



PHYSICAL EDUCATION STUDIES

ATAR course examination 2019

Marking Key

Marking keys are an explicit statement about what the examining panel expect of candidates when they respond to particular examination items. They help ensure a consistent interpretation of the criteria that guide the awarding of marks.

Section One: Multiple-choice

20% (20 Marks)

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

Section Two: Short answer

50% (74 Marks)

Question 21

(9 marks)

- (a) Identify what type of spin Thomas would suggest the players place on the ball to increase the distance of their throw. Explain how the spin effects the ball's flight path. (5 marks)

Description	Marks
Identifies Backspin as the suggested type of spin.	1
<ul style="list-style-type: none"> • Velocity of air on top of ball is fast/high causing a low pressure area • Velocity of air on bottom of ball is slow/low causing a high pressure area • Air moves from high pressure area to area of low pressure • Lift/magnus force is created from air movement. 	1-4
Total	5
Accept other relevant answer.	

- (b) Identify the class of lever at the player's neck used in the movement of their head from the back to the front to head the ball. Draw a labelled diagram representing this lever system. (4 marks)

Description	Marks
Identifies lever as 1 st (first) class	1
1 mark for each correct aspect of the diagram (Effort, Load & Fulcrum) <div style="text-align: center; margin: 10px 0;"> </div>	1-3
Total	4

Question 22

(7 marks)

- (a) Describe **two** physiological effects she would have experienced from having this stimulant in her system. (4 marks)

Description	Marks
Two marks for each effect. Any two of the following:	
Increased heart rate/Cardiac output Which improves delivery of oxygen to the working muscles	1–2
increased respiratory rate Which improves delivery of oxygen to the working muscles	1–2
Increased Central Nervous System (CNS) activity Which improves reaction time/alertness/speed/anaerobic performance	1–2
Suppresses neurotransmitter in nervous system Which masks fatigue/pain and ability to push through it	1–2
Increased metabolism Which reduces weight	1–2
Increase blood pressure Which makes the blood vessel dilate and contract more forcefully	1–2
Increased body temperature Which makes the athlete feel hotter/more likely to suffer from overheating/sweat more	1–2
Glycogen sparing/use of fats (FFAs) Which delays the onset of or suppresses the symptoms of fatigue	1–2
Total	4
Accept other relevant answer.	

- (b) It has been well documented by the Australian media how through the use of stimulants some sports people became addicted. Identify **three** other risks to athletes who use stimulants. (3 marks)

Description	Marks
Any three of the following <ul style="list-style-type: none"> • can cause panic attacks • can cause paranoia • increased blood pressure (hypertension) • increase chance of heart attack/disease/stroke • cause damage to the liver/disease • cause damage to the kidneys/ disease • tremors • insomnia • coordination and balance problems • memory deteriorates • causes violent/aggressive behaviour • dehydration • impaired heat regulation 	1–3
Total	3
Accept other relevant answer.	

Question 23

(10 marks)

- (a) Identify which mental skill strategy the players are using and outline what the benefit is for the players. (2 marks)

Description	Marks
Identifies the mental skill strategy as Performance Routine/ritual/pre-performance routine	1
Identifies any one of the following benefits: <ul style="list-style-type: none"> The purpose of a performance routine is to get athletes into the right mindset (get 'in the zone') or optimises the player's arousal level. The purpose of a performance routine increases an athlete's confidence. The performance routine narrows an athlete's focus to improve concentration. A performance routine may improve motivation 	1
Total	2

- (b) An AFL team's performance is reliant on group cohesion. Outline the **four** factors identified in Carron's model of group cohesion. Give an example of each factor. (8 marks)

Description	Marks
Environmental factors <ul style="list-style-type: none"> Things/common factors that bind members to a team E.g. such as contracts, location, age, eligibility. 	1–2
Personal factors <ul style="list-style-type: none"> Are individual characteristics/demographic attributes of team members E.g. an example about motives for participating. 	1–2
Leadership factors <ul style="list-style-type: none"> The style of leadership used by the coach and captain E.g. how they communicate and build relationships between coach and players. 	1–2
Team factors <ul style="list-style-type: none"> The collective identity/goals/aims/norms/standards of the team E.g. the desire for group success (goals), use of team roles to complement each other and the stability of the team. 	1–2
Total	8
Accept other relevant answer.	

Question 24

(9 marks)

(a) Identify the tennis ball that should be used by each player and justify your answer.

(4 marks)

Description	Marks
Player A should use Ball 2 Player B should use Ball 1	1
Co-efficient of restitution relates to the bounciness of the ball or How much energy remains after a collision between two objects or Ratio of height of bounce/velocity	1
High co-efficient of restitution means high bouncing ball or low co-efficient of restitution means low bouncing ball	1
Player B is short/child so requires a low bouncing ball to hit/slower velocity of ball. or Player A is tall/adult so requires a higher bouncing ball to hit/faster velocity of ball.	1
Total	4

(b) Outline the function of the following components of the neuromuscular system that are involved in producing a successful shot.

(5 marks)

Description	Marks
Dendrites of sensory neurons: pass impulse/signal from the sensory receptors to the cell body of the sensory neuron/eye.	1
Axons of motor neurons: transmit impulse/signals away from cell body to the muscle fibres.	1
Neuron: a cell within the nervous system that transmits impulse/signals to other nerve cells/muscle	1
Spinal cord: transmit impulse/signals from the brain to parts of the body.	1
Motor unit: causes contraction of the associated muscle fibres or to create the desired movement	1
Total	5

Question 25

(9 marks)

(a) Identify the label of the X axis for each graph

(2 marks)

Description	Marks
Graph 1 - Length	1
Graph 2 – Velocity/duration	1
Total	2

(b) Explain the relationship depicted by Graph 1.

(5 marks)

Description	Marks
Muscle force depends on the starting length of the muscle contraction	1
<ul style="list-style-type: none"> Force is greatest at optimal muscle length - the mid-range/resting length of the muscle <p style="text-align: center;">and</p> <ul style="list-style-type: none"> Greatest overlap of actin and myosin filaments occurs at mid-range/resting length of the muscle 	1–2
Explanation must include one of the following relationships	
<ul style="list-style-type: none"> Force is lowest when the muscle is fully lengthened <p style="text-align: center;">and</p> <ul style="list-style-type: none"> Smallest/lower/insufficient overlap of actin and myosin filaments occurs when the muscle is fully lengthened or slippage/ineffective crossbridge activation <p style="text-align: center;">or</p> <ul style="list-style-type: none"> Force is lowest when the muscle is fully shortened <p style="text-align: center;">and</p> <ul style="list-style-type: none"> Greatest/highest overlap of the actin and myosin filaments occurs when contracted/reducing potential to contract 	1–2
Total	5

(c) Outline how the relationship depicted by Graph 2 on page 16, is applied by a rugby player involved in a scrum.

(2 mark)

Description	Marks
The rugby player wants to push slowly because	1
The player in the scrum wants to push with maximum force	1
Total	2
Accept other relevant answer.	

Question 26

(5 marks)

- (a) Identify whether this coaching/training activity is ‘chaining’ or ‘shaping’ and provide a reason for your answer. (2 mark)

Description	Marks
Identifies Shaping	1
The players are performing the whole task but in a simplified version of the skill. or Hitting against the wall allows a constant return of the ball without the added complexity of reading where the other player is going to hit the ball. or It is not chaining because the skill is not broken down into parts.	1
Total	2
Accept other relevant answer.	

- (b) Justify the reasons behind the modifications Thomas’ coach made to his training program when he was injured. (3 marks)

Description	Marks
Answer includes the following points: <ul style="list-style-type: none"> • Thomas needs to minimise the amount of detraining that occurs during the injury/rehabilitation phase or maintains levels of fitness • Thomas wants to prevent further injury from occurring. • Thomas can still train his hand-eye coordination (maintaining skill) • Maintains confidence/motivation 	1–3
Total	3
Accept other relevant answer.	

- (c) A player wants to hit the ball with speed to land just inside the baseline. Identify which option, Option A or Option B above, for the racquet to follow through would be the **best**. Explain why you chose this option. (4 marks)

Description	Marks
Option A identified	1
Option A provides topspin on the ball.	1
Explanation includes any two of the following: <ul style="list-style-type: none"> • The racquet provides an eccentric force on the top of the ball • Topspin will create an earlier dip in the flight of the ball allowing it to land in the court • Earlier dip in the ball allows the player to hit higher over the net (greater margin of error) with greater speed 	1–3
Total	4
Accept other relevant answer.	

Question 27

(11 marks)

- (a) Name and define the type of drag that is reduced by swimming for longer underwater. (3 marks)

Description	Marks
Names Wave Drag	1
One the following points: <ul style="list-style-type: none"> When the athlete moves through the water, it causes waves to be generated Wave drag occurs as a body moves through both water and air 	1
Causing the swimmer to resist movement through the water.	1
Total	3

- (b) The Olympic swimming competition lasts for one week. Describe **two** key objectives of the swimmers training micro-cycle the week before the competition. (4 marks)

Description	Marks
1 mark for stating the objective and 1 mark for how it is achieved:	
Maximising recovery by avoiding heavy training loads or using recovery strategies	1–2
Achieving peak performance/Peaking by applying appropriate rest/recovery or applying a taper	1–2
Tapering by reducing volume and increasing or maintaining intensity	1–2
Maintaining specificity by training with strategies matching the event	1–2
Avoiding injury by avoiding heavy training loads or potentially dangerous training methods (heavy resistance training)	1–2
Maximising muscle glycogen stores by minimising training volume/loads or applying a taper or carbohydrate loading	1–2
Total	4
Accept other relevant answer.	

- (c) Identify the predominant energy system for each event and outline the **best** method for use in the training program for each event. (4 marks)

Description	Marks
50m – anaerobic/lactic acid energy system	1
Training is based around short high intensity/fast intervals.	1
1500m – aerobic energy system	1
Training is based around continuous training/fartlek training/long intervals.	1
Total	4

Question 28

(10 marks)

- (a) Describe the effect of transfer of learning most likely involved with Chloe and Brooke crossing codes. Provide an example to support your answer.

(3 mark)

Description	Marks
Description includes: <ul style="list-style-type: none"> The positive effect of transfer of learning is where a skill developed in one sport helps/aids/assists the performance of a skill in another sport. 	1-2
A valid example is included such as: <ul style="list-style-type: none"> tackling in rugby will help in AFL <li style="text-align: center;">or evasion skills to avoid being tackled are used in rugby and AFL 	1
Total	3
Accept other relevant answer.	

- (b) Provide **three** reasons for the difference in intensity and volume among the three periods.

(3 mark)

Description	Marks
Off-season Low – medium intensity and low volume allows for the body to recover from previous season or reduce detraining of (or maintain some) aerobic fitness	1
Pre-season Medium – high intensity and high volume allows for improvement in aerobic fitness/develop aerobic base.	1
In-season High intensity and medium volume allows for maintenance.	1
Total	3

- (c) Justify the difference in the nutritional considerations between the off-season and in-season. (4 mark)

Description	Marks
Any two of the following: Off-season <ul style="list-style-type: none"> • Has highest % of fat because for low – medium intensity the body prefers to use fats. • Has low % protein because the muscles are not requiring repair after intense exercise. • Has lowest % of carbohydrate because low intensity of training occurs whereby the body prefers to use fats as a fuel source. 	1–2
Any two of the following: In-season <ul style="list-style-type: none"> • Has high intensity hence the increased use of glycogen as fuel source meaning increase in % of carbohydrates. • High intensity causes more damage to muscles hence increased % protein for muscle repair. • In-season involves competition as well as training so increase in carbohydrates & protein is needed for faster recovery. • % fat has decreased because fat takes a long time to break down for a fuel source so is inefficient at high intensity. 	1–2
Total	4
Accept other relevant answer.	

Section Three: Extended answer

30% (30 Marks)

Question 29

(15 marks)

- (a) Describe **five** physiological changes the players would have experienced when playing in these very hot conditions. (10 marks)

Description	Marks
Increase in core body temperature <ul style="list-style-type: none"> due to outside temperature and body's metabolism whilst exercising or <ul style="list-style-type: none"> due to inadequate homeostasis via other systems or <ul style="list-style-type: none"> due to competition for blood between the muscles and the skin 	1-2
Increase in heart rate (cardiac drift) <ul style="list-style-type: none"> elevated body temperature means blood must go to the skin to allow heat loss as well as muscles to continue exercising or <ul style="list-style-type: none"> due to reduced blood volume/stroke volume 	1-2
Increased cardiac output <ul style="list-style-type: none"> due to the body needs to increase the blood supply to go to the muscles as well as the skin. 	1-2
Decreased cardiac output <ul style="list-style-type: none"> due to stroke volume decreasing the body is unable to keep up the demand for blood 	
Increase in sweating <ul style="list-style-type: none"> due to the body losing heat through evaporation 	1-2
Decrease stroke volume <ul style="list-style-type: none"> due to the reduction in blood volume through the loss of sweat 	1-2
Increase in blood pressure <ul style="list-style-type: none"> due to increased blood viscosity/reduced blood volume resulting from the body sweating 	1-2
Increased peripheral blood flow <ul style="list-style-type: none"> due to blood being redirected to the skin to dissipate heat through convection 	1-2
Vasodilation of blood vessels in skin <ul style="list-style-type: none"> due to blood being redirected to the skin to dissipate heat through convection 	1-2
Increased respiration/ventilation <ul style="list-style-type: none"> due to blood being diverted to skin the muscles require more O₂ delivered to them 	1-2
Increase skin temperature <ul style="list-style-type: none"> due to radiation of the sun, conduction and convection 	1-2
Decrease blood/plasma volume <ul style="list-style-type: none"> due to the increase in sweating or <ul style="list-style-type: none"> Increase blood viscosity – blood viscosity is a measure of the resistance of blood to flow. It can also be described as the thickness and stickiness of blood. 	1-2
Increase blood viscosity <ul style="list-style-type: none"> due to the reduction in blood volume through the loss of sweat 	1-2
Total	10

- (b) Outline **five** strategies the coach could have used to ensure the players were training safely in these hot conditions. (5 marks)

Description	Marks
Any five of the following strategies indicating either when, why, where, how or what.	
<ul style="list-style-type: none">• Hydration (pre, during)• Ingestion of slushies• Wearing ice vests• Frequent rest breaks• Spray fans/bottles• Cold water immersion• Wear minimal clothing that is light in colour and thin• Protection from the sun – using shade, hat, sunscreen• Avoid training during the heat of the day ie. moving session to early in the day or early evening• Reduce training volume/intensity/duration	1–5
Total	5

Question 30

(15 marks)

Analyse the biomechanical concepts the skier in the above photograph can apply while in the air to aid in the execution of the forward somersault, include a graph to support your analysis.

(15 marks)

Description	Marks
	1-5
<p>Moment of Inertia (MOI) is identified as a biomechanical concept in skier performing the somersault.</p>	1
<p>Answer includes one of the following points in discussing MOI</p> <ul style="list-style-type: none"> Resistance of a body to changing its angular acceleration/resistance to rotation. <p style="text-align: center;">or</p> <ul style="list-style-type: none"> Product of mass and its distance from the axis of rotation²/distribution of mass from axis of rotation 	1
<p>Provides an example of how MOI effects the trick:</p> <ul style="list-style-type: none"> Skier tucks in tight during the somersault to reduce MOI <p style="text-align: center;">and</p> <ul style="list-style-type: none"> Skier opens out his torso and legs late in the jump to increase MOI to slow rotation so they can land effectively. 	1-2
<p>Angular Momentum is identified as a biomechanical concept in skier performing the somersault.</p>	1
<p>Answer includes one of the following points in discussing Angular Momentum:</p> <ul style="list-style-type: none"> The quantity of angular rotation/motion of a body. <p style="text-align: center;">or</p> <ul style="list-style-type: none"> Product of moment of inertia and angular velocity. 	1
<p>Example of how Angular momentum effects the trick:</p> <ul style="list-style-type: none"> Angular Momentum will stay the same in flight as there aren't any other forces acting on the skier. 	1
<p>Angular Velocity is identified as a biomechanical concept in skier performing the somersault</p>	1
<p>Answer includes one of the following points in discussing Angular Velocity:</p> <ul style="list-style-type: none"> The rate of change in angular position of a body. <p style="text-align: center;">or</p> <ul style="list-style-type: none"> The rate of rotation of a body around a point. 	1
<p>Example of how Angular Velocity effects the trick:</p> <ul style="list-style-type: none"> Skier tucks in tight during the somersault to increase their Angular Velocity. <p style="text-align: center;">or</p> <ul style="list-style-type: none"> Skier opens out his torso and legs late in the jump to reduce their angular velocity so they can land effectively. 	1
Total	15

Question 31

(15 marks)

- (a) Identify and outline the leadership styles Tony might use in his coaching. For each style provide an example of when it would be used **most** effectively.

(9 marks)

Description	Marks
<p>Identifies Authoritarian style (1 mark) Includes one of the following points in discussing Authoritarian style (1 mark):</p> <ul style="list-style-type: none"> • the coach makes all the decisions and the players merely do what they are told. <p style="text-align: center;">or</p> <ul style="list-style-type: none"> • This coach has all the knowledge and is a strong disciplinarian who likes to be in control. <p>Provides a relevant example for the Perth Glory whereby any of the following circumstances exist (1 mark):</p> <ul style="list-style-type: none"> • Lack of time (need for quick decisions) • Need for safety • Strict discipline is required • The coach must make the decision on his own 	1–3
<p>Identifies Democratic style (1 mark) Includes one of the following points in discussing Democratic style (1 mark):</p> <ul style="list-style-type: none"> • The coach involves players in decision-making. <p style="text-align: center;">or</p> <ul style="list-style-type: none"> • The coach will guide players towards selecting and achieving their goals, seeking player input. <p>Provides a relevant example such as (1 mark):</p> <ul style="list-style-type: none"> • Practicing a corner kick-in drill the coach asks players for input about the drill. • During match simulation training the coach stops the game and asks questions about players positioning and tactics being used. 	1–3
<p>Identifies Laissez-faire style (1 mark) Includes one of the following points in discussing Laissez-faire style (1 mark):</p> <ul style="list-style-type: none"> • The coach makes few decisions allowing players to take ownership and make the decisions. <p style="text-align: center;">or</p> <ul style="list-style-type: none"> • The coach makes little organised attempts to influence or coach. <p>Provides a relevant example such as (1 mark):</p> <ul style="list-style-type: none"> • The coach steps back and hands control over to the players to identify leaders of the team. • The coach wants to develop players' problem-solving capacity by allowing them to work out strategies in mini-games/drills. 	1–3
Total	9

- (b) Tony Popovic had the Perth Glory staff record the players during training and matches. Outline **six** benefits of using video analysis. (6 marks)

Description	Marks
<p>Any six of the following dot points:</p> <ul style="list-style-type: none"> • The performance of a player can be compared side by side against an exemplar. • The coach can replay the video footage many times in case anything was missed on the first viewing. • Track progress - the footage can be stored and referred back to as a means to measure improvement. • Video can be zoomed in to pick up on greater detail. • Video can be slowed down frame by frame making it easier to notice errors. • Less trials are required to accurately make an analysis making the process more efficient and less time consuming. • More than one athlete can be filmed in the one shot making the process more efficient. • Players learn faster because they can be shown where they need to improve. • Coaches can see and correct injury prone behaviours, teaching new techniques to correct bad habits. • Is a form of visual feedback for the athlete. • Easier to use an observational checklist. 	1–6
Total	6

Question 32

(15 marks)

- (a) Discuss how the West Coast Eagles' trainer would use qualitative analysis for Nic's rehabilitation program to return him back to the skill level he had before his injury. Fill in the blanks in the qualitative analysis model below and use it to assist you with your discussion. (9 marks)

Description	Marks
Model filled in completely – Step 1. <i>Preparation</i> , Step 2. <i>Observation</i> , Step 3. <i>Evaluation</i> , Step 4. <i>Intervention</i>	1
Preparation <ul style="list-style-type: none"> Trainer gathers relevant knowledge about the activity, the performer, and then selects an observational strategy. Trainer prepares/selects a checklist outlining the key points of the technique/movements that Natanui would need to perform. 	1–2
Observation – any two of the following: <ul style="list-style-type: none"> Trainer would decide on best angle/s to view Nic performing movements Trainer decides how many times to observe and under what conditions Trainer gathers data and information from observing the performance of the movement. 	1–2
Evaluation <ul style="list-style-type: none"> Trainer would use his checklist to mark off what Nic is doing correctly, incorrectly or not at all Trainer identifies strengths and weaknesses of performance Trainer prioritises the potential interventions. 	1–2
Intervention <ul style="list-style-type: none"> Trainer provides feedback and corrections to improve performance. Trainer explains methods to improve weaknesses. (1 mark) 	1–2
Total	9

- (b) With reference to the information above, justify the predominant muscle fibre type that would be expected to be found in each player. (6 marks)

Description	Marks
<p>Justifies Andrew Gaff having predominantly Type I muscle fibre types by <u>discussing</u> any three of the following:</p> <ul style="list-style-type: none"> • Slow contraction speed which allows Andrew to perform endurance/submaximal activities • Uses aerobic energy system which allows Andrew to run continuously • Low force of contraction for extended periods which allows Andrew’s muscles to contract repeatedly for continuous activity • High capacity for ATP production that provides ATP for more muscle contractions • Fatigue resistant which allows Andrew to run for longer periods without tiring • High oxidative density – increase aerobic ATP production/greater oxygen diffusion to working muscles 	1–3
<p>Justifies Nic Naitinui Type IIb by <u>discussing</u> any three of the following points -</p> <ul style="list-style-type: none"> • Larger cross-sectional area which allows for greater muscle force and power to be generated in his jumps • High force of contraction which allows for Nic to produce greater power in his jumps • Fast contraction speed which allows for Nic to produce greater power in his jumps • Low resistance to fatigue/fatigues quickly as Nic isn’t able to run as long as Andrew • Uses the anaerobic energy system and therefore provides fast production of ATP allowing for fast contractions in Nic’s muscles 	1–3
Total	6

ACKNOWLEDGEMENTS

- Question 21(b)** Lever of the players neck graph provided by courtesy of a member of the examining panel
- Question 29(a)** Under answers could include (16th dot point): Blood viscosity [Definition]. In *Wikipedia*. Used under Creative Commons Attribution-ShareAlike licence
- Question 30** Execution of the forward somersault graph provided by courtesy of a member of the examining panel

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303 Sevenoaks Street
CANNINGTON WA 6107*