PHYSICAL EDUCATION STUDIES

11 ATAR Course Examination 2023

Marking Key

Section One: Multiple-choice **20% (20 marks)**

Question	Answer
1	d
2	b
3	c
4	a
5	b
6	b
7	c
8	d
9	c
10	c
11	a
12	b
13	d
14	a
15	d
16	d
17	b
18	c
19	a
20	b

Section Two: Short answer 50% (65 marks)

Question 21 (9 marks)

(a) Explain the main function of the circulatory system (2 marks)

Description	Marks
Explains the main function of the circulatory system	
Comprehensive explanation of the main function of the circulatory system	2
Simple explanation of the main function of the circulatory system	1
Total	**2**
Answers could include: The circulatory system is the transport system in the body which is responsible for • Carrying oxygen and nutrients to the muscles and cells • Removing carbon dioxide and waste	
Accept other relevant answers	

(b) The heart plays a central role in the functioning of the circulatory system. Identify the type of muscle the heart is classified as. (1 mark)

Description	Marks
Identifies Cardiac muscle type	1
Total	**1**

(c) There are three main blood vessels that make up the vascular system. Name the **three** types and state **one** function of each. (6 marks)

Description	Marks
For each of three types of blood vessel (3 x 2 marks)	
Names the vessel	1 – 3
Sates a function	1 – 3
Total	**6**
Arteries – carry blood away from the heart Veins – carry blood to the heart Capillaries – distribute oxygen and nutrients to every cell / removes waste	

Question 22 (12 marks)

(a) Name the **three** phases of learning according to Fitts and Posner. (3 marks)

Description	Marks
Names the three phases of learning	1 – 3
Cognitive Associative Autonomous	
Total	**3**

(b) A volleyball player is
- beginning to take cues from the external environment
- starting to eliminate large errors
- focusing practice on timing and sequencing of whole skills
- placing greater emphasis on internal feedback.

Identify the phase of learning this volleyball player is currently in and outline **two** characteristics of performance that would move them towards a higher level of learning. (3 marks)

Description	Marks
Identifies Associative phase	1
Subtotal	**1**
Provides **two** characteristics	1 – 2
Subtotal	**2**
Possible answers could include: Fewer errors / able to detect their own errors Perform without conscious thought High degree of accuracy/consistency Less distracted by the external environment	
Total	**3**
Accept other relevant answers	

(c) A beginner would require more cues to improve their current level of skill performance than a more seasoned player. Name **three** types of cues that a coach could provide during a training session and provide an example for each. (6 marks)

Description	Marks
Names **three** types of cues	1 – 3
Visual Verbal Proprioceptive	
Subtotal	**3**
Provides an example for each	1 – 3
Subtotal	**3**
Possible answers could include: Visual – the coach using a demonstration at the start of the session to show a visual representation of the skill to be learnt. Verbal – the coach calls out instruction of key performance criteria from the sideline during drills/game play. Proprioceptive – the coach directs the performer to feel the skill being learnt eg: moving the arm through the serve motion.	
Total	**6**
Accept other relevant answers	

Question 23 **(6 marks)**

(a) Name the bone that has been broken in the upper arm. (1 mark)

Description	Marks
Names the Humerus as the broken bone	1
Total	**1**

(b) Identify the **two** muscles that are responsible for the flexion and extension of the arm at the elbow. (2 marks)

Description	Marks
Identifies the **two** muscles	1 – 2
Flexion: Bicep Extension: Tricep	
Total	**2**

(c) The musculoskeletal system works with the joints of the body to create movement. Outline what is meant by the term 'antagonist pairs' and describe how this relationship creates movement in the body. (3 marks)

Description	Marks
Outlines the term antagonist pairs	1
Muscles work in pairs, pulling on the bones at the joint to create movement.	
Subtotal	**1**
Describes the relationship	
Clear description of the relationship	2
Simple explanation of the relationship	1
The main muscles involved in the movement is called the agonist (prime mover) The agonist pulls on the muscles to create movement at the joint. On the opposite side there is the opposing muscle called the antagonist. This muscle relaxes allowing the agonist to contract and create movement at the joint.	
Subtotal	**2**
Total	**3**
Accept other relevant answers	

Question 24 **(10 marks)**

(a) The graph below represents the continuum of the three energy systems to provide ATP at the start of the race. Identify each energy system on the graph. (3 marks)

Description	Marks
Labels each part of the graph	1 – 3
a: aerobic b: lactic acid c: ATP-CP	
Total	**3**
Accept other relevant answers	

(b) Jess holds a personal best time of 4 minutes 42 seconds. Identify the energy system which would contribute the most to energy production in the latter parts of the race. Justify your answer by comparing the contribution of each energy system. (4 marks)

Description	Marks
Identifies the Aerobic system	1
Subtotal	1
Justifies the contribution of the energy system	
Comprehensive justification providing relevant information	3
Clear justification including mostly relevant information	2
Simple justification including minimal relevant information	1
Justification can include the following: The ATP-PC system contributes more readily to energy production, as it does not require the presence of oxygen to generate ATP. This system only lasts up to 10seconds, so would not be the main contributor to the latter stages of the race. As the contribution of the ATP-PC system drops off, there is a transition to the Lactic Acid system, this system is the major source of energy production for 30 seconds to 2 minutes, therefore would not be the main contributor to the latter stages of the race. The aerobic system is the main contributor to energy production for the rest of the race, as adequate oxygen is now available for the energy to produce ATP aerobically. This is the main energy system in the latter stages of the race.	
Subtotal	**3**
Total	**4**
Accept other relevant answers	

(c) Identify the primary fuel source for energy production for Jess to ensure she has enough energy to sustain herself during training and racing. Explain why this source of fuel is preferred to meet the energy demands. (3 marks)

Description	Marks
Identifies Carbohydrates as the primary fuel source	1
Subtotal	1
Explains why this is the preferred source	
Comprehensive explanation of why this source can met energy demands	2
Simple explanation of why this source can met energy demands	1
Possible answers could include: Carbohydrates are stored as muscle glycogen used during the race to supply energy to the working muscles. Muscle glycogen can last up to two hours, so produces a sustained production of energy required during training and racing.	
Subtotal	**2**
Total	**3**
Accept other relevant answers	

Question 25 **(13 marks)**

(a) At the start of a training session, an athlete begins their warmup with some gentle dynamic movements in the upper body. Label the movement types shown by the arrows below (figure 1a) The athlete moves the arm up and down (a and b) and in a circular motion (c). (3 marks)

Description	Marks
Correctly labels movement types	1 – 3
a. Abduction b. Adduction c. Circumduction	
Total	**3**

(b) The coach sets up a specific number of exercise stations and the athletes complete each station consecutively according to a set work/recovery ratio. Name the type of training method the coach is implementing for the athletes. (1 mark)

Description	Marks
Correctly names Circuit training as the training type	1
Total	**1**

(c) To optimise flight time and distance thrown, throwers can refer to the principle of optimal projection. Explain the optimal angle of release the athlete should consider to maximise flight time and increase distance thrown. (2 marks)

Description	Marks
Explains the optimal throwing angle	
Comprehensive explanation of the optimal throwing angle	2
Simple explanation of the optimal throwing angle	1
Answer could include. The release angle is just less than 45 degrees When the projectile is released from a higher position than which it lands, the time for the projectile to reach its peak is less than the time it takes to land, therefore the release angle is just less than 45 degrees	
Total	**2**

(d) Goal setting is a priority for any elite performer to ensure that all training is focused towards achieving a specific result. Goal setting often follows a set of characteristics. Outline the **seven** characteristics of goals the javelin throwers could use to write effective goals. (7 marks)

Description	Marks
Outlines goal setting characteristics (no marks for just naming)	1 – 7
SMARTER goals S – specific. Goals should clearly state what is to be achieved. M – measurable. Goals should be quantifiable. A – action-orientated. Goals should indicate the action required. R – realistic. Goals should be achievable by the individual. T – timely. Goals should have a timeframe in which to be achieved. E – effective. Goals should be able to achieve the desired results. R – reviewed. Goals should be monitored and revised/adjusted.	
Total	**7**

Question 26 **(15 marks)**

(a) Identify and explain **two** training principles that this coach could use to achieve optimal performance results for the boxer. (6 marks)

Description	Marks
Identifies **two** training principles	1 – 2
Answers could include any **two** of the following: Progressive overload Frequency, Intensity, time, type Specificity Reversibility	
Subtotal	**2**
Explains each principle identified	
Clear explanation including mostly relevant information	2
Simple explanation including minimal relevant information	1
Possible answers could include: *Progressive Overload* The gradual and regular increase in training workload to ensure fitness adaptations continue to occur. *Frequency* Relates to the number of training sessions completed per week. *Intensity* Training is structured so that the athlete's training effort or exertion is appropriate for physiological gain *Time* Training is structured so that the athlete trains for long enough for physiological gains to occur *Type* Training is structured using a variety of methods which target the physiological capacity to be developed.	

Specificity Ensure training targets the movements, muscles and energy systems utilised in the athlete's particular sport *Reversibility (detraining)* The loss of physiological conditioning that occurs as a result of ceasing or reducing training load.	
Subtotal	**4**
Total	**6**

(b) The boxer often uses a weighted punch bag which hangs from the roof of the gym. State Newton's First Law of Motion and explain how this law could be applied to the punch bag as the boxer throws his first punch. (3 marks)

Description	Marks
States Newton's First Law of Motion	1
An object at rest tends to stay at rest and an object in motion tends to stay in motion, with the same speed and in the same direction, unless acted on by an external force.	
Subtotal	**1**
Explains how Newtons' First law of Motion would be applied	
Clear explanation including mostly relevant information	2
Simple explanation including minimal relevant information	1
The punch bag will move if punched by the boxer (external force) and will continue to move unless it is stopped from swinging (caught by the boxer/trainer or air resistance)	
Subtotal	**2**
Total	**3**
Accept other relevant answers	

(c) As the boxer begins his training session his heart rate and respiratory rate start to increase in response to the rising energy and exertion demands on the body. Identify **two** other immediate physiological responses the boxer may experience with the onset of exercise and describe why each of these occur. (6 marks)

Description	Marks
Identifies **two** immediate responses	1 – 2
Subtotal	**2**
Describes **two** physiological responses (2 x 2 marks)	
Clear explanation including mostly relevant information	2
Simple explanation including minimal relevant information	1
Any **two** of the following: *Increase in stroke volume* This occurs as more venous blood is returned to the heart from the working muscles. *Increase in blood pressure* Blood pressure increases due to increase in cardiac output and the requirement for more blood carrying oxygen to be delivered to the working muscles *Increase in cardiac output*	

More blood carrying oxygen is required at the onset of physical activity to fuel the working muscles. Heart rate and stroke volume increase to increase cardiac output. *Increase in perspiration* The increase in physical activity creates metabolic heat in the body, creating the need for the body/blood to release excessive heat by transferring it to the skin and releasing it through sweating. *Blood redistribution* Arteries open and close selectively moving blood away from the non-working muscles to the working muscles.	
Subtotal	**4**
Total	**6**

End of Section Two

Section Three: Extended answer 30% (30 marks)

Question 27 (15 marks)

(a) The information processing model is one example used to consider how learning and execution of a skilled performance takes place. Identify and outline each stage of the information processing model. Apply each stage of the model to the goalkeeper attempting to save the penalty. (12 marks)

Description	Marks
For each of **four** stages of the model (4 x 3 marks)	
Identifies the stage	1
Outlines the stage	1
Applies the stage to the goalkeeper scenario	1
Total	**12**
Identification of stimuli/input Data is received by the brain from the senses, this includes a number of different stimuli or cues. The goalkeeper watches the positioning of the player and observes other cues in the environment in preparation for the possible direction of the penalty.	
Response identification/decision making The brain starts to process all the stimuli/information received, it interprets the information and forms an appropriate response. (Perceptual / decision making / effector mechanism). The goalkeeper interprets the cues (speed and direction of the shot) and the brain prepares an appropriate response.	
Response/output Once the information has been processed the brain signals the neuro muscular system to respond with the appropriate movement. The goalkeeper responds accordingly to the interpretation of the cues, executing when and which direction to dive in attempt to save the penalty.	
Feedback On completion of the movement, the performer receives information about the success of the performance. This will inform future attempts. The goalkeeper receives information about the success of their performance, i.e.: whether the penalty was saved or scored.	
Accept other relevant answers	

(b) The soccer player below prepares to take a penalty kick. He is aiming to drive the ball fast and hard into the bottom right-hand corner of the net. Define Newton's Second Law of Motion and explain how the application of this law could assist the soccer player in achieving his objective and make it more difficult for the goalkeeper to save. (3 marks)

Description	Marks
Defines Newton's Second Law of Motion	1
When a body is acted upon by a constant force, its resulting acceleration is proportional to the force and inversely proportional to the mass. (F=ma)	
Subtotal	**1**
Explains how Newton's Second Law of Motion could assist the soccer player	
Clear explanation including mostly relevant information	2
Simple explanation including minimal relevant information	1
The ball with travel in the direction it has been kicked and the speed of acceleration will depend on how much force was applied (mass remains constant). The greater force may make it harder for the goalkeeper to save the penalty as the ball is moving faster/harder.	
Subtotal	**2**
Total	**3**

Question 28

(a) Identify and outline the type of motion a wheelchair athlete would demonstrate during a race. Explain how the athlete can use race data relating to speed and acceleration during a 1500m race (approximately three and a half minutes). (5 marks)

Description	Marks
With reference to the wheelchair athlete's movement	
Identifies General Motion	1
Outlines General Motion	1
General motion The athlete combines angular and linear motion by the angular rotation of the arms to create linear motion of the wheelchair (body) moving forward.	
Subtotal	**2**
Explains the use of speed and acceleration race data	
Comprehensive explanation of how the race data can be used, referring to speed and acceleration	3
Clear explanation of how the race data can be used, referring to speed or acceleration	2
Simple explanation of how the race data can be used, with minimal reference to speed or acceleration	1
Subtotal	**3**
Total	**5**

(b) Explain how an increase in stroke volume will assist the performance of the wheelchair athlete. In addition, name and outline **two** other cardiovascular effects and **two** respiratory effects that long-term training may have on the athlete. (10 marks)

Description	Marks
Explains how stroke volume will assist the athlete	
Clear explanation including mostly relevant information	2
Simple explanation including minimal relevant information	1
More blood can be distributed throughout the body, delivering more oxygen to the working muscles (increase in size and strength of the heart).	
Subtotal	**2**
For each of **two** cardiovascular effects (2 x 2 marks)	
Names the effect	1
Outlines the effect	1
Any two of the following: *Cardiac hypertrophy* The heart increases in size and strength as a direct result of increased aerobic exercise *Decreased heart rate* The heart rate decreases at rest and during exercise as a result of aerobic exercise due to heart becoming more efficient. *Decreased blood pressure* The heart does not have to work so hard to pump blood around the body. Blood pressure is reduced during rest during sun-maximal exercise. *Increased blood volume / haemoglobin*	

Plasma volume and the number of red blood cells increases as a result of exercise. More oxygen can be transported to the working muscles. *Increased capillarisation* Exercise increases capillarisation with this the body, improving efficiency of oxygen distribution.	
Subtotal	**4**
For each of **two** respiratory effects (2 x 2 marks)	
Names the effect	1
Outlines the effect	1
Any of the following: *Increase VO_2 max / maximum oxygen uptake* Aerobic training improves oxygen supply to muscles and increased ability of the body to utilise the oxygen, resulting in a higher Vo2 max. *Increased ventilation efficiency* Training allows for more oxygen to be extracted and delivered to the body, whilst improving ventilation efficiency at rest (decrease in breathing rate) *Increased oxygen exchange* A greater amount of oxygen is extracted by the muscles from the blood due to increased capillarisation and efficiency of the circulatory system	
Subtotal	**4**
Total	**10**

Question 29 **(15 marks)**

(a) Define self-confidence and outline a reason why optimising self-confidence is beneficial to performance outcomes. To remain confident Tao would need to consistently work on his motivation levels as he strived to overcome his challenges. Name and outline **two** types of motivation and explain how each can be applied to Tao. (10 marks)

Description	Marks
Defines self-confidence Self-confidence is the belief that you can successfully perform a desired behaviour.	1
Subtotal	**1**
Outlines why self-confidence is beneficial The feelings of success can help create positive emotions / assist concentration / set challenging goals / increase effort etc	1
Subtotal	**1**
Accept other relevant answers	
For each of **two** types of motivation (2 x 4 marks)	
Names the type of motivation	1
Outlines the type of motivation	1
Clearly explains how it can be applied to Tao	2
Simply explains how it can be applied to Tao	1
Intrinsic motivation Motivation that comes from within e.g.: a personal desire to achieve Tao may be motivated by the desire to participate in the race / personal satisfaction / desire to be successful / achieve a personal best *Extrinsic motivation* Motivation that comes from external sources e.g.: medals / trophies Tao may be motivated by the public recognition, prize money, praise etc.	
Subtotal	**8**
Total	**10**
Accept other relevant answers	

(b) Tour cycling requires training specific components of fitness such as cardiorespiratory endurance. Define this component and identify **two** additional components of fitness that would be required in the sport of road racing. For each additional component, outline why this component would be important. (5 marks)

Description	Marks
Defines cardiorespiratory endurance	1
Cardiorespiratory endurance The capacity of the body to sustain prolonged, continuous activity / The ability of the heart, lungs and circulatory system to deliver oxygen to the working muscles during prolonged activity.	
Subtotal	**1**
For each of **two** components (2 x 2 marks)	
Identifies the component	1
Outlines why the component is important	

Muscular strength The ability of the muscle to exert a force against a resistance – required to generate force to increase the cadence of the pedals and speed of the bike. *Muscular endurance* Ability of the muscles to exert force over an extended time. The long duration of this race requires high levels of endurance to maintain level of performance. *Speed* Ability to perform a movement or cover a distance in a short period of time. Required at different times during the race to move into a more advantageous position eg: start and end of the race. *Power* Strength x speed. The ability to release maximum force quickly. Required to power up hill and to gain optimal positioning during the race. *Body Composition* The percentage of fat, muscle and bone that make up body weight. Cyclist would have to optimise body composition (fat / muscle) to ensure adequate strength and power and minimise fat to ensure the body/bike can be moved with ease.	
Accept other relevant answers	
Subtotal	**4**
Total	**5**

Question 30 (15 marks)

(a) Define the term balance and identify the type of balance the gymnast (image 1) and the downhill skier (image 2) are demonstrating. If mass is consistent, name and explain how each athlete uses these factors to ensure success in their respective events. (10 marks)

Description	Marks
Defines balance and identifies the types of balance	
Balance is the ability of the body to maintain equilibrium. The gymnast in Image 1 is demonstrating static balance. The skier in Image 2 is demonstrating dynamic balance.	1 1 1
Subtotal	**3**
Names the **three** factors affecting balance with application	
Size of the base of support The height of the centre of gravity The line of the centre of gravity	1 1 1
Subtotal	**3**
Explains how each athlete uses these factors (2 x 2 marks)	
Clear explanation with reference to appropriate factors	2
Simple explanation with minimal reference to the factors	1
The gymnast has a small base of support / a high centre of gravity / the line of gravity is outside the base of support – she reaches with her arm to lower her centre of gravity and maintain stability. The skier has a slightly wide base of support / a lower centre of gravity / line of gravity is outside his base of support – he moves his centre of gravity outside his base of support to allow for faster movement and speed (less stable)	
Subtotal	**4**
Total	**10**

(b) To help the gymnast overcome nerves before the start of her gymnastic routine her coach encourages her to do some diaphragmatic breathing and take a long slow exhale. Outline what the diaphragm is and explain how air is pushed out of the lungs through the process of expiration (exhalation). (5 marks)

Description	Marks
Outlines what the diaphragm	1
An involuntary smooth muscle that forms the base of the chest cavity, it contracts and relaxes to control breathing.	
Subtotal	**1**
Explains the process of expiration (4 x 1 marks)	
The diaphragm relaxes The pleural cavity contracts Air pressure increases in the lungs Air is pushed out of the lungs	1 1 1 1
Subtotal	**4**
Total	**5**