Neap

Trial Examination 2022

VCE Physical Education Units 3&4

Written Examination

Suggested Solutions

SECTION A – MULTIPLE-CHOICE QUESTIONS

1	**A**	B	C	D
2	A	B	**C**	D
3	A	**B**	C	D
4	**A**	B	C	D
5	A	B	C	**D**
6	A	B	**C**	D
7	A	B	C	**D**
8	**A**	B	C	D
9	A	**B**	C	D
10	A	B	C	**D**
11	**A**	B	C	D
12	A	B	**C**	D
13	A	B	C	**D**
14	**A**	B	C	D
15	A	**B**	C	D

Question 1 A

A is correct. The role of myoglobin is to extract oxygen and deliver it to the mitochondria for energy production in the skeletal muscle.

B is incorrect. This is the role of mitochondria.

C is incorrect. This is the role of haemoglobin.

D is incorrect. Myoglobin does not assist in the breakdown of lactate and pyruvic acid.

Question 2 C

C is correct. The correct work-to-rest (W : R) ratio is 2 : 1, which indicates the aerobic system is the dominant energy system.

A is incorrect. This gives the incorrect W : R ratio.

B is incorrect. The anaerobic glycolysis system would need a W : R ratio of 1 : 2 or 1 : 3 to be dominant.

D is incorrect. The ATP–CP energy system would need a W : R ratio of 1 : 5+ to be dominant.

Question 3 B

B is correct. Laboratory tests such as the VO_2 max treadmill test generally produce results that are more accurate, reliable and individualised because of the nature of the testing and the specialists administering the tests. However, field tests are far more practical when testing large groups of individuals such as the students in a Physical Education class. The results may not be as accurate or reliable, but they allow for many people to participate together and are far more cost-effective.

A, **C** and **D** are incorrect. These are attributes of laboratory tests.

Question 4 A

A is correct. The 30-second Wingate test involves individuals pedaling as fast as possible for 30 seconds on a stationary bike. This test is designed to measure the amount of energy provided by the anaerobic energy systems, which makes it a suitable measure of an individual's anaerobic capacity.

B is incorrect. The test does not measure muscular power; it measures the ability to use strength as quickly as possible.

C is incorrect. The test does not measure muscular strength; it measures the amount of force produced in a single effort.

D is incorrect. The test does not measure speed. When testing speed, the aim is to cover a specified distance in the shortest period of time.

Question 5 D

D is correct. Constraints-based learning is centered on the understanding that all performance is influenced by three fundamental boundaries or constraints (the environment, the individual and the task). The way these constraints are modified affects the execution of a goal-related task and, ultimately, the learning of a skill. By offering encouragement and motivation to decrease the anxiety of their players, the coach is manipulating the individual constraint.

A is incorrect. The task constraint refers to a coach manipulating the rules of the sport, the number of participants involved or the field dimensions.

B is incorrect. The environment constraint could involve the participants playing in front of a crowd, on a different playing surface or under lights at nighttime.

C is incorrect. This is not a type of constraint that influences movement.

Question 6 C

C is correct. Increased mitochondrial mass is a chronic adaptation that occurs in the muscles due to aerobic training and would assist in increasing the athlete's lactate inflection point (LIP).

A, **B** and **D** are incorrect. These are chronic adaptations to anaerobic training, which would not assist in increasing an athlete's LIP.

Question 7 D

D is correct. Swimming 21 laps of a 25 m pool equates to 525 m in total. As the student is swimming an odd number of laps, they end up at the opposite end from where they started, which is a displacement of 25 m (the length of the swimming pool).

A and **C** are incorrect. The student swims 21 laps, which is a distance that is well over 21 m or 25 m.

B is incorrect. Linear displacement refers to an object's overall change of position from one point in time to another point in time. The displacement can only be 0 or 25 m, depending on how many laps are swum. In this case, it is 25 m.

Question 8 A

A is correct. The three factors that determine a projectile's motion are the speed of release, where the greater the speed of release, the greater the distance; the angle of release, where, in most sporting situations, a maximal distance is required and there needs to be an optimal angle of release; and the height of release, where an object that is released from a higher point will travel further than one released from a lower point.

B, **C** and **D** are incorrect. Air resistance and gravity are external factors that act by either slowing an object down or pulling it back to earth, respectively.

Question 9 B

B is correct. This is a form of augmented feedback, not intrinsic feedback, as the feedback is information provided by an outside source (the coach and a video recording).

A, **C** and **D** are incorrect. These are forms of intrinsic feedback as they all involve feedback via sensory systems.

Question 10 D

D is correct. Through anaerobic training, the greatest adaptation occurs in the muscular system and is designed to bring about increased muscle hypertrophy, enabling greater force production, strength and speed. Increases in PC stores, glycolytic capacity, glycogen stores and ATPase enzyme activity in fast-twitch fibres are developed through anaerobic training.

A, **B** and **C** is incorrect. Long-interval and continuous training are both forms of aerobic training, which does not bring about changes in these characteristics in the skeletal muscle.

Question 11 A

To improve player movement and technique and reduce the potential for injury, coaches and athletes will often use a systemic four task approach to analysis. The correct order of the four stages of a qualitative movement analysis is preparation, observation, evaluation and error correction.

Question 12 C

C is correct. The requirements needed to develop muscular strength is one repetition maximum (RM) of approximately 80–100%, which includes a repetition range of between 1–12 and a set range of 3–6. This option gives one RM of 85%, with eight repetitions and four sets, which dictates muscular strength as the fitness component developed.

A is incorrect. The development of muscular power requires a lower percentage (40–60%) of one RM.

B is incorrect. The repetition range is not high enough for local muscular endurance.

D is incorrect. This training does not specifically develop agility.

Question 13 D

D is correct. Oxidative enzymes do not influence arteriovenous oxygen (a-vO_2) difference because their role is to speed up the breakdown of food fuel such as glycogen and triglycerides.

A, **B** and **C** are incorrect. These factors cause an increase in a-vO_2 difference as they all involve the increased uptake and transport of oxygen at the site of (and inside) the muscle.

Question 14 A

A is correct. The focus is broad as the student must assess the situation, positioning of the batsmen, wind conditions, their field placement and the bounce of the pitch. As the student is delivering the ball, the attention is internal in nature.

B is incorrect. There are very few external cues for the student to focus on besides themselves in delivering the ball.

C is incorrect. Narrow-internal focus is used to focus thoughts and mentally rehearse upcoming movements, such as a springboard diver preparing to dive.

D is incorrect. Narrow-external focus is used to focus on very few external cues, such as a footballer focusing purely on the football.

Question 15 B

B is correct. When an athlete works at their LIP, they are working at their highest aerobic steady state where there is a balance between lactate production and removal. Therefore, the energy system contributing most to energy production at this point in time is the aerobic energy system.

A is incorrect. When the athlete reaches their LIP, their major energy system is aerobic, not anaerobic.

C is incorrect. The ATP–CP system will be depleted by this stage.

D is incorrect. The intensity at the LIP will dictate glycogen as the main energy source, not triglycerides.

SECTION B

Question 1 (13 marks)

a. All three energy systems (ATP–CP, anaerobic glycolysis and aerobic system) provide energy for both events; 1 mark
however, intensity and duration will dictate which system is more dominant.

The 50 m freestyle event is an explosive, high-intensity race that relies heavily on contributions from the ATP–CP energy system and the anaerobic glycolysis energy system, both of which can resynthesise ATP at a fast rate. 1 mark

The 400 m freestyle event is longer and, therefore, has a greater contribution from the aerobic system to provide energy. The aerobic energy system cannot provide ATP at the same rate as the anaerobic energy systems, so the pace for the 400 m freesyle event must decrease. 1 mark

b. **50 m freestyle:** passive recovery 1 mark

During passive recovery, the athlete rests, which means that phosphocreatine (PC) is not required for energy production and allows for the resynthesis of ATP–CP (approximately 98% of PC will be restored in 3 minutes). 1 mark

400 m freestyle: active recovery 1 mark

Active recovery involves low-intensity activity that maintains blood flow to working muscles. This assists with the removal of accumulated metabolic by-products, replenishes oxygen in the myoglobin, prevents venous pooling and reduces core body temperature. 1 mark

c. short interval training 1 mark

d. 3 sets × 6 reps of 25 m swimming sprints 1 mark

W : R ratio of 1 : 6+ (for example, 30 second sprint : 3 minute rest) 1 mark

maximum intensity 1 mark

Note: When designing a short interval training session, it is important to note the sets and reps are not definitive.

e. A warm-up should involve whole-body activity to increase heart rate, prepare the body for exercise and warm up the muscles to avoid injury. 1 mark

It also psychologically prepares the individual for the training. 1 mark

Question 2 (16 marks)

a. During this sequence of play, all three energy systems (ATP–CP, anaerobic glycolysis and aerobic) contribute to energy production. 1 mark

However, depending on intensity and duration, one system is always more dominant than the others. When Sonya sprints down the field with the ball, her dominant energy system is the ATP–CP system 1 mark

as it is dominant for highly explosive, short duration activities and can resynthesise ATP at a rapid rate. 1 mark

Towards the end of the 100 m sprint, after having already played for 55 minutes, Sonya's PC stores will begin to deplete rapidly and she will begin to receive large contributions from her anaerobic glycolysis system. The anaerobic energy system is a major supplier of ATP resynthesis as the sprint remains a high intensity effort, requiring rapid resynthesis of ATP. 1 mark

Before the play begins, when Sonya is resting for one minute, her dominant energy system is the aerobic energy system. This energy system is also dominant after she scores the try and is celebrating with her teammates, as well as when she jogs back to the fullback position and rests for two minutes. 1 mark

The aerobic system is dominant during these periods as the intensity of the activities are quite low and this system aids in the replenishment of intramuscular CP stores. 1 mark

b. *Any one of:*

- depletion of intramuscular ATP and CP stores

  Intramuscular ATP and CP can be synthesised at a rapid rate, which would help Sonya to sprint at a high intensity. Depletion of these stores would result in an increase in contribution from the anaerobic glycolysis system, which cannot resynthesise ATP at the same rate. Therefore, her intensity will decrease, causing her to slow down.

- accumulation of metabolic by-products

  H+ ions would continue to build in Sonya's body as she sprinted down the field. These H+ ions would interfere with muscle contractions, increasing muscle acidosis in the body and, thus, inhibiting her ability to continue running at a higher intensity.

2 marks

1 mark for identifying a fatigue mechanism.
1 mark for explaining how the fatigue mechanism would impact Sonya.

c. *Any one of the following nutritional strategies:*

- Consuming high GI carbohydrates within the first 30 minutes of recovery time: restores muscle glycogen quicker, enabling a faster recovery to a pre-training state.
- Consuming foods high in protein: aids muscle recovery and micro tears to maximise performance for the next session.
- Combining the consumption of carbohydrates with protein: aids muscle repair and allows for better carbohydrate absorption due to the increased presence of insulin, which helps return the body to optimal levels more quickly.

Any one of the following physiological strategies:

- Passive recovery: allows for the resynthesis of ATP–CP (approximately 98% of PC restored in three minutes) maximising performance for the next session.
- Active recovery: maintains blood flow and oxygen levels, which speed up the removal of accumulated metabolic by-products, prevents venous pooling, promotes venous return to the heart and creates a muscle pump that increases oxygen supply to remove waste products to maximise performance for the next session.
- Static stretching: relaxes muscles, maintains and increases the flexibility and range of movement of joints, and reduces any stiffness and soreness to maximise performance for the next session.
- Dynamic stretching: improves the flexibility of the muscle and reduces any stiffness and soreness to maximise performance for the next session.

Any one of the following psychological strategies:

- Sleep: aids in tissue growth and repair, immune function and allows the brain to rest and recharge to maximise performance for the next session.

6 marks

1 mark for each correct strategy (three required).
1 mark for a correct description of each strategy.
Note: Responses should not refer to a hydration strategy such as consuming sports drinks. Sports drinks are known to assist in the replenishment of glycogen; however, after an 80-minute game of tag rugby, Sonya will require more than sports drinks to aid in the recovery of glycogen stores.

d. Momentum is equal to mass × velocity.

$$\text{opposing team member's momentum} = 100 \times 6$$
$$= 600 \text{ kg m/s}$$

$$\text{Sonya's momentum} = 80 \times 7$$
$$= 560 \text{ kg m/s}$$

The opposing team member has greater momentum than Sonya and will be less affected in the collision. 1 mark

Sonya has a lower momentum than the opposing team member and will be more greatly affected in the collision, which could result in Sonya crashing backwards to the ground. 1 mark

Note: Responses do not require calculations to obtain full marks.

Question 3 (18 marks)

a. *Any one of:*

- Breathing control/techniques: Use of slow, controlled breathing could help Ivar focus on the target and calm his mind.
- Progressive muscle relaxation: Ivar could contract and release his muscles to relax them and help him focus his mind and body towards the target.
- Cue words/routines: Ivar could have a number of cue words and a set routine for the kick that helps focus his mind.
- Positive self-talk: Ivar could use positive self-talk to increase his confidence and concentration before making the kick.

2 marks

1 mark for identifying one psychological strategy Ivar may use.
1 mark for explaining how this strategy may aid his concentration.

b. *Any one of:*

- Muscular power: the ability of a muscle group or group of muscles to exert a maximum amount of force in the shortest period of time, which would be essential when Ivar kicks the ball.
- Balance: the ability of the body to remain in a state of equilibrium while performing a desired task, which would be essential for Ivar when he runs in to kick the ball successfully.
- Coordination: the ability to use different parts of the body together smoothly and efficiently, which would be essential for Ivar to make contact with the ball and kick it accurately through the posts.

2 marks

1 mark for identifying one fitness component.
1 mark for justifying why this fitness component is required.

c. Newton's first law of motion states that an object will stay at rest or remain in constant motion unless external forces act upon it. 1 mark

Ivar will overcome the inertia of the stationary ball with force from his body when kicking the ball towards the posts. The ball will stay in constant motion until acted upon by an external force such as gravity, air resistance or the posts. 1 mark

Note: Responses should not simply state the 'law of inertia' without explaining the law.

d. The mechanical advantage of a lever refers to the ratio of the lengths of the force and resistance arms. In the case of a third-class lever, the resistance arm is always longer than the force arm, producing a mechanical advantage of less than one or no mechanical advantage. 1 mark

Having a longer resistance arm is beneficial when kicking the rugby ball as this type of lever can have an increased range of motion and speed, which can be transferred to the rugby ball on contact. 1 mark 1 mark

Note: Responses should include that the result increases the range of motion and speed of the kick, which can be transferred onto the ball. Responses that link this back to force production should not be awarded full marks.

e. Massed practice involves less frequent training sessions that last for longer periods of time with limited rest periods. 1 mark

This would suit Ivar as he works full time, so longer but less frequent sessions would fit in with his life schedule. Practicing his conversion kick skills in one continuous training block would assist him in replicating efficient movement patterns. 1 mark

f. *Any three of:*

- spread his legs to increase the size of his base of support
- align his base of support in line with oncoming forces (opposing team members)
- crouch down to lower his centre of gravity
- place his centre of gravity over his base of support
- shift his centre of gravity towards oncoming forces (opposing team members)
- increase friction between himself and the ground

3 marks

Note: Ivan could also maximise stability by increasing his mass. However, he cannot do this while tackling opponents during a rugby game, so this is not a correct response.

g. *Any two of:*

- Peers/friends: If Ivar had friends who also played rugby, he would be more likely to participate and, therefore, have greater exposure to the activity.
- Gender: If there are equal opportunities for all genders to play rugby, there would be general increased likelihood of participation.
- Socioeconomic status: If Ivan's family could afford membership costs, equipment, coaches and a uniform, he would be more likely to play and, therefore, have greater exposure to the activity.
- Local community: If there were rugby facilities and role models available in the local community, he would have greater exposure to the activity.
- Cultural norms/expectations: Rugby is one of Queensland's most played and watched sports. There may be a level of expectation to play the game and, therefore, greater exposure to the activity.

4 marks

1 mark for identifying each correct sociocultural factor (two required).
1 mark for explaining how each sociocultural factor named may have influenced Ivar's development.

Question 4 (9 marks)

a. When an individual begins exercising, the working muscles need to produce more energy for ATP resynthesis. However, during the change from rest to exercise and at any time during exercise when intensity increases, there is a period of time where the amount of oxygen required and the amount of oxygen supplied are not the same. This discrepancy is known as oxygen deficit. 1 mark

Because of the discrepancy between oxygen supply and demand, anaerobic pathways provide energy during these periods. 1 mark

Any one of the following factors that could determine the size of the oxygen deficit:

- Exercise intensity: The greater the intensity of the exercise, the greater the oxygen deficit, as it takes longer for the oxygen supply to equal the oxygen demand of the exercise.
- Training status of the individual: For any given exercise intensity, a trained individual will attain steady state more quickly than an untrained individual. The trained individual will also accrue a smaller oxygen deficit than an untrained individual.

2 marks

1 mark for stating a factor that could determine the size of the oxygen deficit.
1 mark for discussing how this factor could determine the size of the oxygen deficit.

b. The individual reaches steady state at approximately 25–27 minutes. 1 mark

Note: Accept responses in the range of 22–30 minutes.

When steady state occurs, it means that the oxygen supply to the working muscles is now meeting the oxygen demand. 1 mark

c. excess post-exercise oxygen consumption (EPOC) 1 mark

d. *Any two of:*

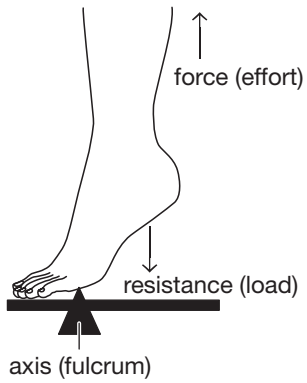
- Extra oxygen is required to metabolise lactic acid.
- Extra oxygen is required to replenish ATP, CP and glycogen stores.
- Extra oxygen is required to pay back any oxygen that has been borrowed from myoglobin, haemoglobin, air in the lungs and air in the body fluids.
- Extra oxygen is required to increase blood flow to prevent venous pooling and avoid delayed-onset muscle soreness (DOMS).

2 marks

Question 5 (4 marks)

a. second-class lever 1 mark

b.



3 marks

1 mark for each correct label provided.

Question 6 (9 marks)

As the diver begins their run-up along the platform, they initiate all three of Newton's laws. The first law (inertia) states that an object will remain at rest or in motion unless it is acted upon by a force strong enough to change its rest or motion. 1 mark

In this case, the diver applies force by pushing off the ground and, therefore, alters their state of motion. 1 mark

Newton's second law (acceleration) states that the acceleration of an object is directly proportional to the amount and direction of the force applied. 1 mark

The diver applies enough force to accelerate along the platform, which allows them to successfully perform their first manoeuvre. 1 mark

Newton's third law states that for every action, there is an equal and opposite reaction. 1 mark

This law is shown twice. When the diver begins their run-up, they push back into the platform (action), which allows them to move forward (reaction). This law also applies when the diver jumps off the platform. They again push down and backwards into the platform (action), allowing them to jump up and forward (reaction). 1 mark

When the diver begins their manoeuvres, they aim to quickly twist and spin as many times as possible. They do this by bringing their mass closer to their axis of rotation, which decreases their moment of inertia and increases their angular velocity. 1 mark

As the diver runs along the platform, they build linear momentum. Once in the air, this linear momentum changes to angular momentum and the momentum is conserved by the body. 1 mark

When the diver finishes their routine in the air, they aim to decrease their angular velocity to achieve a safe entry into the water. They do this by taking their mass away from their axis of rotation, which increases their moment of inertia and decreases their angular velocity. 1 mark

Question 7 (6 marks)

a. Having a shorter lacrosse stick results in the stick (and the subsequent mass of the stick) being closer to the axis of rotation. This allows the junior player to decrease their moment of inertia, increase their angular velocity and, therefore, increase the overall speed and momentum that can be applied to the throw. 1 mark

Having a lighter lacrosse stick (decreasing the sticks mass) makes it easier for a junior player to swing and apply the correct amount of force (through decreasing angular momentum). 1 mark

This will improve their overall skill development and success in the sport as they will be able to increase the speed in which they can throw the ball while being able to wield the stick with the appropriate amount of force. 1 mark

b. Participating in the sport of lacrosse, especially from a young age, would increase the participant's fundamental motor skills. These improved skills would motivate the participant to continue playing and. therefore, increase their performance and overall enjoyment for the sport of lacrosse. This would lead to further skill improvement, increased motivation and improved overall performance. 1 mark

After session 1, player 2 had only achieved a successful shooting accuracy rate of approximately 7–8%. This suggests player 2 was still in the cognitive stage of learning. 1 mark
After session 2 their success rate was approximately 32%, as they had most likely improved and moved to the associative stage.

This data correlates strongly with player 2 being more motivated to continue, as their fundamental skills, confidence and overall performance improved. 1 mark

Note: Responses must reference the data to receive full marks.

Question 8 (14 marks)

a. *Any two of:*

- identify individual strengths and weaknesses so the training program can be tailored to improve or maintain specific fitness components
- set a benchmark so training adaptations can be measured
- monitor training progress
- provide motivation and incentives
- identify specific individual attributes to a sport or a skill

2 marks

b. *Any one of the following perspectives:*

- Physiological: It seems that Divya has not obtained pre-participation health screening information (PARQ) and informed consent. This documentation would give Divya greater insight into Aiko's current fitness and health state and can be used to determine the level of risk of testing and, subsequently, select appropriate tests. Aiko is relatively active and, therefore, maximum/exhaustive tests such as the Cooper's 12-minute run test are appropriate. Despite Aiko's participating in high-intensity workout classes, a 1 RM strength test may not be the most appropriate test as according to the information given, Aiko is only a recreational athlete. A more suitable test would be the hand grip dynamometer test or the 7-stage abdominal strength test, which are less strenuous tests and more applicable for Aiko's current health and fitness levels.
- Psychological: It seems that Divya has not obtained informed consent. Informed consent gives the participant a clear understanding of the testing process and prepares them psychologically. Not knowing the testing procedures would most likely increase Aiko's anxiety. Hydrodensitometry is quite an invasive test and may also cause Aiko some anxiety. A more appropriate test would be a BMI, which is a less invasive test. It is important to establish the best way to compare Aiko's results (such as criterion-based testing versus normative testing).

2 marks

1 mark for evaluating the fitness tests from a physiological or psychological perspective.
1 mark for giving at least one example of an inappropriate test and at least one example of an appropriate test.

If Aiko undertakes these tests and scores poorly on them, she may lose confidence and motivation to continue to participate further. 1 mark

c. The program is effective in developing aerobic power for Aiko as the following training principles have been applied correctly.

Any three of:

- Frequency: The 3–5 sessions per week are adequate for Aiko to develop aerobic power.
- Duration: The duration of the sessions (45–80 minutes) are adequate for Aiko to develop aerobic power.
- Type: The session type (running) is suitable as Aiko is training for a 21 km half-marathon.
- Progression: Throughout the program, progression has been applied correctly as no area exceeds the 2–10% rule.
- Specificity: The training schedule is very specific to that of a 21 km half-marathon as Aiko is undertaking running training that varies in length between 45–80 minutes.

3 marks

1 mark for each correct critique of a training principle referring to data.

d. *Any one of:*

- Intensity: In weeks 1–3, 4–6 and 21–24, the intensity of the running is inappropriate. In weeks 1–3 and 4–6, 50–65% maximum heart rate (MHR) is too low and, in weeks 21–24, 90–95% MHR is too high. The training intensity should stay between 70–85% MHR.
- Variety: There is very little variety in the program. For six months, Aiko will be running only. Divya should also incorporate other fitness activities in the program, such as swimming, rowing or bike riding.

2 marks

1 mark for stating a training principle that has been applied incorrectly, using data to justify the answer.

1 mark for suggesting how the training principle could be applied correctly.

e. *Any one of:*

- training log or diary
- electronic device/activity tracker to monitor training
- heart rate monitor
- training phone application

1 mark

f. *Any one of the following physiological variables:*

- energy levels during training
- heart rate responses (at rest, during exercise and during recovery)
- muscle soreness
- sleep patterns
- breathing rate
- perspiration levels
- nutritional information

Any one of the following psychological variables:

- emotional and motivational variables
- confidence levels
- arousal levels
- stress levels
- goal setting
- positive self-talk

Any one of the following sociological variables:

- temperature and weather conditions during the training sessions
- training time and day
- type of training session
- length of training session
- place of training session (indoors or outdoors)
- training partners/teams

3 marks

Question 9 (7 marks)

a. As we exercise, our bodies naturally heat up. This process is magnified in conditions such as 32°C heat. To expel heat, our bodies produce sweat to cool the body. Warmer conditions increase sweating rates as, to counteract the excess heat, the body tries to thermoregulate itself by sweating more. 1 mark

To do this, vasodilation of the body's blood vessels occurs closer to the surface of the skin. This controls heat loss but affects the athlete as vasoconstriction of the blood vessels occurs at the muscles. 1 mark

Vasoconstriction at the site of the muscles means less oxygenated blood, which means less metabolic by-products can be broken down and less ATP resynthesis can occur. 1 mark

As a result, the athlete in the 2018 race would receive greater contributions from the anaerobic glycolysis system. Their intensity would decrease, meaning that the athlete will slow down and run a slower time. 1 mark

b. Some sport drinks contain carbohydrates, which replace the glycogen levels that may have depleted during exercise. 1 mark

Sports drinks also contain electrolytes that are essential for brain function and muscle contractions and are lost through sweat. 1 mark

When used in conjunction with sports drinks, water assists in the uptake and absorption of these carbohydrates and electrolytes. 1 mark

Note: Responses must refer to both water and sports drinks to receive full marks. Responses may also refer to sports drinks being more palatable than water and that sports drinks can speed up the recovery process of absorption and the retention of water in the body.

Question 10 (6 marks)

a. *Any two of:*

- skills involved in the performance
- W : R ratios
- distance covered (and at what speed the distance was covered)
- energy system requirements
- movement patterns, type and direction
- muscle and muscle actions used
- intensity of movement
- strengths and weaknesses of the opponent

2 marks

b. Muscular power: seated basketball throw 1 mark

Speed: 20 m **OR** 35 m **OR** 50 m sprint test 1 mark

Note: Muscular power of the upper body is a predominant fitness component in this question; therefore, the vertical jump, standing long jump and Margaria-Kalamen stair sprint tests are incorrect as they are lower body muscular power tests.

c. *For example:*

direct observation 1 mark

Any one of:

- provides immediate feedback to the athlete
- low cost
- relatively easy to do

1 mark

Note: Responses could also include video recording.

Question 11 (3 marks)

An increase in alveoli numbers and alveoli surface area will, in turn, increase pulmonary diffusion as it will increase the diffusion of oxygen and carbon dioxide across the alveolar–capillary membrane. 1 mark

This means more oxygen can be inhaled and diffused via the respiratory system and, subsequently, more oxygen can be transported via the cardiovascular system to the working muscles. This enables greater resynthesis of ATP under aerobic conditions and greater breakdown of lactate. 1 mark

This, in turn, would increase the athlete's LIP. Increased LIP would allow the athlete to work at higher intensities for longer aerobically without succumbing to fatigue. 1 mark