

SPORT SCIENCE (SPT315118)

This section will be comprised of General Comments with regard to the paper as a whole, followed by specific Marker's Comments with regard to each section, followed by solutions for each section.

GENERAL COMMENTS

The general feeling of the Marking Team was that the paper was a fair one which gave all candidates the opportunity to demonstrate their level of knowledge and understanding of the course, and achieve a result consistent with their abilities.

In a reversal of previous years, there was a large and disappointing increase in the number of candidates using pencil throughout their paper. Once again, **it is strongly advised that candidates use pen and not pencil** to complete their paper, in order to make their writing easier for the Marker to read and assess, and to avoid any risk of their work being erased.

There continues to be a theme of Markers concerned over 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.

Another aspect noted 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.

Those candidates aiming for the highest possible award are reminded that they are required to use appropriate, relevant and, wherever possible, specialised terminology. Conversely, candidates are reminded that there is a limited range of universally known and accepted abbreviations and acronyms suitable for exam use (e.g.: bpm, RHR, MHR, SMARTER, FITT, etc.). Consequently, individual 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).

This year saw a change to the exam structure, format and specifications. This was particularly so with regard to changes in the way **Criterion 6 – Cross Disciplinary Links** (CDL's), is presented and assessed. These changes saw CDL questions being placed in a separate booklet, and the requirement for three questions with no choice dropped back to a choice of answering two out of three questions. The trade-off was that each question is now marked out of 15 instead of 12, with extra time allocated for each question. Consequently, it was expected that candidates would have the opportunity to provide longer answers with more detail and relevance to the scenario. Unfortunately, this did not appear to be the case. While many more candidates attempted both questions, the overall standard did not increase at all. In some respects, the standard went backwards as many candidates seemed unfamiliar with the guidelines on how to answer such questions, which suggest how best to set out information, and how marks will be allocated.

Common errors in answering these CDL's included: writing two words with an arrow in between and believing that this is providing a "link", e.g. autonomous -> confidence; placing irrelevant theory about the topic in general, at the expense of only including the theory that is relevant to the scenario and relating it to the specifics of the sport and the athlete/s, e.g. if Luke Hodge is clearly an autonomous athlete, why include theory on the cognitive and associative stages of learning? Given that 4 out of the 7.5 marks for each link are allocated for this relevance and application, which includes the use of examples, many candidates scored 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 only equivalent to a "t" rating.

Another concerning issue was how many candidates simply stated that two aspects “combined” to achieve what was being discussed. Each aspect may have been relevant and explained, but they were discussed **independently of each other**, and no clear link or interrelationship was established between the two aspects: e.g. explaining how LeBron James used recovery effectively and stating why he has good self-efficacy, yet not explaining how his recovery contributed in any way to his improved self-efficacy going into Game 6. Such an answer does not address any of the elements for the criterion and achieves zero marks for the link.

Finally, when two out of the three questions (Questions 17 and 18) required answers to be written in a specified direction, it seems that many candidates were unable to construct answers in the required direction. Many wrote their links in the correct direction, but then in their expansion of the link, it was clear that they were describing conditions related to the wrong direction.

Perhaps some of the above can be attributed to the notion that many candidates enter the exam with “pre-prepared, generic links”. While such a method can be effective for better 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. In some instances, the ‘generic’ link used is inappropriate for the specifics of the question altogether: e.g. suggesting that LeBron James improved his Aerobic capacity/LIP, which improved his self-confidence/self-efficacy – in the two days between Games 5 and 6.

Overall, very few candidates were able to provide answers for CDL’s which addressed the standards at the highest level. 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 in other criteria, as they need the breadth and depth of knowledge in order to provide detailed answers in the first place.

In the interests of ensuring a greater understanding and consistency on Criterion 6 questions, the guide used for marking is as follows:

- The 7.5 marks for each link be allocated along the lines of up to ½ mark for an appropriate and relevant link; up to 3 marks for appropriate and relevant theory (1 ½ marks for each core), and up to 4 marks for the application and relevance of the link and theory to the specifics of the question; including sporting examples.
- 0 marks be awarded for an INTRArelationship link, i.e. where a link goes from one aspect of Phys A/B to another from Phys A/B; or Skill to Skill, or; Psych to 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 2 marks be allocated for a CDL between the WRONG CORE areas (e.g. - Phys and Psych, when it should be Phys and Skill).
- A *maximum* of 3.5 marks be allocated for links not answered from the correct PERSPECTIVE i.e. should have been answered in a positive sense but has been done negatively, or vice versa.
- A *maximum* of 3.5 marks be allocated for links which are written in the wrong DIRECTION i.e. the question expressly calls for links from one core to another e.g. from Phys to Skill, not Skill to Phys (*This is especially relevant for Question 17, which must go from Phys to Psych, and Question 18, 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, e.g.: 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 6*.

Finally, part of the ability to perform well in an exam is knowing and understanding not just what to do, but also what not to do. The following points are noted by many Marking Coordinators every year, and have been addressed in this subject on an annual basis. However, the problems continue to arise each year, so they will be mentioned again.

For candidates wishing to perform well, they would be advised to understand and address the following issues, which take the negative point and turn it around to a positive perspective:

- Write **legibly**, using appropriate **terminology**, in black or blue **pen**. *Unfortunately, far too many candidates are writing their exams in pencil, which presents several issues, both actual and potential.*
- 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 5 questions (7, 11, 15) 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 6 questions (16, 17, 18) 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, as set out above.
- Understand that where an answer and a justification are required that a greater weighting will be given to the justification than simply giving the answer; so always try to give detail in support of answers.

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

MARKER'S COMMENTS

SECTION A - EXERCISE PHYSIOLOGY A (CRITERION 1) AND B (CRITERION 2)

Overall, very few questions were left unattempted, which is a pleasing to note. Many candidates were let down by failing to recognise and/or understand the difference between the respective cue/key words in questions; for example: 'list'; 'outline'; 'identify'; 'explain', etc. Some examples of this were in two/multi-parted questions where only one part was answered, for example, Questions 3d) and 6c).

While it was pleasing to note that fewer candidates lost marks for failing to refer to data and make use of units in Question 7, others experienced some issues reading from the correct graph axis – e.g. absolute v relative.

QUESTION 1

- a) Candidates that knew a pre-prepared definition did well. Those that attempted to “make up” a definition answered the question poorly.
- b) Most candidates could state that ATP is stored in the muscle cells. However, some did say the mitochondria and even myoglobin. Most candidates misinterpreted the question and gave the time frame as 10 seconds instead of 2 seconds worth of stored ATP.
- c) This question was generally answered poorly. Most candidates could discuss the structure of ATP and the first step of the high energy bond breaking, however the required depth of understanding was lacking.
- d) Many candidates did not read this question carefully enough. As a result, many simply listed three fuels, without indicating their rank in order of how consumed. Others stated carbohydrates, glycogen and glucose as the three fuels. Alternatively, some candidates listed 3 foods an athlete might eat e.g., pasta, lollies etc.

QUESTION 2

- a) Most candidates could state a definition for stroke volume. However, some did get confused with cardiac output. The second part of the question was answered poorly as candidates could not apply their definition to the question asked.
- b) Candidates answered this question well.
- c) Most candidates could give a basic outline of oxygen deficit. However, a deeper understanding was required for full marks and at times application of this concept to the question was poor.
- d) Most candidates could state a definition for aerobic steady state. Candidates found linking it with stroke volume challenging.

QUESTION 3

- a) Most candidates who read the question correctly knew the acute response and chronic adaptation for heart rate. However, many candidates gave responses related to other physiological aspects of the body and not heart rate.
- b) Not well answered. Candidates did not make the link between increased surface area of the capillaries and an increased VO_2 Max.
- c) Not well answered. Most candidates were unable to calculate relative VO_2 Max. Many did not make the connection that the VO_2 Max's given were absolute and tried to calculate an absolute VO_2 Max. Many candidates made a general statement about athlete 1 having the better VO_2 Max, but weighing more. Which was too basic in absolute terms and incorrect in relative terms.
- d) Not well answered. Most candidates said LIP is the point where LA begins to accumulate. This statement is incorrect. It is the highest intensity at which a steady state can be achieved; where there is a balance between LA being created and being removed. It is only at an intensity beyond the LIP where LA builds up at a faster rate than it can be removed. A lot of candidates also said it improves performance but not directly linking how it does to the second part of the question.
- e) Not well answered. Many candidates gave answers that were incorrect or too generalized e.g. interval training.

QUESTION 4

- a) Well answered. The use of the term “phase” caused some candidates to confuse a training “session” with the training “year”.
- b) Most candidates gave a very basic description of the principle of specificity e.g. Specificity is training to the specifics of a sport, rather than training the appropriate energy system/s, muscle groups, fitness components and sporting skills required by the sport/ athlete.
- c) Many candidates answered this with a basic answer of decrease volume and decrease intensity. Which, dependent on the sport, is not the case as some maintain a high level of intensity but decrease the volume significantly and increase rest between the high intensity, short, sharp bursts. In most cases, no outline was given.
- d) Generally answered well, apart from some suggesting dynamic stretching, which is more appropriate to a warm up, not a cool down.

QUESTION 5

- a) Candidates answered this question well.
- b) Candidates were very basic in their explanation of progressive overload or basically wrote ‘progressive overload is progressively overloading the body with weight’. However, most were able to give 2 good examples of the principle in action.
- c) Candidates answered 1/3 of the question well. Most could say what the training would look like in each phase e.g. endurance based/ skill work/ game play etc. However, many seemed to “guess” how long each phase should last with many stating that the specific sub phase lasts longer than the general sub phase. Also many candidates did not refer to volume and intensity of each sub phase in their answer.
- d) Poorly answered. Many gave 2 fitness components that it would possibly develop by restating the components in the question stimulus.

QUESTION 6

- a) There was a lack of understanding around EPOC. Many got the phases of EPOC around the wrong way. Also, many candidates made little or no reference to oxygen consumption despite the question specifically requiring it.
- b) Most candidates could recognise an active recovery as most appropriate. However, few knew what the majority of LA is converted to.
- c) This question was poorly answered. Candidates could state what intensity is but were very vague in their explanation of the full concept of DOMS. Most did not mention that it is potentially due to microscopic tears in the muscle fibres. Most candidates stated that “training at high intensity = DOMS”. This is not the case. It is due to the unusual increase in intensity/duration, e.g. the beginning of a new exercise program. If an athlete trains at high intensity regularly, they will not experience DOMS. Plus, athletes do not need to be training at high intensity e.g. An increase from running 20km a week to 80km a week at sub maximal intensities is just as likely to cause DOMS.
- d) There were two main ways in which candidates did not answer this question as well as they could have: either by giving strategies which were not nutritional in nature, or by failing to provide an outline of their nutritional strategy.

QUESTION 7

- a) Well answered unless candidates gave absolute VO_2 Max data instead of relative.
- b) Most candidates could give the values however many gave no comparison. Also some candidates gave their answers using relative VO_2 Max data instead of absolute.
- c) Answered poorly. Many candidates gave answers such as “the graph said so” or “It’s just higher the graph says” or the line on the graph went up”.
- d) Generally answered well apart from incorrect data at times from reading the graph incorrectly.
- e) Generally answered well.
- f) Generally answered well.

- g) Many candidates either used the incorrect data to do their calculation, just gave the data without showing a calculated difference, or gave the overall difference without showing how they calculated this.

SECTION B - SKILL ACQUISITION

QUESTION 8

- a) Most candidates were quite thorough in their understanding here. Occasionally, some candidates made the mistake of saying the same characteristic twice but stating it another way, for example, “the subroutines were not timed well” and then saying “the movements were jerky.”
- b) As the question asked for “the correct sequence”, many candidates did not get full marks for their subroutines as they may have listed them in order, but missed steps in the correct sequence, for example, missing the point of contact in between a downswing and a follow through.
- c) This question was interpreted in two different ways by most candidates. Provided sufficient detail was given, either interpretation was considered acceptable: either ‘detailed steps in the teaching of the subroutines’ OR ‘general coaching tips that reinforce the learning process’.
- d) Was answered well although some candidates mistakenly described the difference between whole and part practice.

QUESTION 9

- a) Whilst most candidates could define schema, many did not, or could not apply it to the given scenario and instead related it to a sport of their own choice.
- b) This question demonstrated the difference in understanding and application between the better candidates and the rest. The conditions of the ground, the rain, water, etc. are relevant cues in this scenario and some candidates said that selective attention will enable the soccer players to ignore the wet weather and focus on the important parts of their game plan. However, the better answers recognised that they should have been using selective attention to adapt to the changing conditions in the second half. Many candidates also forgot to give a specific example, as required.

- c) This was answered quite well although it is important that when asked to name and describe a process, in this case the Psychological Refractory period, that the use of the abbreviation PRP is insufficient for full marks. Some candidates also forgot to answer the second part of the question and say what would happen to the opponent. Candidates are also reminded that the use of terms such as “sell the candy” should be avoided.
- d) The vast majority of candidates were aware that temporal anticipation was about predicting WHEN something would happen. Some struggled to apply it to the scenario.
- e) It was expected that most candidates would be able to easily differentiate between KR and KP. However, there were some interesting interpretations, including one where one was explained as being internal and the other external, which is incorrect. In the given scenario it was KP that was considered best and that the coach could give the players specific information about technique for striking in wet conditions, passing in wet conditions, force changes, etc.

QUESTION 10

This question proved to be the most difficult out of the three on this criterion, with fewer candidates achieving higher marks.

- a) It was clear that many candidates did not know how to describe these terms accurately.
- b) The question specifically asked for a “skill”, whereas many candidates simply listed a sport. Better answers were specific not just about the skill, but also about in which sub-routine the action occurred, for example, not just stating “the serve in tennis” for wrist flexion, but “at the moment of impact in the tennis serve”.
- c) Generally answered well. A couple of candidates made comments about less stability in a basketball shot when they jump into the air. Better answers discussed stability in general.
- d) Most candidates were able to outline characteristics of an autonomous performer, fewer were able to make the connection between a skilled performance and memory. LTM is about more than just about remembering how to perform a skill and better answers also discussed matters such as muscle memory, schema and chunking in relation to the LTM and the Autonomous performer.
- e) Candidates were able to use any of the classifications which fit this scenario, which covered almost all except KR.

- f) Candidates did a reasonable job of applying their knowledge to this scenario presented in the accompanying image. Some candidates, however, forgot to discuss velocity and only spoke about the angle and flight path information.

QUESTION 11

Candidates generally did very well in this question. Parts b), d) and f) were the sections that gave better candidates the opportunity to identify themselves. While many candidates gave the relevant units, those that did not were penalised ½ mark for each occurrence, up to a maximum deduction of 1 ½ marks. It should also be noted that when a question asks for ranking in a particular order, in the case of 10 f), from fastest to slowest, then ranking from slowest to fastest is not correct.

SECTION C – SPORT PSYCHOLOGY

QUESTION 12

- a) Most candidates found it relatively straightforward to define Self-Confidence. Some had trouble explaining how Self-Efficacy and Self-Confidence differed.
- b) Candidates either did really well or really poorly on this question. Many candidates did not seem to understand what the term “implications” meant.
- c) Most candidates were able to explain how a vicarious experience enhances the athlete’s self-efficacy. The example had to be a specific sport related one.
- d) Generally answered well. Problems arose when candidates referred to strategies that applied once the athlete arrived at the venue, or they listed rather than outlined their strategies, as required.
- e) Most candidates could adequately define a coping strategy, although some did not select a team sport context in which to provide their example.
- f) Candidates needed to focus their attention on aspects of debriefing which could enhance self-efficacy. Pointing out negative factors would not generally enhance one’s self-efficacy.

QUESTION 13

- a) Most candidates could respond to the fact that the intrinsically motivated athlete would respond differently to the extrinsically motivated athlete. Most comments reflected the notion that the

IM athlete has the burning desire to succeed whilst the EM athlete, after 5 losses, won't care anymore as they are not getting external rewards.

- b) Not answered particularly well. The actual definition for “flow state” was missed on many occasions, with candidates going straight to “highest form of intrinsic motivation”. Candidates had trouble describing HOW the IM athlete may achieve the state of flow.
- c) Not answered particularly well. The level of understanding of “process goals” was quite poor, reflected in both the definitions and examples (if given) that were provided by the majority of candidates. Many mistakenly gave answers which represented “performance” or “outcome” goals, which were incorrect.
- d) Many candidates did not relate their answers to the “world junior championship” as required (especially those that chose AFL). Most answers were generic examples of the SMARTER acronym and not related to the sport they identified. Some could not identify all 7 aspects of SMARTER Goal Setting.
- e) Candidates had very little trouble linking short term and long term goals.

QUESTION 14

- a) There were not a lot of good definitions provided for “cognitive anxiety”. Many candidates mistakenly linked ‘cognitive’ with the cognitive stage of learning from skill acquisition and stated that cognitive anxiety was for beginners only. If a candidate understood cognitive anxiety, they were usually able to provide a sound sporting example.
- b) Candidates had little trouble with these behaviours although some were so similar to each other that full marks could not be awarded.
- c) Generally answered well, or poorly. Candidates needed to link the visualisation with the reduction of anxiety to achieve full marks, as an explanation, not a list, was called for.
- d) Very poorly answered. Some defined trait anxiety. Most discussed this person who has a predisposition to under arousal as being over aroused. Those few who answered well, suggested the athlete was more ‘laid back’ and thus naturally under-aroused.
- e) Answered very well. Lots of pep talks and loud stimulating music.

- f) Answers tended to be rather inconsistent. Some started well but missed the specific focus on Nideffer. Others focused too much on arousal, rather than attentional errors. Many answered this almost like a skill acquisition question, focusing on aspects of selective attention and not making the connection specifically to attentional errors.
- g) Few candidates could provide accurate definitions for “attention” and “concentration” or at least the difference between the two. Many candidates did not provide sufficient reasoning to support their decision.

QUESTION 15

Data questions were generally done well.

- c) Candidates who went about their response to this question in a methodical manner were generally rewarded for their efforts.
- d) Some candidates failed to make mention of the mean score in their response. Candidates also had to make comment regarding the effectiveness of mental rehearsal for full marks.

SECTION D

The information with regard to performance on this section of the paper can be found in the General Comments Sections, and a detailed analysis with a set of exemplars can be found in the Solutions Section.

SOLUTIONS

SECTION A – EXERCISE PHYSIOLOGY A

QUESTION 1 (CRITERION 1)

Energy is fundamental to body function but not something most people think about it. For elite athletes, who stress their bodies each day, accessing and replenishing energy stores are essential considerations when training and competing.

- a) Define energy. (1 mark)

The capacity or ability to perform work

- b) Where is ATP stored in the body and for how long will it last? (1 mark)

Muscles (cells). Enough to last for 2 seconds of work.

- c) Discuss the process of ATP splitting. (3 marks)

Structure is an adenosine molecule and three phosphates.

When energy is needed the bond between a phosphate splits and energy is released.

The remaining substance is ADP and a phosphate.

- d) Identify the THREE fuels athletes consume to help reform ATP. Rank these fuels according to the amount of energy they contribute to an athlete competing in an endurance event. (2 marks)

1) Carbohydrates 2) Fats and 3) Lipids.

QUESTION 2 (CRITERION 1)

Madison de Rozario is a world class wheelchair endurance athlete who has competed successfully in the Commonwealth Games and the London Marathon this year.

- a) What is stroke volume? How would prolonged endurance training have increased Madison de Rozario's stroke volume? (2 Marks)

Stroke Volume is a measure of how much blood is squeezed/ejected/pumped out of the heart/left ventricle every beat. Increased the volume of the left ventricle, therefore more blood ejected per beat.

- b) Most of a marathon is completed at sub-maximal pace. Which energy system will provide most of the energy for Madison in a marathon? What are two by-products produced by this system? (2 marks)

Aerobic or O₂ system - CO₂, H₂O, Heat (two of)

- c) If Madison has to respond to an increased race pace or has to race uphill she may experience Oxygen Deficit. Explain this process and identify the specific energy system which Madison will use to cope with this increased intensity. (3 marks)

Oxygen deficit occurs when the body is unable to meet all of its energy needs aerobically because it doesn't have the time for the body's systems to transport oxygen OR

The difference between the amount of energy required for a task and that which can be supplied aerobically.

ATP-PC (Phosphagen) and Lactic Acid Systems.

- d) What is aerobic steady state? How would Madison's large stroke volume enhance her ability to reach aerobic steady state early in race? (2 marks)

There is a balance between the amount of energy needed for activity and the amount of energy being supplied aerobically by the body OR

Supply of oxygen is equal to required demand of oxygen.

A larger stroke volume means more oxygenated blood leaves the heart with each beat, increasing access to O₂ for aerobic energy production.

QUESTION 3 (CRITERION 1)

When athletes exercise aerobically they can expect a number of acute responses and chronic adaptations.

- a) Considering heart rate, what would be an acute response whilst training and a chronic response after a number of weeks of training? (1 mark)

Increased HR

Decreased Resting HR or Decreased HR at same work intensity

- b) One chronic adaptation to endurance training is an increase in the maximal amount of oxygen an athlete can consume, or their VO₂ Max. Explain how increased capillary density in muscles assists this adaptation? (2 marks)

Increased capillary density increases the surface area of capillary walls through which the oxygen can diffuse into muscle cells (or means that there are more capillaries supplying the muscles with blood), hence, more oxygen can be consumed, which in turn increases the VO₂ max.

- c) Compare and evaluate two endurance athletes' relative and absolute VO₂ Max capacities by using the following information. (4 marks)

Athlete 1 VO₂ Max. = 5.6 Litres/minute Weight = 80 kg

5600 = 70ml/kg/min

80

Athlete 2 VO₂ Max. = 4.8 Litres/minute Weight = 60 kg

4800 = 80ml/kg/min

60

Athlete 1 has a larger absolute VO₂ max, by .8 L; and

Athlete 2 has a larger relative VO₂ max by 10 mL/kg/min.

- d) What is Lactate Inflection Point (LIP) and how does its improvement influence aerobic performance? (2 marks)

LIP is the exercise intensity at which a person is unable to process and remove lactic acid at the rate it is accumulating OR

the highest intensity of aerobic exercise where a steady state can be achieved; it is only once you cross the LIP that lactate accumulate rapidly.

The higher the LIP the greater the intensity of aerobic work that can be handled/performed before accumulating fatiguing by products.

e) If an athlete achieved the following chronic adaptations

- Increased diameter of fast twitch muscle fibres
- Increased stores of creatine phosphate

what are TWO types of training they could be using? (1 mark)

Resistance training (especially for strength or power), sprint training, HIIT, Interval training with explanation of type of interval, plyometrics, etc.

Anything that is high intensity and primarily anaerobic in nature.

SECTION A – EXERCISE PHYSIOLOGY B

QUESTION 4 (CRITERION 2)

Training sessions should be structured to improve the physiological fitness components an athlete needs for competition and should also be part of a long term plan that considers major competitions, recovery and return to training from injury and illness.

a) What would usually be the first phase in a training session? What is it designed to do?

(1 mark)

Warm up. Prepares muscles that will be a focus in training and activates energy systems OR increases blood flow to muscles OR increases muscle temperature OR decreases risk of injury.

b) Describe the principle of specificity, and explain how it would guide the conditioning/skill development phase of a training session to improve running speed. (2 marks)

Specificity requires training to focus on the muscles, movements, fitness components and energy systems necessary for an activity.

Repeated short sprints of 30 - 40m OR mention of the relevant info for each of the elements of specificity instead of stating an appropriate training method.

c) Consider a major sporting event. Outline TWO changes that would occur in a training session during a tapering period? (2 marks)

A reduction in volume/ duration and intensity of training. Complete recovery, maximum levels of strength, endurance etc. and maximum energy stores.

- d) What is the purpose of a cool down to complete a training session? What are two activities a cool down should include? (2 marks)

A primary purpose is to limit venous pooling OR returning muscle fibres to pre-exercise length OR allowing HR and/or body temp to reduce slowly to resting levels OR speeding up the removal of LA and H⁺ ions.

It should include a continuation of the activity/movement at reduced intensity and stretching (static or PNF).

QUESTION 5 (CRITERION 2)

A midfield player in a team sport requires a range of fitness components to meet the demands of their position. These could include speed, agility, aerobic capacity and muscular power.

- a) In order to improve muscular power the player could use resistance training. Briefly describe what is meant by 1 Repetition Maximum and by 10 Repetitions Maximum. (2 marks)

1RM – The maximum load that can be lifted once.

10RM – The maximum load that can be lifted 10 times.

- b) Explain the training principal of progressive overload and provide two examples of how it could be applied to a resistance training program. (2 marks)

The gradual increase in training loads in response to physiological adaptation.

Increased load, increased repetitions, increased sets, reduced recovery, etc.

- c) The preparatory or pre-season period of training will be essential to the midfielder's physiological preparation. Discuss the characteristics of each of the general preparatory sub-phase and the specific preparatory sub-phase. Include how long each sub-phase should last. (3 marks)

General – focus on developing general fitness, especially aerobic capacity High volume but relatively low intensity. It lasts from 4 – 10 weeks.

Specific – more focus on event/sport related fitness. Intensity increases whilst volume may decrease. It lasts from 2 – 6 weeks.

- d) Identify two advantages of cross training which may assist the midfielder player. (1 mark)

Keeps up motivation with variety and prevents workouts from becoming too stagnant and boring; develops any or all energy systems, components and muscle groups; helps avoid overuse injuries.

QUESTION 6 (CRITERION 2)

Any athlete who is training appropriately will need to recover between each training session to ensure training quality is maintained.

- a) With reference to oxygen consumption, lactic acid and creatine phosphate, explain how Excess Post-Exercise Oxygen Consumption (EPOC) contributes to an athlete's recovery? (3 marks)

EPOC is the elevation in oxygen consumption during recovery above that usually consumed at rest.

It aids recovery by replenishing ATP and PC during the alactacid phase and the resaturation of myoglobin and haemoglobin with oxygen.

Removal of lactic acid during the lactacid phase.

- b) What sort of recovery should an athlete use to enhance lactic acid removal, and what will happen to the majority of the lactic acid that is removed? (2 marks)

Active Recovery using same muscle groups and movements.

65% oxidized to CO₂ and H₂O.

- c) Explain the terms training intensity and Delayed Onset Muscle Soreness (DOMS), and discuss their relationship. (2 marks)

Intensity is a measure of how hard and athlete is training.

DOMS describes the phenomenon of muscle pain, soreness or stiffness that occurs 1-3 days after a change in exercise program or unusual exertion has occurred.

Thus if an unusual dramatic increase in intensity occurs, DOMS could occur.

- d) An athlete struggling to recover fully after training sessions decides to seek advice from a nutritionist. Detail THREE nutritional strategies the nutritionist would recommend they could use to improve this aspect of his recovery. (3 marks)

Consume carbohydrates within one hour of training being completed to maximise glycogen store replenishment.

OR with eat a high GI snack ASAP after training.

OR eat a Low GI meal within a couple of hours of training.

OR High GI foods in the first 20 minutes followed up with Low GI foods.

OR Consume 15 – 25gm of protein within the first hour of recovery to reduce muscle protein damage and to assist in glycogen absorption.

OR proteins are needed post exercise as amino acids are necessary to rebuild damaged muscle tissue.

OR rehydrate with fluids and electrolytes. Monitor weight and urine colour.

OR avoiding alcohol as this slows the recovery process.

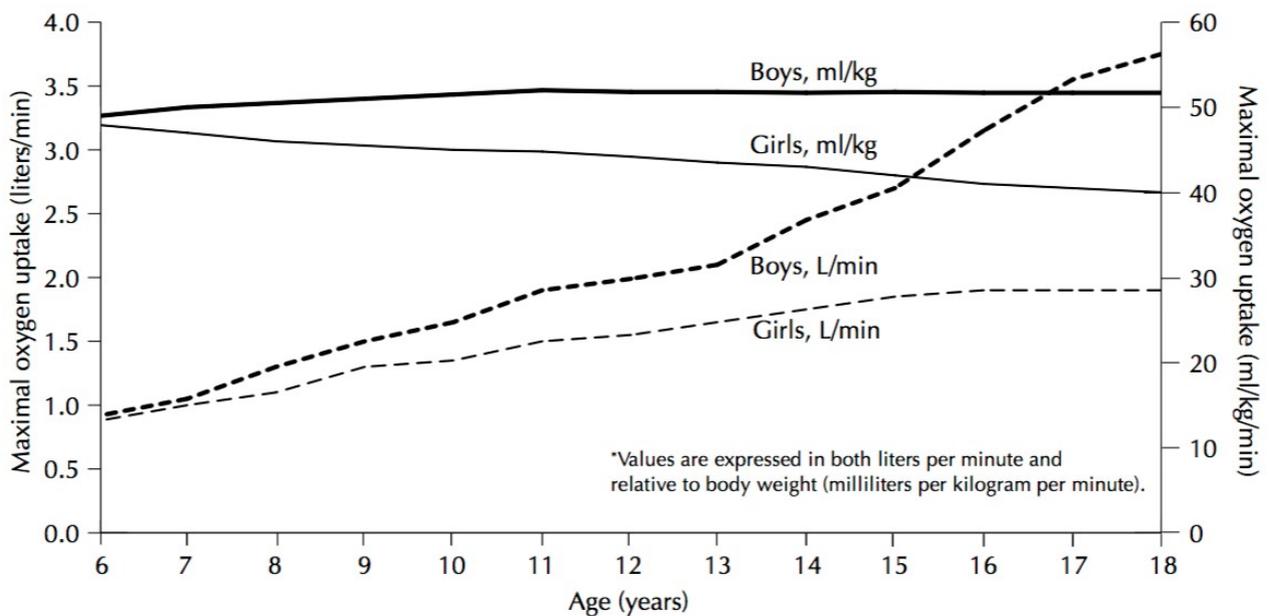
OR avoiding fat consumption during the recovery process as this will result in a decreased rate of glycogen replenishment.

QUESTION 7 (CRITERION 5)

All answers to this question must make reference to the information that follows.

VO2 Max is often used as a measure of aerobic capacity. As with many physiological measures, VO2 max will change through life and in response to lifestyle.

Graph I: Changes in VO2 Max with increasing age from 6 to 18 years of age in boys and girls.



Source: <https://www.cdc.gov/nccdphp/sgr/pdf/chap3.pdf>

- a) What is the VO₂ Max relative to body weight for 15 year old girls and for 15 year old boys? (1 mark)

Girls: 41 – 43ml/kg/min

Boys: 51 – 53ml/kg/min

- b) Compare the increase in VO₂ Max (L/min) between the ages of 13 to 18 years for boys and girls. Refer to data in your answer. (3 marks)

Boys: 13 = 2.1 L/min - 18 = 3.7 L/min; or an increase of 1.6 L/min

Girls: 13 = 1.6 L/min - 18 = 1.8 L/min; or an increase of 0.2 L/min

The comparison statement could be about how much more the boys increased than the girls, or stating the diffs b/n boys and girls at 13 and 18.

- c) What is the reason for your observation in b)? (1 mark)

Most boys between ages 13 – 18 will be larger than girls of the same age.

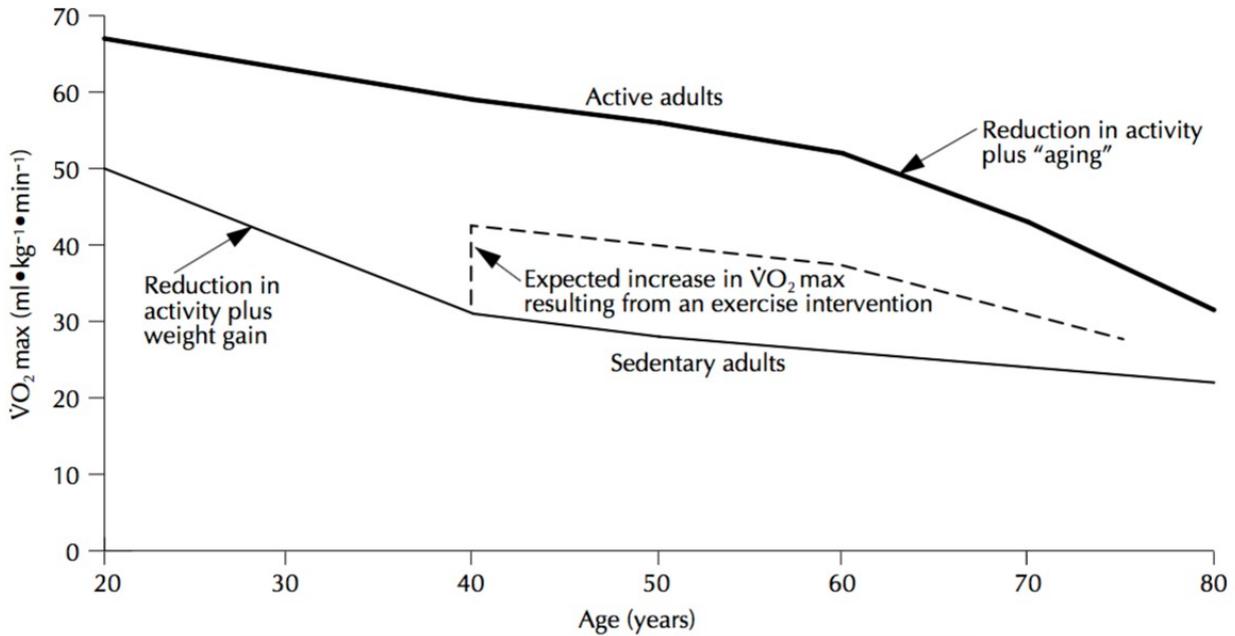
OR Chronic adaptation –VO₂ max increased due to increased aerobic fitness.

OR due to an increase in body size, as subjects get older body size will increase.

OR females go through puberty earlier.

OR boys may be more active.

Graph 2: Changes in VO₂ Max with aging, comparing active and sedentary populations and an expected response to exercise intervention in sedentary adults.



Source: <https://www.cdc.gov/nccdphp/sgr/pdf/chap3.pdf>

- For each group in Graph 2 identify in which 20 year period they experience their greatest decline in VO₂ Max. How much is each decline? (2 marks)
Active: 60 – 80 years. 52 – 31 ml/kg/min or 21 ml/kg/min.
Sedentary: 20 – 40 years. 50 – 31 ml/kg/min or 19 ml/kg/min.
- If sedentary adults began exercising what would be their expected VO₂ Max at age 50 years? (1 mark)
41 ml/kg/min
- At what age does the expected benefit to sedentary adults of exercise intervention begin to decline? (1 mark)
60 years
- What is the difference in VO₂ max at age 80 years between active adults and sedentary adults? (1 mark)
32 – 22 = 10 mL/kg/min

SECTION B – SKILL ACQUISITION

QUESTION 8 (CRITERION 3)

When learning a new physical skill there is a risk that it can be learnt incorrectly. Good demonstration, instruction, practice and feedback can assist the learner to have the best chance to develop well organised and efficient skills.

- a) What are FOUR characteristics of someone in the cognitive stage of learning? (2 marks)

Make many errors, devote attention to step-by-step procedures, rarely repeat the skill the same way, can perform the skill slowly, poor skill timing, good progression and improvement, self-talk while performing, frustration, lose motivation, concerned with what to do and how to do it, needs extrinsic feedback (any four of).

- b) Select a skill and place FOUR of its sub-routines in the correct sequence. How is this skill classified? (3 marks)

Answers here were dependent on the skill chosen.

- c) If you are coaching someone to learn the skill identified in b), present THREE key, specific teaching points that you could make to reinforce skill learning for the learner enhance learning. (3 marks)

The answers here were dependent upon the previous answer. Answers could relate to either specific coaching tips for the cognitive learner, or relate specifically to the chosen sub-routines, much like a skill analysis

- d) Describe massed practice and identify why this form of practice may not be preferable for someone learning a skill. (2 marks)

*Practicing a skill without breaks until it is learnt.
It may be fatiguing and prolonged periods of struggling with the skill may decrease motivation.
Might perform the skill incorrectly 100 times if a beginner.*

QUESTION 9

At half time in a soccer match it rains heavily. The ground, which was dry in the first half, will now be slippery for players attempting to change direction. Also, the ball will now react differently when passed along the ground and when bouncing.

- a) Define schema and, using a specific example, describe how it could influence response selection in the scenario above. (2 marks)

The rules we learn to guide the execution of skills in different environments.

Any suitable example of a changed response selection. For example, a pass made to a player may slow up on the wet ground. They choose to move toward the ball more quickly than they usually would.

- b) Outline what is meant by selective attention and discuss how its use early in the second half of the soccer match may assist a player to adapt to the changing conditions. Use a specific example to support your answer. (3 marks)

Selective attention is knowing what information/stimuli to attend to in an environment and blocking out irrelevant cues/noise.

Once on the wet ground players should attend to how the ball bounces, how it rolls, changes in players' agility, puddles and wet parts of the field etc. so that they can deal with the new conditions.

For example, a ball kicked by the GK may now skid on and not bounce as high. OR A defender may change the distance between themselves and the bounce to deal with the new trajectory OR, need more force to strike the heavier ball the same distance.

- c) Effective fakes and baulks can work well in team sports. Name and describe the process a fake or baulk may initiate in an opponent. (2 marks)

Psychological Refractory Period. We can only process one stimulus at a time.

There will usually be a delay in responding to a second stimulus presented soon after the first; so this will initiate a delayed response or an error from the opponent.

- d) Discuss how temporal anticipation may assist a goalkeeper's response time now that their movements may need to be a little slower in the conditions. (2 marks)

Temporal anticipation is anticipating WHEN something is likely to happen. If a GK can anticipate in this way they can begin to move sooner.

The ability to know when there is a likely shot attempt means the GK can make up for a slower MT with a quicker Reaction Time and reduced overall Response Time.

- e) Differentiate between feedback that is knowledge of performance (KP) and that which is knowledge of results (KR). For a player struggling in the wet conditions which type of feedback would be most useful? Provide an example, specific to this scenario, of this type of feedback.

(3 marks)

KP – feedback relates to their skill performance and WHY something happened.

KR – feedback relates to the outcome of their performance.

In the wet – KP is most appropriate.

Any suitable example, such as “To maintain your footing when changing direction shorten your stride and lower your centre of gravity.”

QUESTION 10 (CRITERION 3)

Many movements executed in a sport have elements common with movements in other sports. For example, a good overarm throwing technique in cricket is very similar to the technique required to throw a javelin. The subroutines and their sequence and timing, in each, are similar.

- a) Describing movements succinctly is an important element of skill analysis. What do the following words mean? (2 marks)

Flexion – *angle decreases at a joint*

Adduction – *movement to the midline of the body*

Extension – *angle increases at a joint*

Anterior – *front of the body*

- b) Identify a sporting skill in which flexion occurs at the wrist and another skill in which extension occurs at the hip. (1 mark)

Flexion - Follow through on tennis serve, etc., etc.

Extension – Take-off leg straightening in high jump, etc., etc.

- c) If an elite netball goal shooter decides to play basketball, what are THREE ways she can ensure stability before shooting which she can transfer to her new sport? (3 marks)

Wide base of support

Lower centre of gravity

Centre of gravity within base of support

Good pair of court shoes to increase friction and therefore stability.

- d) Outline the characteristics of autonomous skill performance, and describe how long term memory assists an elite performer in the execution of their skills in competition.

(3 marks)

ASP - skills can be performed automatically, without thought, seem effortless, good timing, minimal errors, can self-correct etc.

Muscle Memory – committing a movement to LTM through repetition so it can be encoded and performed autonomously. The LTM can also be useful the storage of set plays (chunking) and Schema rules to improve decision-making in Autonomous athletes.

- e) Good coaching often requires naked eye analysis and immediate and concise feedback to players who are struggling to work out why they are making skill errors. Classify this type of feedback.

(1 mark)

Extrinsic/External/augmented; KP; Terminal; Concurrent

- f) The image below illustrates an example of projectile motion in which a person jumps from one structure to another.



- g) Explain how the angle of take-off and velocity of take-off influence the person's ability to jump successfully from one structure to another.

(3marks)

Too great an angle beyond 45 deg or too small an angle below 45 deg; with an explanation of the likely outcome.

Take-off velocity must be fast enough to project them forward and stay in the air long enough OR not so fast that they cannot establish a take-off angle of about 45 deg and overshoot the wall.

QUESTION 11 (CRITERION 5)

All answers to this question must make reference to the information that follows.

The following tables include information collected on the response of three balls of different size and weight which became projectiles when a force was applied to them.

Each ball had the same force applied to them and was released from the same height. The trials were conducted indoors.

Table 1: Ball characteristics, trial results and mean scores.

Ball Type	Mass (kg)	Time in Air (seconds) 5 Trials	Distance Travelled (metres) 5 Trials	Average Time in Air (seconds)	Average Distance Travelled (metres)
Golf Ball	0.0459	0.75, 0.78, 0.75, 0.71, 0.72	4.14, 4.24, 4.14, 3.83, 3.96	0.74	4.06
Tennis Ball	0.0578	0.70, 0.72, 0.78, 0.69, 0.71	3.47, 3.53, 4.32, 3.51, 3.50	0.71	3.66
Baseball	0.1462	0.63, 0.65, 0.61, 0.66, 0.69	3.00, 3.01, 2.99, 3.04, 3.02	0.65	3.01

Source: <https://sites.google.com/site/catapultprojectile/results/data-tables>

Table 2: Acceleration and velocity data.

Measure	Golf Ball	Tennis Ball	Baseball
Velocity (m/s)	5.46	5.15	4.63
Acceleration (m/s/s)	7.37	7.25	7.12

- a) Identify the ball that travelled the furthest during the 5 Trials. How far did it travel? (1 mark)

Tennis Ball (1/2) 4.32m (1/2)

- b) For the golf ball and the tennis ball, identify the range for time in air during the five trials? (2 marks)

The golf ball. Its range was from 0.71-0.78, or 0.07 sec's.

The Tennis Ball. Its range was from 0.69-0.78 or 0.9 sec's.

- c) With reference to TWO pieces of data, briefly describe the relationship between ball mass and average distance travelled. (3 marks)

As ball weight increases distance travelled decreases... OR, the lighter the ball the further it travelled.

- d) Some trials for each ball produced some significantly different results to the majority. What factor influencing the balls' release may not have been as controlled as others? (1 mark)

Angle of release

- e) In Table 2, which ball experienced the greatest acceleration? Refer to data in your answer. (1 mark)

The golf ball, with an acceleration of 7.37 m/s/s

- f) For the balls in Table 2, rank the velocity from fastest to slowest. What is responsible for the difference in the balls' velocity? (2 marks)

Fastest = golf ball at 5.46 m/s, then tennis ball at 5.15 m/s and baseball the slowest at 4.63 m/s

The differences in velocity are caused by the differences in mass between the balls.

SECTION C – SPORT PSYCHOLOGY

QUESTION 12 (CRITERION 4)

Champion tennis player, Arthur Ashe, offered the following advice

“One important key to success is self-confidence. An important key to self-confidence is preparation.”

- a) Define self-confidence. How does self-efficacy in sport differ from self-confidence? (2 marks)

Self-confidence is a person's belief in themselves and their abilities (general sense).

Self-efficacy in sport is a situational form of self-confidence and relates to confidence individuals have in their ability to perform a specific task.

- b) What are TWO possible implications for an athlete lacking self-confidence? (1 mark)

Negative thoughts, doubts about their adequacy, poor performance. May not engage in behaviour. Opts out. Worry, increased anxiety and depression. Will give up if initial attempts are unsuccessful. May become a motivated, negative self-talk, low resilience, etc. (any two)

- c) For a sport of your choice provide a specific example of a vicarious experience that may enhance an athlete's self-efficacy. (1 mark)

Any example, such as: A footballer sees a team mate chase down and successfully tackle a larger opponent, making them think they can do the same next time.

Doesn't ask for definition, just the sporting e.g. Vicarious experience (modelling) relates to when we see someone succeed and we think 'If they can do that, I can too'.

- d) The comments from Arthur Ashe highlight the importance of preparation to an athlete's self-confidence. Outline THREE pre-competition strategies an athlete could use prior to arriving at the competition venue. (3 marks)

Rest: How much sleep do they need? Time to bed and time to get up.

Diet: What, when and how much to eat/drink. Energy needs and comfort.

Equipment check: All equipment, food and drink you need. Night before.

Spare time: Plan to fill in spare time with activities that steer the mind away from anxiety causing thoughts. Read, music, TV, mental rehearsal etc.

Travel: What time must they arrive, what time to leave, transport options, etc.

Mental preparation: relaxation, visualisation etc. When and where.

- e) Define coping strategies, and provide a practical example of a coping strategy from a team sport of your choice. (1 mark)

Coping strategies are secondary plans/behaviours to implement should a primary strategy fail or not meet needs.

Any relevant TEAM sporting example, such as: Centre court player in netball is struggling to feed the ball into the circle. They are replaced by a backup player.

- f) Following competition, planning for the next competitive event will begin almost immediately. What aspect of debriefing could help enhance an athlete's self- efficacy? (1 mark)

Identifying the things they did well (positive aspects of performance or what went right?) OR Involving the athlete as it makes them feel their opinion is valued, which in turn increases their S-E.

QUESTION 13 (CRITERION 4)

One of the challenges for coaches of teams is to bring together a diverse range of people to play as one unit. Their greatest diversity will often be in their psychology.

- a) A soccer team loses the first five matches of its season. Discuss how an intrinsically motivated player and an extrinsically motivated player may have a different perspective of this situation. (2 marks)

Intrinsically motivated – will focus on the process, will identify the aspects that went well, will be motivated by changes that promise improvement.

Extrinsically motivated – may lose motivation because they feel the cause is lost, the results override the process, they see no way to change things.

- b) Define flow and briefly describe how an intrinsically motivated athlete may achieve a state of flow. (2 marks)

Definition: Complete immersion in an activity. Athlete becomes one with the activity. The highest form of intrinsic motivation, etc.

Intrinsically Motivated athlete sees a match between the demands of an activity and their ability. They focus on the activity and not the outcome of the activity.

- c) Discuss how achieving process goals can enhance a player's intrinsic motivation. Provide an example of a process goal from a sport of your choice. (3 marks)

Process goals focus on movements/actions/steps and strategies that contribute to our sporting performance OR they are the means to improve performance and provide an opportunity for athletes to be successful.

They are often seen as the stepping stones to more distant, outcome goals. Int Mot players focus on the process of playing and improving. Process goals provide this opportunity in training and playing. (1 mark)

Any relevant e.g., such as: A process goal in basketball would be to shut down the passing lanes into the key.

- d) Goal setting is often based around the SMARTER principle. How does this principle assist a young and improving athlete with their goal to gain selection for the world junior championships, in a sport of your choice, in two years' time? (4 marks)

The principle assists the athlete by giving them guidance and direction as well as a structure to their program, while scheduling periods of review to monitor progress and make changes.

Meaning

Example

Specific

I will attend all training sessions this week.

Measurable

I will work to increase my shooting % to 75%

Agreed

All members of the team believe we can improve our KPIs

Realistic

We can increase our gym sessions by one/week

Time Framed

I want to increase my VO2 max by 5% in six months.

Evaluate or Exciting

I will review progress in a month/I am motivated by this goal the coach thinks I can achieve (any goal)

Recorded or Reviewed

I will write my goal in my diary/ same as evaluate

- e) Why should short term and long term goals be linked? (1 mark)

ST goals are the processes that underpin the achievement of LT goals. They assist in providing motivation and a connection between the effort and the outcome. ST are stepping stones to helping achieve LT goals. Stepping Stone approach i.e. Short term goals are stepping stones to achieve a long term goal.

QUESTION 14 (CRITERION 4)

The Catastrophe Theory aims to present the relationship between arousal and performance. Although similar to other theories it includes a third variable, anxiety.

- a) What is cognitive anxiety? Provide a sporting example that may contribute to an athlete's cognitive anxiety. (2 marks)

Cognitive anxiety manifests itself as worrying about your capabilities and/or performance.

Negative thoughts and feelings will often increase when we struggle to meet the demands of a competitive situation. Cog Anx is a combination of trait (of the personality) and state (of the situation) anxiety that contribute to how one feels at any given time/place.

Any relevant e.g., such as: A cricketer has dropped the last two catches presented to him.

Begins to question their ability instead of focusing on the next catching opportunity. Things linked to previous failure, reliance on outcome/results, being underprepared, injured etc. Links to apprehension we feel about a task.

- b) An athlete may demonstrate behaviour to coaches and other athletes which may indicate they are anxious. List FOUR of these behaviours. (2 marks)

Biting fingernails; Lethargic movements; Inhibited posture; Playing safe; Going through the motions; Introversion; Uncharacteristic displays of extroversion; Fidgeting; Avoidance of eye contact; Covering face with hand; etc. (any four)

- c) Explain TWO benefits of visualisation which may assist an over anxious athlete to reduce their anxiety to manageable levels. (2 marks)

Examples include:

It will focus attention on what they can/need to do.

It will reinforce that they have the ability in a context.

May provide solutions to problems that are causing anxiety.

Will realign attention to process, is positive and realistic, and preceded by relaxation assisting with anxiety

Aid concentration and therefore the ability to maintain focus on the task at hand and exclude distractions

Reduce anxiety and physical tension which can assist athletes to achieve optimal arousal and thus performance

Suggest a possible course of action; a "Problem Solving" approach helps to determine a response or outcome, etc.

- d) In a team, some athletes may have a pre-disposition to be under aroused. Describe how their trait anxiety may contribute to this arousal level. (1 mark)

Trait anxiety is the anxiety of our personality. An under aroused athlete may have low trait anxiety and, as such, is unlikely to find the competition environment threatening

- e) A coach is struggling to raise the arousal level of a number of athletes to optimal levels. Identify TWO methods they could use. (1 mark)

Play loud, stimulating music; Set personal achievement challenges; Put on motivational videos; Conduct a vigorous warm up; Stress the importance of the result; Give athletes a publicised responsibility; Give the athletes a "pep" talk; Provide performance goals to be achieved, etc.

- f) Robert Nideffer suggests that when over aroused our attentional capabilities may suffer. Identify ONE of the attentional errors he indicates may occur and, a specific sporting example of the error. (2 marks)

Attention narrows (Involuntary narrowing). Focus on the ball in your hand (NE) and miss passing to the free player (BE).

OR Lose ability to shift attention. Fields ball and throws to wrong end in cricket.

OR (attentional mismatch) Dominant attention style takes over. Baseballer analyses previous poor swing (NI) instead of being in NE to hit the next ball.

OR Overload of information (try to attend to everything). Still processing all options (BE) when should have narrowed down to one choice (NE).

OR Inability to maintain appropriate attentional focus. Tennis player when over aroused looks towards the crowd and his team (BE) rather than focus on his game (NE), etc.

- g) Describe the difference between attention and concentration. Which of the following (A or B) is an example of attention. (3 marks)

A: An AFL player focuses on their kicking technique when in goal kicking range.

B: An AFL player looks for players in a better position before deciding to kick at goal.

*Concentration is our ability to focus on anything for the time needed to process and respond to it, whereas Attention is our ability to focus on the correct thing at the correct time.
Either player could have been was acceptable, depending on the justification given.*

QUESTION 15 (CRITERION 5)

All answers to this question must make reference to the information that follows.

A sport psychologist is recruited by a soccer club to try and convince players of the benefits of mental rehearsal. He conducts the following to collect meaningful data.

The players are split into two groups of 10. Each group completes a drill culminating in a shot at a target. Each trial is scored out of 10. The higher the score the faster and more accurate the performance.

Group A repeats this drill once in each of the next two weeks. **Group B** is trained in some mental rehearsal methods, uses these methods and repeats the drill once in each of the next two weeks.

Table 1 – Trial results for Group A

Player	1	2	3	4	5	6	7	8	9	10	Mean
Trial 1	5	6	7	4	9	7	3	3	6	2	5.2
Trial 2	6	4	6	4	7	5	5	4	7	4	5.2
Trial 3	6	5	6	5	8	7	5	5	7	5	5.9

Table 2 – Trial results for Group B

Player	1	2	3	4	5	6	7	8	9	10	Mean
Trial 1	6	4	4	6	9	8	6	3	6	3	5.3
Trial 2	7	6	5	7	7	8	7	4	7	5	6.4
Trial 3	8	6	6	8	8	9	7	5	8	6	7.2

- a) Which player in Group A benefitted the most from repeating the task? Refer to data in your answer. (2 marks)

Player 10. Score improved by 3 (2 – 5) more than any other player.

- b) Which player in Group B appears not to have benefitted from using mental rehearsal? Refer to data in your answer. (2 marks)

Player 5. Only player who's score decreased in each trial over the course of the trial, from 9 – 8.

- c) A score of 7 or more is considered a good score. Identify the number of players achieving a score of 7 or more in Trial 1 and/or Trial 3 for Group A and Group B. Refer to data in your answer and comment on the results you have identified. (4 marks)

Group A - 3 in Trial 1 (Player 3, 5 & 6) & 3 in Trial 3 (Players 5, 6 & 9)

Group B – 2 in Trial 1 (Players 5 & 6) & 6 in Trial 3 (Players 1, 4, 5, 6, 7 & 9)

Comment for Group A: (example)

Same number of players in trials 1 and 3 but 1 player is different, i.e. player 3 in Trial 1 and player 7 in trial 3 – with reference to some results.

Comment for Group B: (example)

There was an increase in the number of players from trial 1 to trials 3 who achieved 7 or more thus 3 times the amount of players in trial 3 compared to trial 1 or 4 more new players improved.

- d) Refer to the mean scores for each group in presenting a statement about the effectiveness, or not, of using mental rehearsal. (2 marks)

The control group (A) increased its mean score by 0.7, from 5.2 to 5.9 (either/or).

The group using mental rehearsal (B) increased its mean score by 1.9, from 5.3 to 7.2 (either/or).

Mental rehearsal proved over twice as/nearly three times more effective.

SECTION B – CRITERION 6

QUESTION 16 (CRITERION 6)

Former Hawthorn AFL player, Luke Hodge, is now playing for the Brisbane Lions. Although not as fast as he once was, he is highly skilled, has a good understanding of strategy and is a very calm player.

Use **TWO** cross discipline links to demonstrate how Luke Hodge's high level of skill (**Skill Acquisition**), his experience and personality (**Sport Psychology**) will work together to make him a valuable player for Brisbane. (15 marks)

Perhaps because this question allowed for links to be made in either direction, it was answered better than either of the other two. Despite this, many candidates still chose theory which was difficult to relate to the specific scenario.

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 Luke Hodge (LH) use to enhance his skilled output that made him a valuable player at the Lions; or how did LH's attributes from a skill acquisition perspective enhance his psychological strengths?

Two links need to be made. Each link is assessed out of 7.5 marks, according to an agreed Guide, as set out in the General Comments section at the start of the Report.

Some of the commonly used links included:

- LH was motivated to use effective practice
- LH was motivated to seek/provide augmented feedback
- LH's autonomous attributes enhanced his self-efficacy
- LH's ability to control his arousal/anxiety levels allowed him to better selectively attend and make better decisions

“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:

Arousal control > selective attention

Luke is a champion player who knows how to control his arousal. He is a very calm player and therefore does not let himself get too stressed out. When he feels himself becoming too aroused, he calms himself down by listening to chill out music, accepting anxiety to be a normal part of competition, or focussing on his breathing. As he is known to be a calm player, it is more likely that he will be under aroused. When he feels this way, Luke will get himself up to the right levels by listening to pump up music or by doing a hard warm up.

His ability to keep his arousal levels right means he can selectively attend to relevant cues.

Selective attention is the ability to focus on all relevant information and ignore the ‘noise’. The noise would include the crowd, the sledging and all the flashing ads around the ground. The relevant cues would be things like where his teammates and opponents are in relation to him and the goals.

Because Luke can stay calm and focus on the right cues and not the noise, he can be a valuable player for Brisbane.

“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:

Arousal control enables selective attention

Luke is an extremely experienced player who knows how to control his arousal before and during a game. He is a very calm player and therefore does not let himself get over aroused. When he feels himself becoming too aroused, he can bring it down by listening to music he finds calming, accepting anxiety to be a normal part of competition, or practicing momentary relaxation. It is more likely that Luke will be affected by under arousal. When he feels this is an issue, Luke effectively raises his arousal to optimal levels by listening to pump up music or by undertaking a vigorous warm up.

His ability to control his arousal means he can selectively attend to relevant cues.

Selective attention is the ability to focus on all relevant information and ignore the ‘noise’. This would be extremely important when playing in front of big crowds with all the noise they make, as well as the constant changing of electronic ground advertising and replays on the scoreboard. Luke is able to block out these irrelevant cues and focus on the relevant ones. For example, Luke can realise he is too far out to score and detect which teammate is in a better position to score and pass the ball to them.

Luke is able to selectively attend to these relevant cues and act on them due to his ability to control his arousal, making him a great player.

“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:

Luke’s ability to control his arousal enabled him to selectively attend to cues.

Luke is an extremely experienced player who knows how to control his arousal before and during a game. He is a very calm player and therefore does not let himself get over aroused. When he feels himself becoming too aroused prior to a big game, he can effectively control his arousal by listening to music he finds calming, accepting anxiety to be a normal part of competition, or practicing momentary relaxation, such as controlled breathing, where he focusses specifically on the rate and depth of his breaths, prior to taking a shot on goal. As he is known to be a calm player, it is more likely that he will be affected by under arousal. When he feels this is an issue, Luke effectively raises his arousal to optimal levels by listening to motivational or high-tempo music; setting challenging goals and/or by undertaking a vigorous warm up.

His ability to control his arousal enables him to selectively attend to relevant cues.

Selective attention is the ability to focus on all relevant information and ignore the ‘noise’. This would be extremely important when playing at a ground like the MCG, with tens of thousands of people in the crowd, clapping, cheering and waving flags; with flashing advertising constantly changing around the fence and replays on the scoreboards; or even the sledging of opponents. Luke is able to block out these irrelevant cues and focus on the relevant ones. For example, after doing his

momentary relaxation, Luke can detect the wind speed and direction, as well as the distance he is from goals; or whether another teammate is in a better position to have the shot.

Luke is able to selectively attend to these relevant cues and act on them due to his ability to control his arousal and stay calm.

It is these abilities which enable him to be such a valuable player for the Brisbane Lions.

QUESTION 17 (CRITERION 6)

At the Gold Coast Commonwealth Games, the Australian netball team was beaten by one point in the Gold Medal match by England, despite being a strong favourite. Australia's players played tentatively and, at times, looked very slow. England, on the other hand, played confidently and moved quickly around the court.

Use **TWO** cross discipline links to demonstrate how England's strong physical condition (**Exercise Physiology**) positively influenced their mindset throughout the match (**Sport Psychology**).

(15 marks)

Despite the fact that this question asked candidates to discuss how the English Netball team were able to defeat Australia, far too many made their links about why Australia lost; how Australia could have played better, and even how England beat Australia in cricket!

Better answers focused on the performance in the actual Gold Medal match, and related their links to how it would have been applied during the game scenario. For example, they did not just state *"Improved muscular power will improve their self-efficacy"* as many did, they explained that, *"Improved muscular power will improve their self-efficacy as a consequence of consistently leading their opponent to the ball, out jumping them on rebounds and being able to pass the ball more forcefully and over greater distances. Thus, this enhanced England's antecedent of physiological state and thus increased their high self-efficacy traits of confidence and persistence with making strong, powerful passes to team-mates."*

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

Links must be made in the **specific direction from Exercise Physiology to Sport Psychology**.

Links must be made from a **positive perspective** - that is - what physiological strategies did the English Netball Team (ENT) use to enhance their psychological attributes, which enabled them to beat Australia?

Two links need to be made. Each link is assessed out of 7.5 marks, according to an agreed Guide, as set out in the General Comments section at the start of the Report.

Some of the commonly used links included:

- Improved muscular power/speed/strength, etc. will improve their self-efficacy
- Improved aerobic capacity/LIP will enhance the ability to effectively shift between attentional styles
- Appropriate Periodisation allowed the ENT to execute their game plan

“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:

Increased LIP > shifting between attentional styles

England beat Australia as the Aussies looked slow and the English were fast and confident.

This was because of the English did Lactate Threshold (LT) training, where they worked at just over 85% MHR for 20-30 minutes a few times a week. This caused an increase in the lactate and hydrogen ions in their blood. Over time, their body got used to this new level, which meant they had an increased LIP.

This increased LIP meant the English could last longer before being affected by fatigue. This meant they could shift between appropriate attentional styles for longer than the Aussies.

The appropriate attentional style in netball is constantly changing and the English were better at being in the right one at the right time. For example, at the end of the game, the English GS was able to shift from broad external where she assessed the best position to be in to catch a pass, to narrow external to focus on the hoop when making the winning shot.

By having an increased LIP, the English players knew they could last the whole match before being affected by the burn of lactic acid. This allowed them to shift into the right attentional style at the right times to win the gold medal match by one goal.

“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:

Increased LIP gives better shifting between attentional styles

While Australia looked slow in the gold medal match, England looked fast and confident. This was because of their training which increased their LIP. They did Lactate Threshold (LT) training, where they worked continuously at 95-105% LT for 20-30 minutes a few times a week. They also did some HIIT. Both methods would flood the blood with lactate, which over a period of time would increase both the English players' LIP's and their ability to tolerate higher levels of lactate.

By avoiding the decrease in pH for longer, the English players were instead able to effectively shift between appropriate attentional styles.

The appropriate attentional style in netball is constantly changing and the English were better at being in the right attentional style at the right time. For example, their goal shooter was able to shift from being in narrow external to catch the pass from her team mate, to being in narrow internal to see herself executing the shot perfectly, back to narrow external to focus on the ball and the hoop to make the shot that gave the English the victory.

The English players' increased LIP ensured they could last throughout the whole match before being affected by the burn of lactic acid; which in turn allowed them to shift between appropriate attentional styles, ultimately giving them the edge over Australia and allowing them to win the gold medal match.

“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:

England's increased LIP allowed them to effectively shift between attentional styles

While Australia, at times, looked slow in the gold medal match, England looked fast and confident. This was because of the training the English undertook, which increased their LIP. They did this using methods such as Lactate Threshold (LT) training, where they worked continuously at 95-105% LT for 20-30 minutes, or interval training at a work to rest ratio of 1:3 with active recovery during the rest periods. Both methods would flood the blood with lactate, and create the chronic adaptations of increasing the English players' LIP's and their ability to tolerate higher levels of lactate.

By avoiding the decrease in pH for longer, the English players were able to prevent themselves from focusing narrowly and internally on the pain and discomfort in their muscles, instead enabling them to effectively shift between appropriate attentional styles.

As international netball is a fast paced, open sport, the appropriate attentional style is constantly changing and the English were better at being in the right attentional style at the right time. For example, their centre player would be in broad external when preparing for the centre pass to assess the best option, before shifting to broad internal to choose the best player to pass to. They then shift to narrow internal to work out the speed and angle needed for the pass and to 'feel' the amount of force to be applied to the ball before finally shifting to narrow external to focus on the teammate they are passing to and accurately passing the ball into the correct space for them to receive it. These shifts must happen very fast, almost at a sub-conscious level.

The English players' increased LIP ensured they could last during the match before being negatively affected by lactic acid and hydrogen ions; which in turn enabled them to shift between appropriate attentional styles to enhance their performance, ultimately giving them the edge over Australia and allowing them to win the gold medal match.

QUESTION 18 (CRITERION 6)

In game five of the Eastern Conference Basketball Final in the NBA, Boston defeated Cleveland to take a 3 – 2 lead in the best of seven series. Star Cleveland player LeBron James had a poor game. Two days later, James dominated game six with 46 points to lead Cleveland to a win.

Use **TWO** cross discipline links to demonstrate how James's physical condition (**Exercise Physiology**) enabled him to improve his performance (**Skill Acquisition**) in game six.

(15 marks)

This question was perhaps the most poorly answered of the three as it required a specific direction and had an emphasis on the difference in LeBron James' (LJ) performance between Games 5 and 6, which were two days apart. Unfortunately, many candidates gave links which related to the development of a range of chronic adaptations, which were impossible to develop in two days. Many others also referred to the training principle of "variety" but really only mentioned the variety of elements of skill and not the physiological aspects.

Better answers focused on a range of recovery techniques, improved warmup, improved player rotation in and out of the game, appropriate fluid and energy replenishment throughout the game etc. and how these would positively impact his skilled output.

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

Links must be made in the **specific direction from Exercise Physiology to Skill Acquisition**.

Links must be made from a **positive perspective** - that is - what physiological strategies did LeBron James' (LJ) use to enhance his skilled output, which enabled him to score 46 points in Game 6, after a sub-par performance in Game 5?

Two links need to be made. Each link is assessed out of 7.5 marks, according to an agreed Guide, as set out in the General Comments section at the start of the Report.

Some of the commonly used links included:

- A range of different recovery strategies (e.g. nutrition, rehydration, cool down, stretching, sleep, hydrotherapy etc.) were linked to a range of different skill aspects (e.g. better selective attention; decision making, timing of sub routines in output; ability to receive better internal KP FB, etc.)
- An appropriate and effective warm up was also linked to the various skill aspects (e.g. better selective attention; decision making, timing of sub routines in output; ability to receive better internal KP FB, etc.)

“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:

Proper recovery > great output in game 6

LJ was cooked and played poorly in game 5. With only 2 days until game 6, he knew he had to be ready to go, so he made sure he did a full and proper recovery at the end of game 5, so he could be at his skilled best for game 6.

The sort of recovery LJ did after game 5 included a cool down where he continued moving at a reduced intensity to keep the blood flowing around his body. He also would have done some static stretching to help realign his muscles to their normal length. To refuel his muscles, LJ would have had a small snack of high GI food within 30 minutes, followed by a more substantial meal within 2-3 hours.

Because of all of these strategies, done right after game 5, and having a day off between games, LJ was able to enter game 6 feeling refreshed. This enabled him to show his usual level of elite skills in game 6, where he dominated and scored 46 points.

For example, as he was not feeling any fatigue in game 6, LJ was able to jump higher than his opponents to get his jump shots away, and dunk on his defenders, and he was able to perform good free throws, because he gets fouled a lot. e.g. – the sub routines for the free throw would be grip, stance, drawback, release and follow through.

So, LJ's proper recovery after game 5 meant he could show off his elite skills in game 6 and lead Cleveland to a victory.

“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:

Proper recovery strategies allowed LeBron James (LJ) to produce great output in game 6

After a poor performance in game 5, LJ undertook a full and effective recovery, so that he would not suffer any negative effects from fatigue on his ability to execute his skilled output in game 6, 2 days later.

After game 5, LJ would have completed an active recovery where he continued moving at a reduced intensity to promote blood flow, as well as doing some static stretching to help realign his muscles to their natural length. He also would have used CWI and some CWT, alternating between hot and cold water. To replenish his glycogen stores, LJ would have ensured he had a small snack of high GI food within 30 minutes, followed by a more substantial meal within 2-3 hours. He also would have drank enough water to rehydrate himself.

All of these strategies, completed straight after game 5, meant that LJ was able to go into game 6 feeling physically and mentally refreshed, so he could effectively execute his skills to an elite level.

For example, as he was not feeling any fatigue in game 6, LJ was able to jump higher than his opponents and get rebounds at both ends of the boards as well as dunk on his defenders. He was able to perform his lay ups and jump shots and free throws with optimal timing and sequencing of the relevant sub routines, e.g. – the sub routines for the free throw would be grip, stance, drawback, release and follow through.

It was because he was free from the fatigue that affected him in game 5 that LJ was able to execute his great skills and lead Cleveland to a victory in game 6, all because of the proper recovery he undertook after game 5.

“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:

Effective recovery strategies enabled LeBron James (LJ) to make best use of his Info Processing (IP) Model

After a poorer than expected performance in game 5, LJ knew how important it was to undertake a full and effective recovery, so that he would not suffer any negative effects from fatigue on his ability to fully utilize his IP in game 6, 2 days later.

Due to the high intensity of the NBA Finals series, LJ would have completed an active recovery after the game where he continued moving at a reduced intensity to promote blood flow and prevent venous pooling, as well as doing some static stretching to help realign his muscles to their natural length. He also would have used CWI to limit the swelling in his body due to the jarring nature of the game and court surface. After that he would have completed some CWT, alternating between hot and cold immersions, to increase the speed at which the LA and H⁺ ions are flushed out of his system. The cumulative effects of so many games also meant that LJ’s fuel stores may have been low, so he would have ensured he took on board sufficient CHO’s, with a small snack of high GI food within 30 minutes, followed by a more substantial, low GI meal within 2-3 hours, all with a little protein and water to more rapidly replenish his muscle and liver glycogen stores and fully rehydrate himself.

All of these strategies, completed immediately after game 5, along with having a rest in the day between games meant that LJ was able to enter game 6 in a fully reinvigorated and rejuvenated state, both physically and mentally. This enabled him to effectively take in, process, output and receive feedback in game 6 to such a degree where he dominated and scored 46 points.

For example, as he was not feeling any fatigue in game 6, LJ was able to better orient to the right areas, and then selectively attend to cues such as the opponent’s man-on-man defensive set up, so he could decide on the best move in creating a mismatch against their weakest player, and then drive to the basket against that player while drawing the foul.

He would then walk to the free throw line before going through his sub-conscious starter mechanism which enabled him to correctly perform the sub routines of the free throw with the correct timing and sequencing and score the extra point. If he missed any shot, LJ would be able to detect the relevant intrinsic KP, FB and make the relevant adjustment for the next shot to ensure it was successful.

It was because he was free from the fatigue that affected him in game 5 that LJ was able to fully utilize his IP capacity to lead Cleveland to a victory in game 6, as a direct result of the thorough recovery processes he implemented after game 5.