B

Free Exam
for 2011-16 VCE study design

Engage Education Foundation

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.

Section A – Multiple-choice questions

Question 1
The correct answer is C. Members of the older population may experience memory decline in their old age and so have trouble remembering what they have done during the past day/week and therefore have trouble recording it. Note: Children under the age of 12 are susceptible to cognitive limitations.

Question 2
The correct answer is A. 1 MET = 3.5 mL/kg/min. Please note, on average males consume 250 mL of oxygen per minute, but this is NOT measured per kilogram! On average females consume about 200 mL of oxygen per minute.

Question 3
The correct answer is A. Skill-related fitness components include muscular power, speed, agility, coordination, balance, reaction time Health-related fitness components include aerobic capacity, anaerobic capacity, muscular strength, muscular endurance, flexibility and body composition.

Question 4
The correct answer is B. As he is cycling in high heat, his largest fatigue factor will be dehydration. Hypotonic sports drinks have a lower concentration of electrolytes than the body and so are absorbed into the body quickly. This will provide a fast form of hydration.

Question 5
The correct answer is D. The muscular system most readily adapts to anaerobic changes through the enlargement of fast twitch muscle fibres and through the training of the CNS.

Question 6
The correct answer is C. Dependence is one of the many side effects of taking steroids. Athletes may experience higher levels of LDL cholesterol and only males experience breast enlargement, whereas females experience breast atrophy.

Question 7
The correct answer is B. In this movement, Jill's bicep is shortening in length – an isotonic concentric contraction.

Question 8
The correct answer is D. Demographics is an individual level factor.

Question 9
The correct answer is D. Lucy will have a high concentration of fast-twitch muscle fibres because of her heavy engagement in anaerobic activity. She has not spent considerable time training her aerobic system, and therefore her mitochondria level and capillary density will be relatively low.

Question 10
The correct answer is C. Pulmonary diffusion is an acute respiratory system response.

Question 11
The correct answer is B. A carbohydrate gel will provide him with sufficient energy (glycogen stores) to be able to complete the long distance. Considering a high temperature is not specified, but a long distance is, it would be more sensible to choose carbohydrate gel as an answer opposed to a hypotonic sports drink.

Question 12
The correct answer is A. Gardening is only a light intensity physical activity. It is specified in the NPAGs that older adults should be completing at least 30 minutes of MODERATE intensity physical activity on most, preferably all, days.

Question 13
The correct answer is A. It is useful to remember that oxygen deficit occurs before exercise, when our aerobic system has not begun to work fast enough to supply energy to the body aerobically. Oxygen debt is incurred after exercise.

Question 14
The correct answer is B. It is important to remember that LIP is the point BEYOND which lactate production exceeds removal. At LIP, the rate of lactate production and removal is the same.

Question 15
The correct answer is D. Be sure to learn the different %RMs, sets and reps that define each type of muscular training.

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

As a result of sweating and dehydration, an athlete's blood plasma level will drop. This means the flow of blood to working muscles will decrease. [1]

Therefore fewer waste products will be removed from the muscles, and less oxygen will be delivered to muscles, meaning the body has a decreased ability to break down and remove lactic acid. [1]

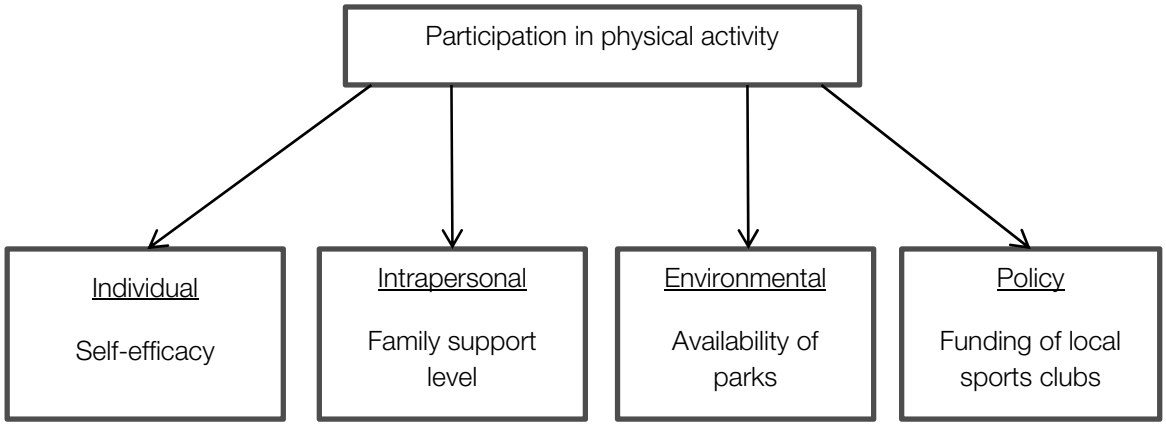
Question 1b

Athletes should weigh themselves before and after the event. [1]

For every kilogram lost during exercise, they should consume 1 – 1.5 litres of water. [1]

Question 2

Any diagram that correctly demonstrates the Social Ecological Model is acceptable, below is one example:



[1] mark for identifying each level of the SEM and one factor influencing each level (x4)

Question 2b

Students should complete the following points for full marks

- Identify how the factor chosen from part a) will impact negatively on physical activity [1]
- Identify a strategy to address the factor they have chosen [1]
- Justify why their strategy would address the factor [1]

For example:

> *If children have low self-efficacy, they lack confidence in their ability to be physically active*
> *They will therefore be unlikely to engage in sport/physical activity because they may feel embarrassed at their ability. [1]*
>
> *To overcome this, local primary schools could create different groups within their physical education classes in which children are matched with others of a similar ability level. [1]*
> *This will mean that children won't feel embarrassed as they will be in an accepting environment that nurtures and caters for their physical activity ability. [1]*

Question 3a

- At least 60 minutes (and up to several hours) of moderate to high intensity physical activity every day [1]
- No more than 2 hours a day using electronic media for entertainment particularly during the daylight hours (unless it is educational) [1]
- Phil does not meet the NPAGs [1]

And one of the following:

- Phil does not meet the NPAGs as it appears that he would only perform at least 60 minutes of physical activity on a maximum of three days. [1]
- It is likely that Phil does not meet the sedentary behaviour guidelines as it seems quite possible he would be using electronic media for more than two hours per day [1]

Question 3b

Answers will vary from student to student, marks are awarded for the following:

- Correctly Identifies Subjective Measure [1]
- Correctly identifies an advantage of chosen subjective measure [1]
- Correctly identifies a disadvantage of chosen subjective measure [1]
- Correctly identifies Objective Measure [1]
- Correctly identifies an advantage of chosen subjective measure [1]
- Correctly identifies a disadvantage of chosen subjective measure [1]

An example answer is provided below:

An objective measure that could be used is a pedometer. Pedometers are a simple form of electronic motion detection that can be used to determine the distance a person travels on foot. [1]

An advantage of this method is that pedometers are small, lightweight and non-invasive. [1]

A disadvantage is that they provide no information about frequency, intensity or duration of physical activity. [1]

A subjective measure that could be used to measure Phil's level of activity would be a proxy report completed by his school teacher or parent. It is a questionnaire or survey that is completed by a youth or adult on behalf of someone else. [1]

An advantage of this method is that both sedentary and active behaviour can be measured and recorded. [1]

A disadvantage of this method is that it is labour intensive and time-consuming / that it may be considered invasive. [1]

Question 3c

Answers will vary from student to student, marks are awarded for the following:

- Identifies which method would be more appropriate [1]
- Justifies why chosen method is more appropriate [1]

An example answer is provided below:

A proxy report may be considered a more appropriate measure in this circumstance… [1]
as it will provide information on both Phil's sedentary and active behaviour, whereas a pedometer won't. [1]

Question 4a

- The 20 metre shuttle run (beep test) is most appropriate. [1]
- This is because it is a cheap and easy method to administer in a school setting and all girls can complete the test at the same time. [1]

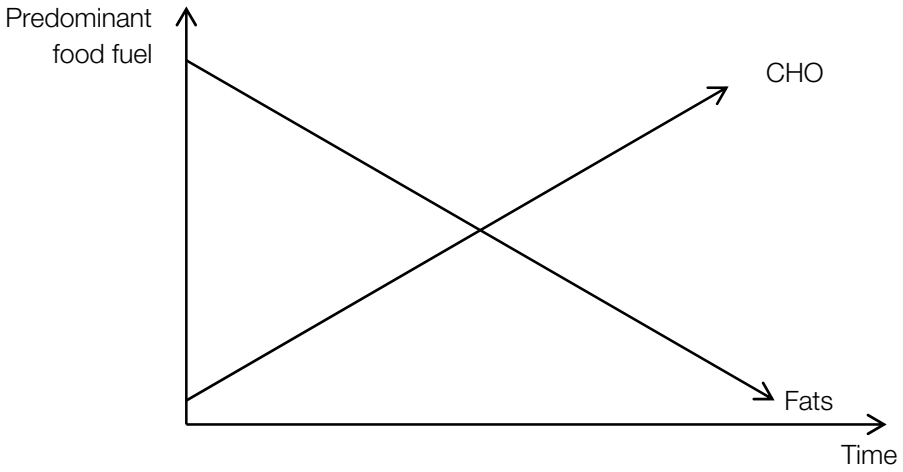
or

- This is because it is specific to the game of netball as it involves running similar distances. [1]

Question 4b

- Reliability is the ability of a test to produce consistent and repeatable results.
- To ensure reliability Coach Smith should:
    - Conduct the pre- and post-test at the same time of day [1]
    - Conduct the same warm-arm prior to each test [1]
    - Tell the girls to wear the same clothes and use the same footwear (use same environment/equipment) [1]
    - Anything else appropriate [1]

Question 4c



- Identifying CHO as a main food fuel [1]
- Identifying fats as a main food fuel [1]
- Displaying a decrease in fat contribution as intensity increases throughout the test [1]
- Displaying an increase in CHO contribution as intensity increases throughout the test [1]

Question 4d

- The ATP-PC system is dominant for the first 3-4 seconds of the run as it provides an immediate muscular ATP store. [1]
- It then quickly breaks down PC to rebuild ATP for the next 2-3 seconds. This relies on fast, simple chemical reactions. [1]
- During this stage, the contribution of the lactic acid system and aerobic system is increasing. [1]
- After five seconds the lactic acid system becomes dominant. [1]
- This system breaks down lactic acid to produce energy. It is a slower energy producer than the ATP-PC system because it relies on 12 slightly longer chemical reactions. [1]
- The system peaks between 5 and 15 seconds and remains dominant until around 20 seconds. [1]
- Between 5 and 20 seconds the contribution of the aerobic system is building and the contribution of the ATP-PC system declines. [1]
- After 20 seconds the aerobic system becomes dominant and remains dominant for the duration of the activity. [1]
- It becomes dominant at this early stage because the activity is of a low intensity, meaning energy demands can be met aerobically relatively quickly. [1]
- At the start of each level the time between beeps decreases, meaning the lactic acid system has to increase its energy production contribution. However, the aerobic system still remains predominant. [1]

Question 4e

- This contribution from the lactic acid system causes a build-up of hydrogen ions which causes fatigue. [1]
- Hydrogen ions accumulate in the blood and muscles, creating an acidic environment which slows enzyme activity and the breakdown of glucose. [1]
- Fatigue is also caused by an increase in body temperate, generate by our muscles. [1]
- As we get hot, blood flow is redirected towards our skin at the expense of the working muscles. Less oxygen is sent to the muscles and so working rate decreases. [1]
- Reduced CNS firing is another cause of fatigue. [1]
- The brain detects the build-up of metabolic by-products and an increase in body temperate and so slows the working rate of the muscles. [1]

Question 4e

One mark for correctly identifying cause predominant cause of fatigue:

- The predominant cause of fatigue would be the accumulation of hydrogen ions [1]

Two marks for justification:

- As the test progresses the intensity increases/input from the anaerobic glycolysis system shall increase [1]
- This results in increased lactic acid production/LIP shall be passed resulting in accumulation of H+ [1]

Two marks for effects on performance:

- The accumulation of Hydrogen ions (H+) results in an acidic environment [1]
- This results in slower enzyme activity and breakdown of glucose [1]/interrupts the chemical reactions required for energy production [1]
- H+ accumulation can result in pain in a muscle [1]
- Once LIP has been passed athletes must either stop activity or significantly decrease their intensity

Question 4f

- The girls could engage in contrast water therapy in the form of hot and cold showers. [1]
- This would involve alternating showering in hot and cold water to elicit vasodilation and vasoconstriction of the blood vessels which will increase the removal of waste products and the delivery of oxygen from and to the muscles. [1]

- The girls could engage in an active recovery [1]
- This involves doing a gradual cool down from exercise, this helps to remove lactate acid from the blood and prevent venous pooling [1]

- The girls could engage in a pool or beach session the next day. [1]
- This involves immersing the body in water, resulting in a compressive effect which reduces muscle oedema and increases blood flow to the muscles. [1]

- Anything else appropriate [1] and appropriate description [1]

Question 5a

- The target group is children (5 – 12 years). [1]
- The setting of this strategy is schools. [1]

Question 5b

- At the individual level, the program is successful in that it improves their self-efficacy by enhancing their fitness and motor abilities through encouraging them to practice jump a rope. This will encourage the children to exercise more. [1]
- At the interpersonal / social level, the program may be considered successful as it gives the children social support by encouraging them to skip in teams and groups. Having others to exercise with means it is more likely they will exercise. [1]
- At the physical level, the program gives the children new equipment, meaning physical activity is readily accessible. [1]
- At the policy level, the program shows that skipping can be undertaken by both boys and girls by teaching them new tricks and offering prizes. [1]
- One shortcoming is that physical environment factors are not widely addressed. Schools should be offered more money to improve their grounds and facilities. [1]
- Policy factors are not widely addressed. The government should be asked to provide funding so more money can be paid to charity. [1]

Question 6a

- He is not following the principle of specificity. [1]
- At a 70% maximum heart rate, he is training his aerobic system and not his anaerobic system. He should increase his intensity to 90% maximum heart rate. [1]

Question 6b

- Tom should undergo plyometrics training. [1]
- Plyometrics training involves short, powerful movements in which there is a rapid eccentric muscle contraction followed by a rapid concentric muscle contraction. [1]
- Rapidly stretching the muscle in this way can result in microtears in the muscle. [1]

Question 7a

- EPOC is the volume of oxygen used during recovery from exercise in excess of resting oxygen consumption. [1]

Question 7b

- The two phases of EPOC are the fast replenishment and slow replenishment phases, [1]
- Fast replenishment is primarily involved in restoring PC and takes 2 – 3 minutes. [1]
- Slow replenishment is concerned with the removal of lactic acid through buffering. [1]

Question 7c

- High altitude training can be used to reduce EPOC. [1]
- It involves training at altitudes around 2000 to 2500 metres above sea level. [1]
- At these levels the brain senses that the body is not receiving normal levels of oxygen and so produces a greater number of red blood cells. [1]
- The heart and lungs also increase their work rate and (in the long term) increase in size. [1]
- A disadvantage associated with this practice is that it reduces training specificity as athletes must reduce their volume of training. [1]
- It takes up to three months to achieve greater oxygen capacity at altitude than could be attained at sea level. [1]

Question 8a

Example of sporting activity	Aerobic or anaerobic chronic adaptations	Training method suited to this sporting activity
Marathon runner	Aerobic	Continuous training
High jumper	Anaerobic	Plyometrics training
100 metre sprint	Anaerobic	Short interval training

Other answers are acceptable as long as they are appropriate

Question 9a

- Advantage: masks fatigue [1]
- Advantage: improves anaerobic performance [1]
- Disadvantage: results in anxiety [1]
- Disadvantage: causes cardiac arrhythmia [1]
- Anything else appropriate [1]

Question 9b

- The substance or practice, alone or in combination with other substances or practices, has the potential to enhance or enhances sporting performance [1]
- The substance or practice represents an actual or potential health risk to the athlete [1]
- WADA's determination that use of the substance or methods violates the spirit of sport described in the Code [1]

Question 10

- 3 – 4 days before the event he should begin to taper his training. [1]
- 3 – 4 days before the event he should increase his CHO intake to 70-75% of his diet. [1]
- Advantage: He will have an increase in muscle glycogen stores which prolongs the use of CHOs as the main food fuel. [1]
- Disadvantage: Weight gain due to the water stored with extra CHOs adds to energy cost. [1]

Question 11a

- Margaret will have a greater cardiac output (Q) because she is an aerobic athlete. [1]
- She will therefore have an increased stroke volume due to factors such as an increased venous return and an increased size of the left ventricular cavity. [1]

Question 11b

- Margaret will have a higher stroke volume than Alison at submaximal levels. [1]

Question 11c

- Cardiac output is the product of heart rate and stroke volume. [1]
- Therefore an increase in heart rate and stroke volume would lead to a larger cardiac output. [1]
- An increased cardiac output means that more blood is delivered to the muscles. As blood contains oxygen, this means that muscle oxygen uptake is also increased. [1]

Question 12

- The three mechanisms are the muscle pump, the respiratory pump and venoconstiction. [1] x 3
- Muscle pump: The contraction of the muscles causes the veins to be constricted, forcing blood back towards the heart. [1]
- Respiratory pump: Regular breathing changes the pressure in the thorax and abdomen, causing them to fill and empty of blood. [1]
- Venoconstriction: constriction of the veins forces blood towards the heart. [1]