



# Units 3 and 4 Physical Education

## Practice Exam Solutions

Stop!

Don't look at these solutions until you have attempted the exam.

Any questions?

Check the Engage website for updated solutions, then email [practiceexams@ee.org.au](mailto:practiceexams@ee.org.au).

## Section A – Multiple-choice questions

### Question 1

The correct answer is A. Heart 1= Average Person, Heart 2 = Marathon Runner, Heart 3= Weight Lifter

A person who is aerobically trained (Marathon Runner) will have an increase in the volume of their left ventricle, while a person who is anaerobically trained (Weight Lifter) will have hypertrophy of the muscles in the walls of the ventricle resulting in an increased thickness of the ventricle walls of the heart.

### Question 2

The correct answer is D. Insufficient information is provided to determine whether Jodie does or does not meet the National Physical Activity Guidelines

In order to tell whether someone meets the National Physical Activity Guidelines (NPAG) we must have information on all of the dimensions (Frequency, Intensity, Duration, Type) in order to conclusively say whether someone meets the NPAG or not. As an adult Jodie must only exercise 5 days a week to meet the NPAG.

### Question 3

The correct answer is C. An Eccentric Contraction

A muscle contraction in which the muscle lengthens is an eccentric contraction.

### Question 4

The correct answer is D. The Enforcement Phase

### Question 5

The correct answer is A. An increase in duration by 3 minutes

Overload can only be applied to one factor at a time, and must be applied by less than 10% for all factors with the exception of Intensity which can only be increased by 2%. The only option that meets all of these requirements is option A.

### Question 6

The correct answer is C.

The 400 metre race is a very good example of a time when the Anaerobic Glycolysis System is dominant. As red blood cells have no mitochondria they must produce their energy anaerobically using the Anaerobic Glycolysis System. During a Marathon the Aerobic System is dominant, while the contribution of the anaerobic glycolysis system would increase at this time the increase would not be enough to contribute more than the aerobic system which will have a very high Oxygen intake at this point and be producing a lot of energy.

### Question 7

The correct answer is D. Beta Blockers are used to mask the use of stimulants by lowering the heart rate

While Beta-Blockers lower heart rate they are not used to mask the use of stimulants.

### Question 8

The correct answer is B. Increased Inorganic Phosphates

### Question 9

The correct answer is A.

B is refers to self efficacy and C refers to reactivity

**Question 10**

The correct answer is C. Glycogen

ATP and PC deplete very quickly, and water is not a fuel source.

**Question 11**

The correct answer is C. Alcohol

**Question 12**

The correct answer is A. A person's cultural background.

Cultural Background is predominantly a Social Factor.

**Question 13**

The correct answer is B. The Lactic Acid System

The table below gives us a work to rest ratio of 1:2 which indicates that the Lactic Acid System is dominant.

**Question 14**

The correct answer is D. None of the above.

5km is predominantly an Aerobic event ruling out A and b. 5km would take approximately 30 minutes, which is not time for glycogen to deplete ruling out C. If fatigue were to occur it would therefore not be due to one of these reasons

**Question 15**

The correct answer is B. Decreased Cardiac Output

## Section B – Short-answer questions

Marks allocated are indicated by a number in square brackets, for example, [1] indicates that the line is worth one mark.

### Question 1a

Any three of:

- Lower Burden on Health Care System [1]
- Environmental---less emissions from active transport [1]
- Less Absenteeism [1]
- Improved Immunity[1]
- Decreased risk of Cardiovascular Disease, Type 2 Diabetes and other appropriate health conditions [1]
- Improved Well-being [1]
- Improved productivity [1]
- Less stress [1]
- Anything else appropriate [1]

### Question 1b

Either of:

- A School Setting [1]
- A Community Setting [1]

### Question 1c

Any two of:

- Provides a safe and convenient way for children to get to school [1]
- Provides opportunities to create/expand/reinforce a social network [1]
- Increases Knowledge of the benefits of Physical Activity [1]
- Provides Information on the benefits of Physical Activity [1]
- Anything else appropriate [1]

### Question 2

Any three of:

- Preferred answer: Can be used to help design a program targeted to the individuals needs [1]
- Fitness testing provides a baseline measurement [1]
- Can be used to Identify strengths and weaknesses [1]
- Can be used to monitor the progress and success of a training program [1]
- Provides motivation to some [1]
- Identify the position or sport a person is most suited to [1]
- Identify a person's potential [1]
- Anything else appropriate [1]

**Question 3a**

1 mark for correctly defining reliability:

- Reliability refers to how well the test is able to be performed repetitively to provide accurate and valid results [1]

2 marks for correctly selecting a factor that can be fixed so as to improve reliability:

- Use the Same Equipment [1]
- Try to perform the test at the same time of day [1]
- Perform the test in the same area (preferably indoors as this is not effected by outside environment e.g. weather) [1]
- Not after a long/hard training [1]
- Participants should be in a similar nutritional state and have similar level of hydration for both tests (should be a good level for both) [1]
- Anything else appropriate [1]

**Question 3b**

2 marks are awarded for correctly identifying two sports that require the same fitness component.

4 marks are awarded for:

- Correctly identifying a fitness test for the each sport [1+1=2]
- Explaining why each test is more specific to each sport [1+1=2]

Example answer:

Agility is required in both football (AFL) and Netball. However the area of play is much smaller in Netball than AFL which has a much larger playing area. For this reason the semo-agility test which takes place in a much smaller space is much more specific to netball than AFL. On the other hand the Illinois Agility Test which takes place in a larger area is much more specific to AFL than Netball.

Other examples of acceptable examples (there may be others):

Aerobic Capacity:

- Beep Test for an Intermittent Sport such as Hockey
- Cooper's 12 Minute run for a continuous runner
- VO2 MAX Treadmill test for a Runners
- VO2 MAX Bike Test for a Cyclist

Speed:

- 5 or 10 minute timed sprint for a Netballer
- 50 minute timed sprint for a 100m runner

Muscular Power:

- Vertical Jump for a High Jumper or Basketball Player
- Horizontal Jump for a Long Jumper or Triple Jumper
- Medicine Ball Throw for a Netballer, Shot putter, Discus Track Athlete, Javelin Thrower

**Question 4**

2 marks for any two of the following:

- O<sub>2</sub> Debt occurs at the start of exercise when there is a sudden increase in Oxygen Demand [1]
- O<sub>2</sub> Demand is greater than O<sub>2</sub> Supply [1]
- There is insufficient oxygen supply to meet energy demands aerobically because it takes time for the respiratory and cardiovascular systems to increase their work rate and adjust to their new workload. [1]

To receive the final 4 marks, students must also mention:

- Energy must be supplied anaerobically at this time [1]
- O<sub>2</sub> Debt occurs at the end of exercise when O<sub>2</sub> supply is greater than O<sub>2</sub> demand giving an excess of Oxygen [1]
- This occurs to repay the Oxygen Debt or other way of linking to O<sub>2</sub> deficit [1]
- Excess oxygen is used to recover the Anaerobic Systems, restoring PC Stores for the ATP-PC System and removing Lactic Acid and Hydrogen Ions for the Lactic Acid System [1]

**Question 5a**

- The capacity of the anaerobic systems is finite/limited in their capacity [1]
- The ATP-PC system is limited by the PC stores which deplete very quickly [1]
- The LA system is limited by the production of Lactic Acid that results in the accumulation of fatiguing H<sup>+</sup> ions of which the body can only tolerate a certain amount [1]
- As a result the Anaerobic Systems are only able to contribute a set amount of energy to each activity resulting in the same contribution across all three events. (The rest must be supplied by the Aerobic System that can vary it's contribution) [1]

**Question 5b**

- While the amount is similar the percent of contribution is very different across the 3 events [1]
- As the anaerobic systems produce energy at a faster rate a higher percentage of anaerobic contribution translates to a faster speed [1]
- Student must refer back to the question and explain the above two points in relation to at least one of the three events in their answer. E.g. as the 100meter event has the largest percentage of anaerobic contribution this event will also occur at the fastest speed [1]

**Question 6a**

Any three of:

- Specificity - work to rest ratio of 1:5 shows that she is utilising her ATP-PC system which is the dominant system in the 100 metre sprint. [1]
- Variety - Engages in 3 different types of activities. [1]
- Frequency - trains at least three times a week to improve fitness components. [1]

**Question 6b**

Adaptations must be for anaerobic training

3 marks for any of the following sets:

Adaptation	Reason
<ul style="list-style-type: none"> <li>• Increased Fibre Size/Hypertrophy [1]</li> <li>• Increased ATP stores [1]</li> <li>• Increased CP stores [1]</li> <li>• Increased Contractile proteins[1]</li> <li>• Increased Myosin ATPase [1]</li> <li>• Improved Motor Unit Recruitment [1]</li> <li>• Improved Neural Transmission [1]</li> <li>• Increased size of connective tissue/tendons</li> <li>• Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>• Increased force of Contraction/Increased Power [1]</li> </ul>
<ul style="list-style-type: none"> <li>• Improved Motor Unit Recruitment [1]</li> <li>• Improved Neural Transmission [1]</li> <li>• Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>• Increased Rate of Energy Production/Speed of contraction [1]</li> </ul>
<ul style="list-style-type: none"> <li>• Increased size of connective tissue/tendons</li> <li>• Increased Contractile proteins[1]</li> <li>• Increased Myosin ATPase [1]</li> <li>• Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>• Improved biomechanics---stronger lever [1]</li> </ul>
<ul style="list-style-type: none"> <li>• Increased ATP stores [1]</li> <li>• Increased CP stores [1]</li> <li>• Increased muscle buffering capacity/by-product tolerance [1]</li> <li>• Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>• Less fatigue [1]</li> <li>• Would fatigue more slowly [1]</li> </ul>
<ul style="list-style-type: none"> <li>• Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>• Anything else appropriate [1]</li> </ul>

**Question 6c**

- The change responsible for the decreased results is the decreased recovery time [1]
- The ATP-PC system requires a 1:5 work to rest ratio to recover [1]
- The current work to rest ratio is close to 1:3, therefore the ATP-PC System therefore does not have enough time to recover [1]
- Therefore Nina's training is no longer specific to her event as the ATP-PC system can no longer be dominant (the Lactic Acid System would be being trained) [1]

**Question 7a**

Any two of the following:

- Cool clothing [1]
- Water Stations on the route [1]
- Providing participants with drink bottles to take with them [1]
- Plan the route through shaded areas [1]
- Taking breaks along the way to rehydrate and cool down in the shade [1]
- Anything else appropriate [1]

**Question 7b**

3 marks for associating three of the following points with increased heat:

- Dehydration due to increased sweating for evaporative cooling. [1]
- Increased viscosity of the blood means it is harder to transport blood around the body (therefore less oxygen is going to the muscles and less waste is removed). [1]
- Vasodilation of capillaries to the skin---redirecting of blood away from working muscles [1]

**Question 8a**

2 marks for covering the following points:

- Increased carrying capacity or Increased Red blood cell count [1]
- Increased oxygen carried to the muscles for energy production [1]

**Question 8b**

2 marks for any 2 of the following points:

- Hyperviscosity of the blood meaning a sluggish flow of blood through the blood vessels [1]
- Increased risk of blood clots, heart failure and death [1]
- Increased risk of blood borne viruses/disease [1]

**Question 8c**

1 mark for any of the following:

- Altitude Training [1]
- The utilisation of Hypoxic Chambers [1]

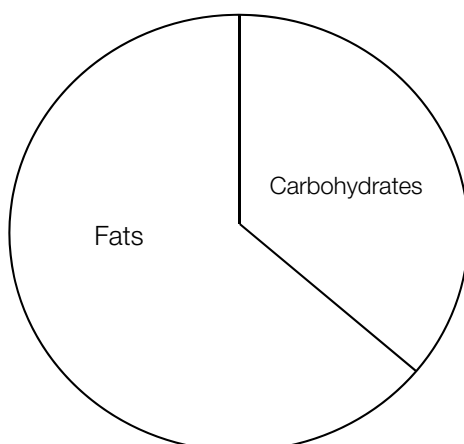
**Question 9a**

In order to be awarded 1 mark the graph for rest should clearly show that 2/3 of energy is being supplied by fat and 1/3 is by carbohydrates [1].

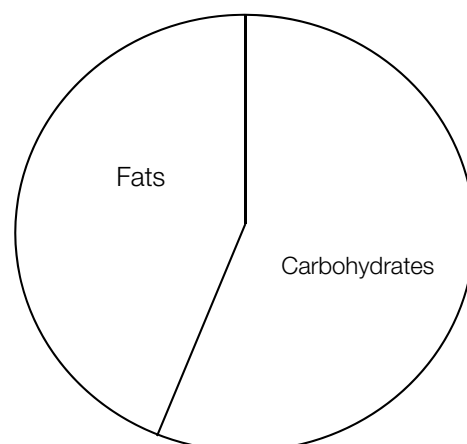
The graph for Exercise is able to be a lot more varied

1 mark will be rewarded as long as the graph shows that the majority of energy is supplied with carbohydrates [1]

Graph for Rest



Graph for Exercise





**Question 9b**

The Inactive person would have a higher heart rate than the trained person [1]

**Question 9c**

Graph 2 would show the fuel use of the aerobic athlete [1].

**Question 9d**

- The trained athlete would have more freely available oxygen during exercise [1]
- Fat requires more oxygen to break down than carbohydrates [1]
- As the trained athlete would have more free oxygen he would be able to break down more fat during exercise/other sentence linking the two above points[1]

**Question 9e**

- By using more fat glycogen is spared [1]
- This will offset the depletion of glycogen in events of long enough duration for this to be an issue [1]

**Question 10a**

Individual Level – 1 mark for any of the following:

- Male [1]
- 37 year olds [1]
- Hypertension [1]
- Anything else appropriate [1]

Social Level – 1 mark for any of the following:

- Lives with wife and two children [1]
- Anything else appropriate [1]

Environmental Factors – 1 mark for any of the following:

- Lives in Ringwood [1]
- Safety of where he lives [1]
- His workplace is a long way from his home requiring a long commute [1]
- Anything else appropriate [1]

Organizational / Policy Level – 1 mark for any of the following:

- His company has mandatory overtime [1]
- Anything else appropriate [1]

**Question 10b**

1 mark for any two of the following:

- Educating Robert about benefits of physical activity [1]
- Educating him about his opportunities that he can be active in [1]
- Encouraging him to walk his children to school instead of driving if it's close enough [1]
- Getting off a stop earlier or later for work so he can walk further [1]
- Getting a dog or another pet to encourage physical activity [1]
- Anything else appropriate [1]

**Question 10c**

Subjective Measures:

4 marks are awarded to students for correctly listing a subjective measure, two pros and two cons outlined in the table below or any other appropriate measure:

Measure	Pros	Cons
Self-Report	<ul style="list-style-type: none"> <li>• Can assess all the dimensions of energy expenditure [1]</li> <li>• Multiple Domains [1]</li> <li>• Affordable [1]</li> <li>• Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>• Doesn't give precise/objective information [1]</li> <li>• Some people are unable to correctly recall their activity; in particular elderly and children under 10 [1]</li> <li>• Anything else appropriate [1]</li> </ul>
Proxy Report	<ul style="list-style-type: none"> <li>• Can assess all the dimensions of energy expenditure [1]</li> <li>• Multiple Domains [1]</li> <li>• Affordable [1]</li> <li>• Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>• Doesn't give precise/objective information [1]</li> <li>• Proxy's may not be with person all the time, and therefore not be aware of all person's activity[1]</li> <li>• Anything else appropriate [1]</li> </ul>
Recall Instrument	<ul style="list-style-type: none"> <li>• Can assess all the dimensions of energy expenditure [1]</li> <li>• Multiple Domains [1]</li> <li>• Affordable [1]</li> <li>• Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>• Social Desirability Bias can influence answers</li> <li>• Recall problems [1]</li> <li>• Anything else appropriate [1]</li> </ul>
Diaries and Logs	<ul style="list-style-type: none"> <li>• Can cover dimensions of physical activity [1]</li> <li>• Can capture quantitative and qualitative information [1]</li> <li>• Can Be administered quickly and easily</li> <li>• Cost effective for large-scale studies [1]</li> <li>• Usually low burden on participants [1]</li> <li>• Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>• Reactivity [1]</li> <li>• Participants may not complete correctly or forget [1]</li> <li>• Not suitable for assessing children under the age of 10 or old adults with recall problems/cognitive limitations [1]</li> <li>• Reliability and validity problems from social desirability bias, memory limitations and misinterpretation [1]</li> <li>• Anything else appropriate [1]</li> </ul>

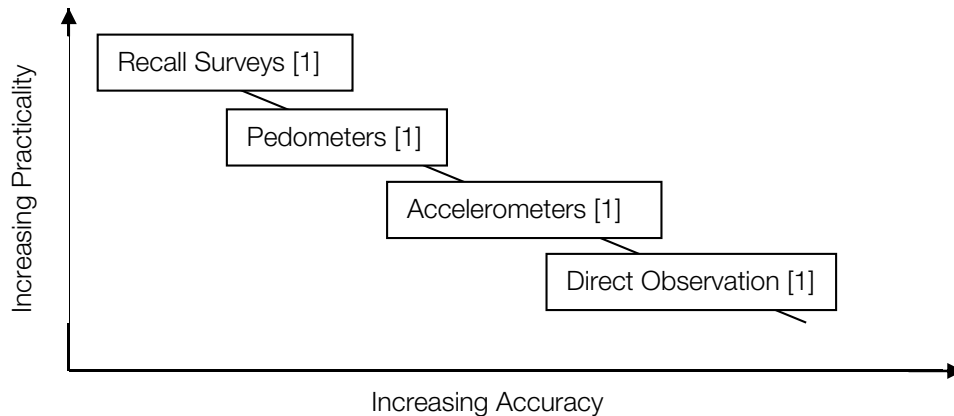
Objective measures:

4 marks are rewarded to students for correctly listing an objective measure, two pros and two cons outlined in the table below or any other appropriate measure.

Measure	Pros	Cons
Direct Observation / SOPLAY	<ul style="list-style-type: none"> <li>Quantitative and Qualitative Information [1]</li> <li>Contextual Information [1]</li> <li>Can be used in a variety of settings [1]</li> <li>Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>Hard to use with large populations [1]</li> <li>Intrusive [1]</li> <li>Labour intensive and time consuming [1]</li> <li>Reactivity</li> <li>Requires training for someone to be a reliable observer [1]</li> <li>Anything else appropriate [1]</li> </ul>
Pedometers	<ul style="list-style-type: none"> <li>Inexpensive [1]</li> <li>Small, lightweight, non-invasive [1]</li> <li>Easy to use with large groups [1]</li> <li>Can evaluate activity change [1]</li> <li>Appropriate for many different settings [1]</li> <li>Immediate feedback [1]</li> <li>Promotes Behavioural Change [1]</li> <li>Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>Only assesses one type of physical activity (walking and running) [1]</li> <li>Doesn't record or store data in real time [1]</li> <li>Doesn't measure intensity of steps being taken [1]</li> <li>No information about frequency, intensity or duration [1]</li> <li>Anything else appropriate [1]</li> </ul>
Accelerometer	<ul style="list-style-type: none"> <li>Small, lightweight and non-invasive [1]</li> <li>Low burden to Participants [1]</li> <li>Good alternative for children [1]</li> <li>Can be used in the laboratory and playing field [1]</li> <li>Assesses intensity, frequency and duration [1]</li> <li>Record movement in real time [1]</li> <li>Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>Expensive for use with large groups [1]</li> <li>Old versions are not waterproof and new ones are not validated for aquatic activity [1]</li> <li>Not sensitive to low impact physical activity--- underestimate cycling and predominantly upper body activities [1]</li> <li>Reactivity [1]</li> <li>Anything else appropriate [1]</li> </ul>
Heart Rate Monitor	<ul style="list-style-type: none"> <li>Gives very accurate information on intensity [1]</li> <li>Easy to use and understand [1]</li> <li>Small light weight and non-invasive [1]</li> <li>Anything else appropriate [1]</li> </ul>	<ul style="list-style-type: none"> <li>Can't be used in aquatic situations [1]</li> <li>Inaccurate with children due to heart rate lag [1]</li> <li>Anything else appropriate [1]</li> </ul>

**Question 10d**

1 mark for each of the correctly placed measures on the line, total of 4 marks available:

**Question 11a**

LIP is of greater importance to a Marathon Runner [1]

**Question 11b**

Using the Aerobic Point:

- LIP is the point when lactate removal is equal to lactate production [1]
- This determines the intensity which an athlete is able to AEROBICALLY maintain without accumulating lactate and fatiguing very quickly as a result [1]
- Therefore the higher a person's LIP is the higher the intensity they are able to maintain so LIP will determine the intensity the Marathon runner can compete at [1]

Using the Anaerobic Approach:

- LIP is the point when lactate removal is equal to lactate production [1]
- A 400meter athlete or any other anaerobic athlete will always be above their LIP as their Lactic Acid System will be dominant---Lactic Acid will always accumulate in these events [1]
- Therefore it is their tolerance of Lactic Acid and other metabolic by-products that will influence their event along with other factors [1]

**Question 11c**

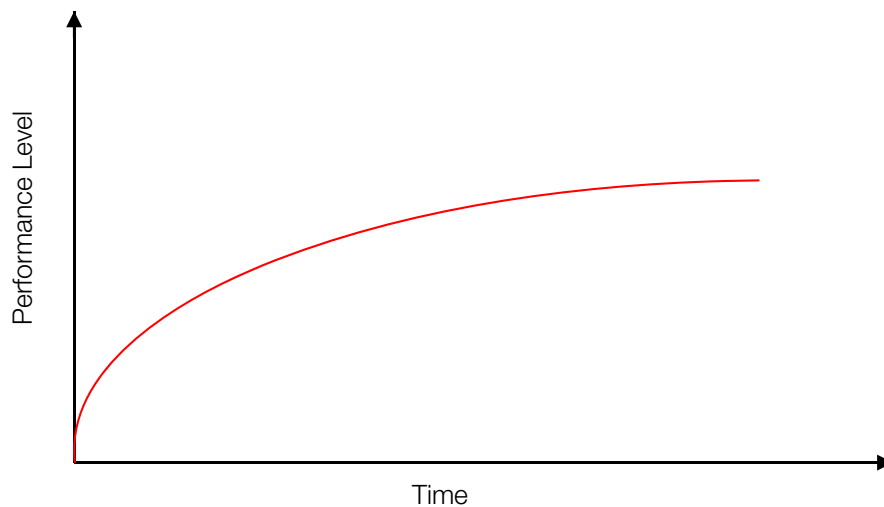
In order to train LIP training should be undertaken at the same intensity that LIP occurs or just above this point [1]

**Question 12a**

Diminishing Returns [1]

**Question 12b**

A line of the following shape should be drawn: [1]

**Question 12c i**

No, you would not recommend Carbohydrate Loading for Ally [1]

**Question 12c ii**

- Carbohydrate Loading is done to prevent glycogen depletion [1]
- Glycogen depletion takes at least 90 minutes -120 minutes of activity to occur [1]
- 10km would not generally take 90 minutes to run especially after a year of training---therefore glycogen depletion is not an issue Ally would have to worry about and Carbohydrate Loading would be inappropriate for her [1]

**Question 12d i**

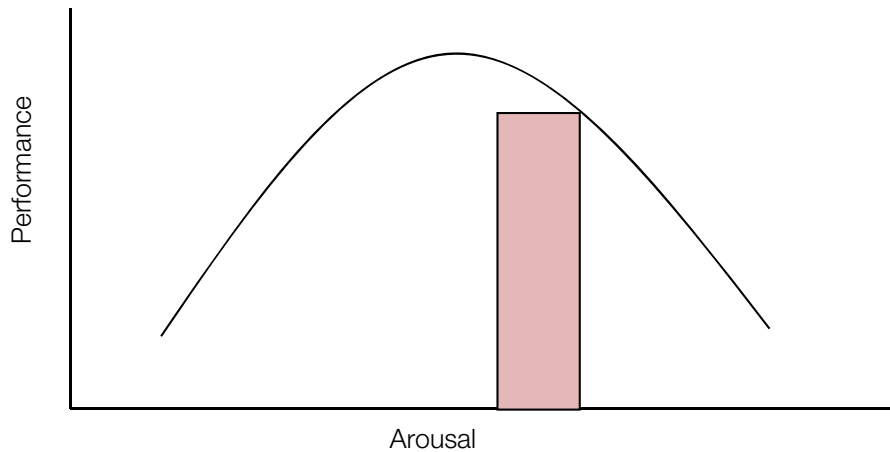
Yes, you would recommend tapering for Ally [1]

**Question 12d ii**

- Tapering is a gradual/slight decrease in training over the week or two leading up to an event [1]
- This would be appropriate for Ally as it would decrease her risk of injury before the event and also give her body time to recover and maximize fuel stores in this time [1]

**Question 13a**

1 mark if area of optimal performance is in an area of higher arousal:



2 marks for the following points:

- A 100 metre event requires a quick start in which the competitor must react to the starting signal quickly [1]
- A higher level of arousal is more appropriate to this situation [1]

**Question 13b**

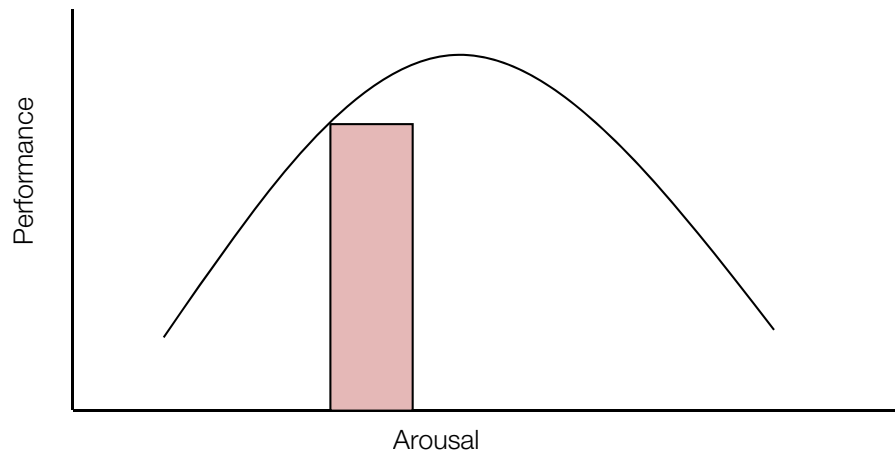
1 mark for any of the following correctly identified arousal promotion techniques:

- Elevated breathing rate [1]
- Act Energetically [1]
- Positive talk and sounds [1]
- Energising Mental Imagery [1]
- Pre-Competition Work out [1]
- Anything else appropriate [1]

1 mark for an appropriate description of how the chosen technique increases arousal or of what the technique involves [1]

**Question 13c**

1 mark if the arousal area is in an area of lower arousal:



2 marks for the following points:

- Archery is an event that requires a lot of focus and concentration [1]
- A lower level of arousal is better suited to this mind set [1]

**Question 13d**

1 mark for any of the following correctly identified arousal reduction techniques

- Progressive Muscle relaxation [1]
- Meditation [1]
- Sleep
- Breathing Control [1]
- Biofeedback [1]
- Stress Inoculation training [1]

1 mark for an appropriate description of how the chosen technique decreases arousal or of what the technique involves [1]