially in (d)). If candidates did not understand the terms state and trait in relation to anxiety, then answering this question was difficult.

### Question 15

While many more candidates were noted as attempting this question than in the past, the same issues as noted in questions 5 and 10 were also present. Particular note was made that two words with an arrow does not clearly set out what the intended link is, and that it should still be explained in the body of the answer.

In addition, it was found that much of the theory referred to was generic and did not specifically relate to or have relevance to the details of the question.

## Sport Science

Course Code: SPT315113

### PART 1 – EXERCISE PHYSIOLOGY

#### Question 1

- a) **Aerobic Capacity** - The body's ability to consume and utilise oxygen for the production of energy.  
**Speed** – the ability to contract muscles quickly and forcefully to move the body quickly and/or move an implement forcefully. The ability to move from point A to point B as quickly as possible. (Throw, Kick, Hit etc.)
- b) Tests should be administered before the pre-season commences to identify strengths and weaknesses and to assist with structuring the program. Also, throughout the pre-season period to monitor the athletes' response to training and make necessary adjustments to the program.
- c) A wide range of answers including those which affect the circulatory, respiratory, muscular systems, at rest or during exercise.
- d)
  - i) Maximum Heart Rate (MHR) =  $220 - 20 = 200$  bpm
  - ii) MHR - knowing the HR they can reach safely when exercising OR establishing the value necessary to calculate training intensities.  
% of MHR – determining whether they are working too intensely or not intensely enough OR to ensure their training intensity is enough to achieve their desired training effect.
- e) It would be assumed that for most athletes a work intensity of 85% MHR would take them beyond lactate inflection point leading to an accumulation of lactic acid (LA).  
They would need time to remove some of the LA in order to work at that intensity again.
- f) An active/exercise recovery.

#### Question 2

- a) The choice of sport will determine the components identified. Would be expecting 3 from aerobic capacity, speed, strength, agility, muscular endurance, power, flexibility etc. with a brief descriptor, as long as those identified are relevant to the chosen sport.
- b) **PREPARATORY (PRE-SEASON)**  
General preparation phase. During the general preparatory or fitness foundation phase, emphasis is placed on developing general fitness as a solid base on which to build and specialise in the subsequent phases.  
Specific preparation phase. During the specific preparatory sub-phase, there is a shift in training towards more specific game-related fitness work.

#### COMPETITIVE (IN-SEASON)

During the competitive season, the emphasis is on maintaining pre-season fitness and recovering for subsequent training and competition.

#### TRANSITION (OFF-SEASON)

The off-season period should be both a psychological and physical break from the sport in which you have been competing. Training during this period should be devoted to remaining reasonably active without staying involved in the chosen sport.

- c) The answer would depend on the component chosen. An example of an expected answer, if aerobic capacity was chosen is shown below:  
Specificity - train using LSD, long interval training, HIIT, muscular endurance resistance training etc. Training should focus on muscle groups and movements relevant to activity.  
Progressive Overload – gradually increase training intensity and/or duration, reduce recovery time etc. in response to improving physiological condition in order to maintain improvement.  
Variety – mix up/vary training to keep athletes mentally fresh and/or assist recovery (run, cycle, spin, swim, row, circuits etc.). Mix up the type of training as long as it is still addressing aerobic capacity.

- d) Warm Up Phase, Skill/Conditioning Phase, Warm/Cool Down

WARM UP PHASE

- Prepare the body for competition or conditioning exercise.
- Increase muscle temperature.
- Reduce the possibility of joint or muscle injury or soreness.
- = Continuous activity, light resistance exercise, dynamic flexibility exercises.

CONDITIONING/SKILL DEVELOPMENT PHASE

- This phase incorporates conditioning to improve or maintain physiological capacities and skill development to improve skill execution. (May refer to skills being performed whilst fatigued.)
- = The specific fitness components for a particular sport are developed using the training methods you favour. Sometimes during this phase, appropriate skills can be worked on in conjunction with any conditioning work.

COOL DOWN PHASE

- The cool down is needed to prevent venous pooling (i.e. pooling of blood in the veins). And/or assist in removal of LA. And/or increase muscle fibre length
- = It should be a continuation of the activity at a much reduced intensity (e.g. after running, keep walking). All cool-downs should include either static stretching exercises or PNF stretching exercises for all muscle groups involved.

**Question 3**

- a) Aerobic or Oxygen system.
- Major fuels are carbohydrates and fats and can use protein when needed
  - ATP production is relatively slow.
  - Unable to produce energy quickly enough for more intense work; Limited by fuel supplies (bonking); Limited by athlete's ability to consume O<sub>2</sub>
- b) The aerobic system is suitable for sub-maximal efforts. The 100m will require a maximal effort and the aerobic system will be unable to provide energy quickly enough. The ATP-PC system would be most suitable for the 100m. Stored ATP for initial burst then Creatine Phosphate is split to provide energy rapidly in this system.

- c)

Characteristics	100m Track Sprinter	Triathlete
Muscle Capillary Supply	Low	High
Muscle fibre proportion (%) Slow Twitch (Type I)	Approx. 35% or Lower	Approx. 80% or Highest
Muscle fibre proportion (%) Fast Twitch (Type IIa)	Approx. 10% or medium	Approx. 15% or medium
Muscle fibre proportion (%) Fast Twitch (Type IIb)	Approx. 55% or Highest	Approx. 5% or Lowest

- d) The majority of glycogen stores will be replenished within 5-10 hours with appropriate diet. If CHO stores are completely depleted it may take several days.

Either High GI food immediately after training, OR Low GI CHO with some protein immediately following training or competition efforts. Ideally within one hour.  
 Hydrate before and throughout training. Continue to hydrate following training. Can take up to 24 hours to rehydrate. Weighing before and after training/competition and monitoring urine colour is recommended.

#### Question 4

- a) 125 = 13.7 ml/100ml (19.2 – 5.5)  
 225 = 15.4 ml/100ml (19.2 – 3.8)
- b) Between 25 watts and 100 watts 25w = 12 ml/100ml and 100w = 6ml/100ml OR  
 Decrease of 2 ml/100ml between each of 25-50, 50-75 and 75-100 watts.
- c) Arterial oxygen content at 19.2 ml/100ml
- d) Blood lactate reading: 1.75 mmol/L  
 Oxygen uptake reading: 38.8 ml/kg/min
- e) Work Intensity = 150 watts; oxygen uptake = 42.8 ml/kg/min
- f) At intensity 200 watts blood lactate is 4 mmol/litre. Beyond this intensity there is a significant inflection to: at 225 watts to 6.1 mmol/liter, at 250 watts to 8.7 mmol/litre and at 275 watts to 10.8 mmol/litre.
- g)
- h)

Work Intensity (watts)	Oxygen Uptake (ml/kg/min)	Blood Lactate (mmol/litre)
50	33	1.6
165	45	2.4
225	51	6.5

#### Question 5

The two core units for this question were Exercise Physiology and Skill Acquisition.  
 Links had to be made the **specific direction of Exercise Physiology to Skill Acquisition**.  
 Links must be made from a **positive perspective** - that is - what could training/physiological measures could Sally Pearson (SP) undertake/implement to enable a refinement of her technique and a return to her best in the future?

**Two** links need to be made. Each link is assessed out of 6 marks, according to an agreed Guide, as set out in the Comments section above.

Examples of some links which could have been used include:

##### Increased Power – Decreased Movement Time

SP needs more explosive power (applying force/strength quickly) and speed. She uses high load, low repetition resistance training to increase the diameter and contractile speed of her Type IIb muscle fibres. This enables SP to decrease her movement time (time taken to start and complete a movement) to leave the blocks quickly and to maintain speed between each hurdle.

##### Improved Flexibility – Improved Speed and Timing of Sub-Routines

SP will work to improve flexibility (reduction in resistance to movement about a joint) in order to ensure her hurdling technique sub-routines can be executed quickly enough to be timed optimally to maintain speed. SP will use dynamic warm-ups and, following training, static stretching and PNF to increase muscle fibre length to ensure

freedom of movement. This flexibility program will focus on her hip flexor for knee lift and her hamstrings for lower leg extension.

#### Skill Component of Training Sessions is Always Filmed – Ready Access to Augmented Knowledge of Performance

SP ensures that the skill component of her training sessions is always filmed. This part of training focuses on the repetition of skill subroutines for starts, hurdling and finishing and will usually follow the warm up component of a training session to ensure she is not fatigued and skills can be executed precisely. This permanent record of her training session enables her to access augmented KP which she can replay, play in slow motion and/or insert into a motion analysis program. The use of this feedback can assist SP and her coach refine her technique.

#### **“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:

#### **Improved Flexibility – Improved Speed and Timing of Sub-Routines**

Flexibility is the range of motion about a joint. It should be built into all training sessions, done dynamically at the start and passively at the end.

Sub-routines are the individual components which join together to make up a motor program. The speed, timing and smoothness of the sub-routines helps determine how well a skill is performed.

SP will work to improve flexibility by doing leg swings and open/close gate swings in her warm up to ensure her hurdling technique sub-routines can be done smoothly and quickly so she can run as fast as possible. In her cool down, SP will hold static stretches, such as a hurdlers stretch for 30 seconds to help realign her muscle fibres. This extra flexibility training will help SP refine her hurdling technique so she can become the best again.

#### **“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:

#### **Enhanced Flexibility – Improved Speed and Timing of Sub-Routines**

Flexibility is a health related component of fitness which refers to the ability of the muscles, ligaments and tendons to allow a full range of motion about a joint. It should be built into all training sessions, done dynamically at the start and passively at the end.

Sub-routines are the individual components which join together to make up a motor program. The sequencing and timing of sub-routines is also contained in the motor program. How well a skill is performed is determined by how quickly and smoothly these sub-routines are executed.

SP will work to enhance her flexibility by doing leg swings to activate her hamstrings and open/close gate swings for her hips in her warm up to ensure her hurdling technique sub-routines can be done smoothly and quickly so she can run as fast as possible. In her cool down, SP will hold static stretches, such as a single and double leg sit and reach for 30 seconds to help realign her muscle fibres. This correct flexibility training will help SP refine her hurdling technique so she can become the best again.

#### **“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:

#### **Optimal *Flexibility* will enable maximal *Speed and Timing of the hurdling Sub-Routines***

To be an elite hurdler, SP must ensure that she clears the hurdles while keeping as low as possible, allowing her to execute the hurdling sub-routine of a consistent stride length between hurdles. The sequencing and timing of the sub-routines involved in clearing the hurdles include the extension of the lead leg and rotation of the hip from the abduction of the thigh and flexion of the knee on the trailing leg. Through the use of specific PNF and static stretching programs which might include single and double leg “sit and reach”; or “hurdler’s” stretches, SP would increase flexibility of her hamstrings (allowing for more efficient leg extension of the drive leg) and her hip flexors (for better trail leg hip rotation), increasing her range of motion.

Through dynamic leg swings, front to back as well as across her body, and increasing the pace of walk/run-throughs doing trailing leg hurdles, SP will ensure she activates the appropriate muscles and utilises her increased flexibility to enable the smoothest and fastest execution of her sub-routines as she clears each hurdle, in order to allow for a consistent stride length between hurdles.

By undertaking such flexibility training, SP will be able to effectively and efficiently complete the complex sub-routines of hurdling so she can again become the best in the world.

## PART 2 – SKILL ACQUISITION

### Question 6

- (a) (i) Answer depends on skill chosen, eg: Golf: Back Swing - Forward Swing - Contact/Impact - Follow Through  
(ii) The autonomous skilled player would focus on the feel of the skill and implementing adjustments to suit the environment. The beginner will focus on each element of the skill and try and put them together in an order and with timing which will enable contact with the ball to be made.
- (b) Open – any activity with a changing environment. Team sports, surfing, car racing, horse racing, combative sports etc.  
Closed – any activity with a relatively predictable environment. Target sports, gymnastics, dance, constant elements of sport such as free throws/kicks.  
Environmental Factor - Speed of players, contact or non-contact sport, indoor or outdoor, rule constraints on possession time, moving or stationary targets etc.
- (c) Gradually increase the 'openness' of environment by manipulating rules/number of players/size of playing space etc,  
Focus on the skill in the environment as opposed to the skill itself, replicate competition scenarios etc.
- (d) Answer depends on example chosen, but it must indicate an awareness of HOW a skill must be modified to account for environmental variability, such as for wind direction and strength, a wet playing surface, faster opponents etc. EG- a golfer who plays a shot with more loft to have it sit on landing rather than skidding through on a wet course.
- (e) Examples include:
- Limit it to only useful/relevant information and only a relatively small volume because only has capacity of 7 – 9 items.
  - Do not present unimportant information because it can act as 'noise.'
  - Present information in a manner in which it can be chunked/linked together so as to increase both capacity and meaning.
  - Present information in a manner that is meaningful because player must be able to understand to be able to remember.

### Question 7

- (a) Sensory Input: ball speed, target distance, team mate options, opponent approaching, distance to sideline etc.  
Processing: any response planning to deal with the input to achieve a desired outcome.  
Output: execution of decision made in processing.  
Feedback: anything relating to KR and/or KP that indicates an evaluation of the input, processing and output.
- (b) Answer may vary depending on sport chosen; although many common elements would be expected across all open environments:  
Orienting – knowing where in the environment to look for information. Do we look at the ball carrier 60m away, do we look at our immediate space, do we listen to what the coach is calling out etc. eg - Focus on the ball carrier wide on the right.

Selective Attention – knowing which specific information should be attended to, such as whether the ball carrier is under pressure or if they have time to execute a skill. eg - Are they crossing the ball in the air into a scoring area or are they passing it off.

- (c) Choice RT – more than one stimulus/response alternative with one or more possible responses. The more choices, the slower the reaction time (Hick's Law).  
PRP is the delay in responding to a second stimulus presented soon after an initial stimulus. (Can only process one stimulus at a time.)  
For example, the GK (Soccer) may be planning to save a shot which is deflected. The GK will still be processing the initial shot direction and speed and will commence the necessary output and will likely not have time to save the deflection.
- (d) Response Time = Reaction Time (RT) + Movement Time (MT).  
A slow RT can mean players are slow to respond such as missing tackles, being too slow to pass, etc. Players can offset this by decreasing MT by training to improve speed or using anticipation to predict what/when something is likely to happen.
- (e) STSS is a store of information held for no more than a second. Information could be visual, auditory, tactile or kinesthetic. A player may see a team mate sprinting to position. They receive the ball and pass to them based on speed, direction and opponent position held in the 'image' in STSS; enabling them to pass without having to look.

### Question 8

- (a) Force: Pushing, pulling or striking an object to change its position, speed or direction of movement.  
Starter Mechanism: Movements completed **before** a skill that help establish a rhythm.
- (b) Increase width of base of support; Lower centre of gravity; Keep the centre of gravity within the base of support  
Application depends on sport chosen; eg - A golfer driving a ball with any of the above not as they should be is likely to lose balance on the back or forward swing and/or will not be able to apply appropriate force to the ball. (Have to slow down forward swing in order to maintain balance)
- (c) Internal/Intrinsic; Concurrent/continuous; Knowledge of Results/Performance.
- (d) Angle of release – try to achieve optimal angle. The closer to optimal the greater the distance thrown.  
Speed of release – the greater the speed of release the greater the distance.  
Height of release – the higher the point of release (relative to the ground) the greater the distance (subject to angle of release.)
- (e) i) Terminal and Augmented/External (knowledge of results/performance)  
ii) eg - Makes the task seem more interesting, keeps the learner alert, results in learners setting higher performance goals and makes tasks more enjoyable.  
iii) eg - Permanent record, can be replayed many times, can be played at slower speed, can be paused, can be compared to other recordings.

### Question 9

- |              |       |       |      |
|--------------|-------|-------|------|
| (a) Beginner | 2.50  | 6.00  | 3.70 |
| Advanced     | 10.20 | 12.50 | 6.70 |
- The beginners score was always lower than the Advanced score (or vice versa), and both groups followed the same pattern of increasing from weeks 1-2 and then decreasing from weeks 2-3.
- (b) Intermediate players' performance declined between weeks 2 & 3 (by 3.5) and again between weeks 3 & 4 (by .3).  
Both the Beginner and Advanced players' decreased performance between weeks 2 & 3 (by 2.2 and 5.7, respectively) but improved performance between weeks 3 & 4 (by 2 and 2.2, respectively).

- (c) Beginners Weeks 3 & 6  
Intermediate Weeks 3, 4 & 6  
Advanced Weeks 3 & 10
- (d) Week 3, Advanced and Intermediate Groups with a score of 6.50
- (e) Likely to continue to improve, even if only gradually, after the decline in performance in Week 10. This is based on the notion that after a previous decline in performance (Week 3) performance increased again, and that after week 6, the rate of improvement became more steady and gradual.
- (f) Week 5; increasing from 6.00 – 11.50 **or** by a value of 5.50

### Question 10

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 could Tiger Woods (TW) do to enable him to improve his performance and ranking?

**Two** links need to be made. Each link is assessed out of 6 marks, according to an agreed Guide, as set out in the Comments section above.

Examples of links which could have been used include:

#### Use of Mental Rehearsal – Improved Timing and Sequencing of Sub-routines

Mental rehearsal is the practice of skills in our mind to complement physical practice. TW has the sub routine competence to make this an everyday part of his training week. Before physically training he can prepare mentally. Quality mental rehearsal, focusing on skill performance, has been demonstrated to improve the execution of skill subroutines. The subroutines are the components of each skill which need to be sequenced and timed correctly for successful skill execution. For example, TW can mentally rehearse subroutines such as backswing, weight transfer and follow through and focus on the feel of the skill. He can then look to establish the same feel when physically practicing.

#### Process Goals – Improved Skill Execution

TW needs to reduce his focus on the outcome of tournaments and use process goals to enhance his play. Process goals focus on the necessary performance elements needed to play well, for example, the execution of each shot. They can be used as stepping stones to improved performance and outcomes. For example, placing each drive on the fairway with control as opposed to hitting each as far as he can. This goal demands TW needs to focus on refining the execution of his drive, such as a slower tempo. This may involve greater time on the driving range and more attention to augmented KP from a coach.

#### Augmented Knowledge of Performance – Improved Self Efficacy

TW has lost confidence in his game and his ability to compete at the top level. Augmented KP in the form of visual replays of his past performances may assist. KP is feedback focusing on the execution and consistency of skills. TW can watch himself execute shot after shot at the standard he needs to. This form of feedback supports the self-efficacy antecedent of performance accomplishments. Self-efficacy is situational self-confidence or a well held belief that we are able to perform in a specific context. If TW can see that he has 'done it before' he is more likely to have the confidence to do it again.

### **“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:

#### **Self-Efficacy -> Sub-Routines**

Self-confidence is a person's beliefs about their general abilities. When it comes to this belief for a specific situation, it is called self-efficacy.

Motor programs are the things we store in our brains that tell us the order and timing needed to perform the sub-routines of a skill, in order to do it properly.

If TW can remember what it was like when he was unbeatable at golf, his self-efficacy will increase and he will have the confidence and belief to start attacking the golf course again in the backswing and downswing sub-routines of his shots and improve his performance and ranking.

### **“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:

#### **Self-Efficacy -> Sub-Routines**

Self-confidence is a person's beliefs about their general abilities; whereas self-efficacy refers to a person's belief about their abilities within a specific situation. Self-efficacy is determined by a range of factors, your own past accomplishments.

Sub-routines are the components, or parts of a skill when it is broken down. A motor programs is a plan we store in our minds that contains the order and timing needed to perform the sub-routines of a skill, for it to be done properly. In a golf swing, the sub-routines include: preparation (grip and stance); backswing; downswing; contact, and; follow-through.

If TW can recall, or watch videos of his previous outstanding performances when he executed his swings with perfect timing, taking calculated risks in attacking the greens, his self-efficacy will increase and he will have the confidence and belief to start attacking the golf course again with more forcefully played sub-routines and improve his performance and ranking.

### **“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:

#### **TW's improved self-efficacy will allow him to execute his sub-routines with optimal timing**

There are four main antecedents which contribute to a person's self-efficacy, which is their situational form of self-confidence. TW can improve his self-efficacy through such means as receiving verbal persuasion from his coach and caddy; through watching others play well, whom he believes he is as good as, and; revisiting his own past accomplishments through video review and then visualisation; which will help re-establish TW's “feel” for the correct sequencing and timing of the sub-routines of his golf swing (grip/stance; drawback; downswing; contact, and; follow-through) to achieve the desired outcome. This improved self-efficacy will see TW apply himself more in the face of the difficulties he has experienced, and take more challenges on the golf course, playing attacking shots like he used to by applying the optimal force to his backswing and downswing so he can make the greens with a chance to putt for more birdies and eagles. All of this will help to improve his performance and ranking.

## PART 3 – SPORT PSYCHOLOGY

### Question 11

- (a) A person's **belief** in themselves and their abilities.
- (b) Any two of the following eg's: Anxiety, worry, depression, avoidance, easily give up, lazy, disinterested, low self-confidence, introverted, doubt and do not think they're good enough, low motivation, low arousal, unlikely to persist under difficulty, will not confront a challenge, will set low expectations of themselves and will not work hard.

Without these qualities an athlete's commitment to training and competition will decline leading to a decreased performance.

- (c) A vicarious experience (*may also be referred to as modelling*) is seeing somebody else perform well, achieve something and or improve and know that you can do the same. In rugby, seeing a player make a maximum effort to tackle a player and save a try may be a vicarious experience for others who may doubt their own ability.
- (d) Process goals focus on the things (actions/ technique) that an athlete can achieve in training and competition (skills, physiology, and strategy) which will gradually lead to improved performance. Each improvement is another stepping stone to a longer term goal.

When athletes see progress in achieving these goals they grow in confidence to achieve other, more challenging goals and realise they are making progress to long term goals.

- (e) An example of such goals could be: Engage in 3 x 60 minute aerobic training sessions within the next fortnight.  
Complete all 10 required rehabilitation exercises twice each day for the next 6 weeks.
- (f) **Specific** – Increase aerobic capacity to improve recovery between efforts by doing extra continuous training twice/week. Or a skill based example.  
**Measurable** – Monitor resting heart rate each morning to monitor response to extra training.  
**Time Framed** – Aim for improvement within 5 weeks.

### Question 12

- (a) Concentration is the ability to focus on one thing. Attention is the ability to concentrate on the correct thing. In competition the correct thing may change constantly. A possible example of the impact of poor attention may include: An athlete in a team sport is concentrating on the ball being worked down the field but should have also been attending to the position of their opponent.
- (b) Answer depends on sport chosen; a possible answer may be: A point guard in basketball is dribbling the ball down the court assessing options for passing to team mates and identifying the position of opponents.  
(External) Decides to shoot. Focuses on his body position, grip on the ball and the force he will apply.  
(Internal)
- (c) Is in the Broad External dimension; because it involves many elements that are found in the external environment.

Positives include:

- Can quickly analyse complex situations and respond to them, usually correctly.
- They "see" everything that is happening
- Good peripheral awareness
- Good at scanning, picking the open team mate

- Negatives include:
  - Can suffer from information overload and therefore can be slow to make decisions
  - May also react too quickly without thinking
  - Falls for fakes easily
  - Too busy reading and reacting to the environment to think clearly
- (d) A tennis player may plan to use a particular service return strategy against an opponent but will review it following two return of service games. This gives the player a performance point of reference to concentrate on.
- (e) Any three of the following:
- **As Soon as Possible after the Performance** (unless clouded by emotions) – De-briefing should occur when the performance is still fresh in the athlete’s and coach’s minds. Decisions made as a result of de-briefing need to be included in time for the preparation for the next contest.
  - **Identify Performance Factors Which Were Omitted** – A good strategy can prove ineffective if certain elements are not adhered to by athletes. If the strategy is to be persisted with these omissions must become a major focus for inclusion in the next competition. Similarly, well executed elements need to be reinforced for continued inclusion.
  - **Identify Ineffective Strategy Elements** – Strategy needs to be altered if certain elements are clearly ineffective. In some cases the strategy may not be appropriate to counter the opposition or is inappropriate due to the ability of the athlete. The reason for its failure needs to be clearly identified so that necessary changes can be implemented.
  - **Involve the Athlete** – It is very easy for a coach to “tell” the athlete about his performance. This breeds an athlete dependent on a coach, who may not always be there, and an athlete unable to analyse their own performance, a process which will often need to occur **during** a contest. Athletes must be encouraged to involve themselves in and take responsibility for an effective de-briefing procedure.

### Question 13

- (a) The Inverted U Hypothesis suggests that performance will improve with increasing arousal until an optimal level of arousal is reached. Quality performers have the ability to keep arousal levels near optimal levels. If arousal levels go beyond this point, often as a result of mental and/or physical stress, performance will decline in athletes unable to maintain arousal at or near optimal.
- (b) Any two from the following list:
- Down play the importance of the contest and the result.
  - Provide time for relaxation.
  - Direct athletes’ attention to the process required to perform well.
  - Present a calm presence themselves.
  - Remind the athletes of their thorough and appropriate preparation.
  - Provide a pre-competition strategy which provides the necessary control and direction to limit anxiety.
  - Keep sport in perspective.
- (c) The extrinsically motivated athlete is most likely to give up and/or become amotivated if the extrinsic reward/outcome has become too difficult to attain. The intrinsically motivated athlete is likely to persist and/or work harder as they gain motivation from the quality of and improvement in their performance and their contribution to the collective in a team sport.
- (d) Any three from the following list:
- **Start with a relaxation**

- Well-timed periods of relaxation will promote more rapid progress. Relaxation will reduce tension and assist the organisation of subtle and often new information as important dialogue occurs between your brain and body.
- **Stay alert**
- This will make images stronger and signals clearer. Discovering what your concentration abilities are will allow you to effectively alternate between periods of relaxation and mental rehearsal. If your concentration wavers, end the session and make your next sessions shorter.
- **Use the present tense**
- Visualisation will be more vivid if undertaken in the present tense.
- **Set realistic goals**
- Imagine yourself performing at a high but realistic level of proficiency. As your physical proficiency increases, so should the performance you visualise. Remember the importance of process driven goals when setting goals and mentally rehearsing the achievement of your goals.
- **Set specific goals**
- The more specific you make the visual and kinaesthetic image, the more effect it will have. Furthermore, specific visualisation will allow you to identify aspects of your game that are going well and those that need further focus.
- **Use all your senses**
- This helps to ensure the experience is as realistic as possible. Visual, auditory and kinaesthetic senses are likely to be the senses we rely on most when mentally rehearsing.
- **Visualise from the inside out and from the outside in**
- Some people prefer to watch themselves from a distance (outside in) whilst others feel themselves acting from the inside looking out (inside out). Those with a preference for 'outside in' are likely to be more visually oriented and those that more likely to visualise 'inside out' more kinaesthetically oriented. Using a combination of both techniques will ensure a wide range of senses are evoked and your mental rehearsal is more effective.
- **Visualise at the correct speed**
- Mental rehearsal should replicate the performance situation and therefore should be practised at the same speed you would practice the skills you are visualising.
- **Practice regularly**
- Consistency is more important than length of rehearsal. If possible, practice your visualisation at the same time and for the same length each day. 5 to 10 minutes a day for 5 to 6 days a week is a good rhythm, particularly at the beginning.
- **Enjoy it!**
- Mental rehearsal should be enjoyable. If you are getting bored or frustrated, stop or change your rehearsal to a different aspect of your performance. Maintain positive thoughts during mental rehearsal as negative thoughts, frustration or anxiety could spill over into your actual performance.

(e)

Strategy Item	Primary Strategy	Coping/Back Up Strategy
E.g. <i>Waking up in time to shower, eat and catch the team bus.</i>	<i>Set the alarm for three hours before bus departs.</i>	<i>Arrange a Telstra wake up call for 10 minutes after the alarm time.</i>
<b>Have all necessary equipment and clothing.</b>	Have it checked and packed the night before competition.	Check weather forecast on morning of competition for possible inclusion of different footwear.
<b>Getting to team bus departure point in time to travel to venue.</b>	Leave an hour before bus departs to get to departure point.	Have phone number of manager should traffic be heavy.
<b>Commence relaxation and mental preparation several hours before competition.</b>	Mentally rehearse on bus trip to venue.	Headphones should others in the team be too noisy.

Commence appropriate warm up 60 minutes prior to competition.	Massage 60 minutes prior to competition.	Additional dynamic flexibility work until masseur/masseuse available.
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#### Question 14

- (a) Mean RHR 1 is measuring the average RHR of all athletes on each of the 6 days. Mean RHR 2 is measuring the average RHR of each athlete over the 6 days.
- (b) Athlete D, on GF day it reached 75 bpm which was 6 bpm higher than the next athlete **OR** Their mean RHR over the 6 days was 66bpm, four higher than the next athlete.
- (c) GF day. Each athlete reached or equaled their highest RHR on this day using data examples. **OR** The Mean RHR for this day at 66bpm was the highest Mean RHR 1 by 5 bpm.
- (d) Athlete B. From day 5 to day 1 their RHR was between 51 and 53 bpm suggesting low trait anxiety. On GF day their RHR increased to 66 bpm. A 14 bpm increase from one day before.
- (e) Athlete D. Increased 5bpm **OR** rose from 59-64 bpm  
Athlete E. Increased 4 bpm **OR** rose from 55-59 bpm
- (f) Athlete A, with a difference of 11 bpm (55 bpm – 66 bpm)

#### Question 15

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

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 could The Aus Netball Team (The Diamonds) do to enable them to withstand the challenge from the NZ "Silver Ferns"?

**Two** links need to be made. Each link is assessed out of 6 marks, according to an agreed Guide, as set out in the Comments section above.

Examples of links that could have been used include:

##### Periodised Training – Enhanced Process Goal Setting

The players adhere to a periodised training program including transition (recover and maintain base level condition), pre-season (maximise physiological capacities) and competition (maintain fitness levels and recover between contests) periods. Each has a specific focus and is timed to prepare players to physically peak for major competition. Their physiological progress through each period is closely monitored.

The structure of training assists players in setting short term, process goals which lead to and underpin longer term goals. Process goals focus on aspects of performance which can be gradually improved. For example, arriving at pre-season training with body composition where it needs to be by doing aerobic activity in transition 3 x week, or improving core strength by the first match by attending additional isometric gym sessions.

##### Resistance to Fatigue/Good Recovery – Flexibility in Attentional Dimensions

A pre-requisite for the players is to have a very high VO<sub>2</sub> max. (ability to consume and use O<sub>2</sub>) They achieve this through regular LSD, long interval and HIIT throughout the pre-season phase which increase capillary density and stroke volume. Recovery from anaerobic efforts and higher intensity aerobic effort are facilitated by a high VO<sub>2</sub> max. This will enhance recovery between efforts and delay fatigue.

In netball, players need to be able to maintain flexibility to move into the appropriate attentional dimension as the demands of the contest change. For example, being able to assess the game with a BE focus, narrowing to a NE focus to move to the ball and narrowing further to a NI to execute a reception and then a pass. Fatigue will often lead to players operating within the dimension in which they feel most comfortable and a loss of flexibility. For example, remaining in a BE dimension when trying to catch and dropping the ball. By limiting fatigue the players are more likely to maintain attentional flexibility.

### High Self Efficacy – Commitment to Overload and Intensity in Training

The Australian players have high levels of self-efficacy, or situational self-confidence. They believe in themselves as netballers to be able to meet the challenges of the game. This is based on their performance accomplishments which indicate that their skill, strategy and physiological condition have enabled them to be a dominant team. Athletes with a high self-efficacy are most likely to try harder, persist for longer and seek out new challenges. In their physiological preparation coaches use the training principles of overload (increasing training loads in response to improvement) and intensity (ensuring each training session is intense enough to achieve the goal of training) to challenge the players. Even when fatigued the players self-efficacy will drive them to fully complete each training session.

#### **“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 -> Intensity of Training**

Motivation is the drive or reason behind why people do the things they do. It can come from inside (intrinsic) or from outside (extrinsic) sources.

Intensity of training refers to how hard people are training. Intensity can be measured in many different ways, such as a % of MHR.

The AUS Netball team will be motivated by the extrinsic drive to maintain their world's #1 status by training at the highest intensity possible for the longest possible time so that they can beat the NZ team, no matter how many young and athletic players they have on their team.

#### **“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:

#### **Motivation -> Intensity of Training**

Motivation is the drive or reason behind why people do the things they do. It can come from inside (intrinsic) or from outside (extrinsic) sources. External sources can be either tangible or intangible. Most motivation is a combination of both. Motivation can also be from a positive or negative standing.

Intensity of training refers to how hard people are training. Intensity can be measured in many different ways, such as a % of MHR; %VO<sub>2</sub> max, or the Borg scale of perceived effort.

The AUS Netball team are positively motivated by the intrinsic pride they take in their level of performance, as well as by the intangible, extrinsic drive to maintain their dominance over the NZ team and to keep their status as the world's #1 team.

This motivation will ensure that they spend maximal amounts of time working at intensities over their LIP (85% MHR) and using their ATP-PC system (above 95% MHR); developing their anaerobic capabilities; which can be quite fatiguing. However, because of their motivation, they will, in order to play at the highest intensity possible and counter the number of young and athletic players the NZ'ers have on their team.

#### **“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 AUS Netballers levels of *motivation* enable them to train at the highest possible *intensities*

The AUS Netball team are driven by the collective, intrinsic pride they take in their level of performance, as well as by the extrinsic drive to maintain their dominance over the NZ Silver Ferns and to keep their status as the world's #1 team. In doing so, they are also achieving the innate drives of competence (through setting world's best standard of play) and relatedness (of belonging to/being part of "The Diamonds").

This motivation will ensure that they spend maximal amounts of time working at intensities over their LIP (above 85% MHR, doing interval training at 1:3 W:R ratios) and using their ATP-PC system (above 95% MHR, doing interval training at 1:5 W:R ratios); developing their anaerobic capabilities. This intensity of training will increase their tolerance to LA and improve their buffering capabilities; but will require great effort and cause much fatigue. However, because of their motivation, they will undertake all this work, in order to play at the highest intensity possible and counter the number of young and athletic players the NZ'ers have on their team.