



PHYSICAL EDUCATION STUDIES

ATAR course examination 2018

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

14% (20 Marks)

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

Section Two: Short answer

50% (64 Marks)

Question 21

(9 marks)

- (a) Name the structures that are labelled on the diagram above. (5 marks)

Description	Marks
A: perimysium	1
B: muscle fibre	1
C: epimysium	1
D: fascicle	1
E: myofibril	1
Total	5

- (b) Define the 'all or none' principle and describe how the basketball player is able to control the forcefulness of her skeletal muscle contractions to perform a fast, penetrating pass. (4 marks)

Description	Marks
Provides a definition of the all or none principle such as: When motor unit receives stimulation/impulses/action potential to threshold. (1 mark) and All the muscle fibres associated with a motor unit will contract to their maximum level (all the same time). (1 mark)	1-2
Describes: The number of motor units/muscle fibres recruited is related to the amount of speed/force produced. and Answers a correct reference to passing the ball with increased speed/force.	1-2
Total	4

Question 22

(10 marks)

(a) Identify the condition that each graph represents.

(4 marks)

Description	Marks
Graph A – resting	1
Graph B – exercise at room temperature	1
Graph C – exercise in the heat	1
Graph D – exercise in the cold	1
Total	4

(b) Justify why you chose the graphs that represent ‘exercising in the heat’ and ‘exercising in the cold’.

(6 marks)

Description	Marks
Justification for choice of graph for hot conditions	
Blood distribution to skin is highest in Graph C due to vasodilation occurring.	1
The reason blood flow to skin increases is to allow heat to escape/dissipate from the body.	1
Heat loss mechanism of convection/evaporation/radiation is related to blood distribution to the skin.	1
Justification for choice of graph for cold conditions	
Blood distribution to skin is least in Graph D due to vasoconstriction occurring.	1
Blood distribution to internal organs is highest in Graph D while exercising.	1
Redistribution of blood from skin and muscles to internal organs is to retain heat in the body/maintain core body temperature. or Blood not going to the skin prevents the loss of heat through the mechanisms of convection/evaporation/radiation.	1
Total	6

Question 23

(6 marks)

- (a) Describe the category of transfer of learning that Max has experienced. (2 marks)

Description	Marks
Comprehensive description of skill to skill transfer of learning	2
Basic description of skill to skill transfer of learning	1
Total	2
Answers may include: Skill-skill transfer of learning – skill developed in one sport has an influence on a skill in another sport. (1 mark) Reference to Max's skill of kicking a ball a long distance in the AFL meets/matches the requirements of the punter in gridiron. (1 mark)	

- (b) Identify **two** other categories of transfer of learning and provide an example of what Max might experience for each category. (4 marks)

Description	Marks
Type of transfer of learning – theory to practice	1
Appropriate example – Max's coach goes through a set play on the whiteboard before a game or at a break, Max then goes and performs the set play. (or similar example that refers to Max)	1
Type of transfer of learning – training to competition	1
Appropriate example – During a training session Max practices his kicking/punting under pressure so he replicates competition/game conditions. He then performs the same skill during the game. (or similar example that refers to Max)	1
Total	4

Question 24

(8 marks)

- (a) Explain how the biomechanical principle of force-time is applied by the bowstring to project the arrow effectively to the target. (4 marks)

Description	Marks
Explains biomechanical principle of force-time, and application of principle to archery including the following:	
The further back the bowstring is drawn (1 mark) and The more/greater time the force of the string/bow can be applied to the arrow. (1 mark)	1–2
The greater the impulse (change in momentum) applied to the arrow (1 mark) and The faster and further/straighter it will travel. (1 mark)	1–2
Total	4

- (b) Outline **two** mental skill strategies Alec could have used during the event and outline how each would have reduced the stress he may have experienced. (4 marks)

Description	Marks
For each strategy students must: <ul style="list-style-type: none"> outline the strategy – 1 mark outline how the strategy reduces stress – 1 mark 	
<ul style="list-style-type: none"> Self-talk by saying a positive statement to himself prior to each shot. Reduces stress by making him feel that he is good enough to meet the demands of hitting the target 	1–2
<ul style="list-style-type: none"> Relaxation by performing an activity/strategy/technique such as controlled breathing, to reduce stress/tension during the event. This reduces the impact of stress by minimising the physical effects on Alec such as increased heart rate, muscle tension etc. 	1–2
<ul style="list-style-type: none"> Performance routines by doing a ritual/sequence of actions exactly the same thing such as tapping his leg before each shot. Reduces the stress response as it gives belief that he is in full control and therefore stops the physical effects of the stress response from occurring. 	1–2
<ul style="list-style-type: none"> Imagery by visualising performing the perfect shot prior to taking his shot. Reduces stress by making him feel that he is good enough to meet the demands of hitting the target. 	1–2
<ul style="list-style-type: none"> Goal Setting by setting small/short term performance related objectives or focusing on one shot at a time (rather than the overall result). Reduces the stress response as it gives performance related objectives, therefore stops the physical effects of the stress response from occurring 	1–2
Total	4

Question 25

(5 marks)

- (a) Justify the sloped design of the new starting blocks in relation to the biomechanical principle of balance. (2 marks)

Description	Marks
Identifies the slope design of the block moves swimmer's line of centre of gravity closer towards the front of the block (closer to outside of base of support).	1
Identifies this position makes the swimmer less stable meaning they can leave the block faster/quicker.	1
Total	2

- (b) In relation to the biomechanical principle of force-motion, explain how the raised lip at the rear of the block improves the performance of the swimmer. (3 marks)

Description	Marks
The raised lip allows force to be applied by the swimmer in more of the horizontal direction rather than the vertical.	1
A decrease in the swimmer's times occurs because the new blocks allow swimmers to increase their starting acceleration (1mark) And either of the following: Producing more force in the direction the swimmer needs to go. (1mark) or Ground reaction force is made more horizontal. (1 mark).	1-2
Total	3

Question 26

(8 marks)

- (a) Use the information provided to identify the **most** relevant biomechanical concept that Jeannette needs to understand to choose the best stick. (1 mark)

Description	Marks
Moment of inertia	1
Total	1

- (b) Apply your knowledge of the above biomechanical concept to justify which stick you would suggest Jeanette should select. (4 marks)

Description	Marks
Justification includes	
<ul style="list-style-type: none"> Identifies 'Diabelek' as best stick for Jeanette. 	1
<ul style="list-style-type: none"> Identifies the Diabelek stick is shorter or lighter (1 mark) meaning it has a lower/decreased moment of inertia (1 mark) 	1-2
<ul style="list-style-type: none"> The Diabelek stick will be easier to swing/move/control for a beginner. 	1
Total	4

- (c) Social loafing can occur in a lacrosse team. What is social loafing? Provide **two** examples of how a coach can minimise it. (3 marks)

Description	Marks
States social loafing is where an individual reduces their effort within a team.	1
Identifies any two of the following examples:	
<ul style="list-style-type: none"> The coach can provide regular feedback to individuals At training the coach breaks the team into smaller groups for practice drills The coach can set team goals for skill/fitness targets for training sessions or over the off season The coach can set individual goals for each player The coach can create clearly defined roles and expectations for the team Set goals for subgroups i.e. defenders, forwards or midfielders Make individuals accountable for effort by publishing results/stats/KPIs for the team. <p>(or any other relevant answer)</p>	1-2
Total	3

Question 27

(8 marks)

- (a) Ignoring the legal ramifications of using anabolic steroids, justify if this advice is correct or not for a marathon runner. (3 marks)

Description	Marks
States anabolic steroids are not going to improve her performance/advice is incorrect.	1
Justification includes:	
<ul style="list-style-type: none"> The race is conducted over a long period of time requiring the aerobic energy system/is an aerobic activity. The marathon does not require a strength/power advantage. Increased muscle will increase weight and decrease running performance. 	1-2
Total	3

- (b) Identify **three** physiological side effects Cynthia could experience from using anabolic steroids. (3 marks)

Description	Marks
1 mark for each physiological affect.	
<ul style="list-style-type: none"> Deepening of the voice Breast atrophy (decrease in breast size) Hypertrophy of the clitoris Alopecia/hair loss/baldness Excessive hair growth of i.e. hair on the face, stomach and upper back (Hirsutism) Abnormal menstrual cycles/amenorrhea/infertility Acne Liver disease/cancer/dysfunction/damage Kidney disease/malfunction/difficulty urinating Raised cholesterol Cardiovascular risks including hypertension (high blood pressure)/heart attack/stroke 	1-3
Total	3

- (c) Other than anabolic steroids, name **two** other categories of performance enhancers. (2 marks)

Description	Marks
1 mark for naming:	
Protein powders.	1
Stimulants.	1
Total	2

Question 28

(10 marks)

- (a) For which weeks has Ahmed's coach applied the training principle of recovery? (1 mark)

Description	Marks
Week 5 and Week 9	1
Total	1

- (b) During week nine, one of the swimmers complains to the coach that his shoulder is sore. Which athlete is
- more**
- likely to have injured his shoulder? (1 mark)

Description	Marks
Daniel	1
Total	1

- (c) In relation to the training program, identify and explain the cause of the injury. (3 marks)

Description	Marks
Identifies – Overtraining	1
Explanation includes:	
<ul style="list-style-type: none"> Overtraining is occurring because the volume is too high for Daniel to recover from. or Not enough recovery time has been given to Daniel. <p style="text-align: center;">And any of the following:</p> <ul style="list-style-type: none"> Periodisation/progressive overload has not been appropriately/correctly applied because too big an increase in volume has been applied without appropriate rest/recovery. The overload from week 1 to week 2 has more than tripled (too large an increase). or Week 6, 7 and 8 too large a volume change. 	1–2
Total	3

- (d) Identify
- two**
- psychological symptoms the athlete may have experienced prior to the injury occurring? (2 marks)

Description	Marks
Identifies any two of the following:	
<ul style="list-style-type: none"> Irritable/moody Loss of motivation/competitive drive decrease arousal level Lack/decrease of concentration decrease self-esteem/confidence Feeling of depression/increased anxiety/stress 	1–2
Total	2

- (e) With reference to periodisation, identify and explain the training strategy you would advise the coach to apply in weeks 13 and 14 of the training program to ensure that Daniel and Ahmed perform at their optimum level at the National Championships. (3 marks)

Description	Marks
Identifies – Tapering	1
Explanation includes:	
Tapering as reduction in training volume.	1
Tapering as increasing/maintaining training intensity.	1
Total	3

Section Three: Extended answer

30% (30 Marks)

Question 29

(15 marks)

(a) Identify the image with the **more** aerodynamic position and justify your response by discussing the following points:

- The type of drag being minimised
- The **two** different types of fluid flow seen in the images and how they affect drag.

(7 marks)

Description	Marks
Identifies Image 1 as the most aerodynamic	1
Identifies type of drag being minimised is form/pressure drag	1
Discussion includes:	
Form/pressure drag is the drag created by a pressure difference between the front and rear of the cyclist moving through fluid/air. or Drag resulting from the build-up of high pressure at the front of the cyclist and low pressure at the rear.	1
Form/pressure drag can be minimised by reducing the cross-sectional area of cyclist i.e. crouching over the bars being more streamline.	1
Identifies Laminar flow as when a fluid flows in layers (parallel lines) or Identifies Laminar flow as the smooth flowing smoke moving over the cyclist.	1
Identifies Turbulent flow as when fluid flows in an irregular pattern causing mini whirlpools/swirls or Identifies Turbulent flow as the swirly smoke behind the rider in Image 2.	1
Identifies the relationship between type of flow and drag experienced i.e. Turbulent flow increases the pressure differential in front and behind the rider to increase drag or Turbulent flow creates a low pressure system at the rear of the rider and a high pressure system in front of the rider causing the high pressure to move to the rear thus increasing drag.	1
Total	7

- (b) With reference to the sliding filament theory, describe how a muscle contraction occurs in the legs of a cyclist to create movement. Your answer must describe what happens from when the muscle receives the initial neural impulse to when it relaxes. (8 marks)

Description	Marks
Any 8 of the following points:	
Calcium is released and enters the sarcomere or Calcium released from the sarcoplasmic reticulum	1
Actin reveals binding site for myosin head to connect or Calcium binds to troponin and moves the tropomyosin to reveal a binding site for myosin head to connect or Myosin is stimulated to reach for actin	1
Myosin attaches to actin filaments creating a cross bridge	1
Breakdown of ATP releases energy to stimulate cross bridges	1
Cross bridges/myosin pull on the actin	1
Sarcomere/muscle fibre shortens as actin filaments move closer together.	1
Z line is pulled closer together/actin and myosin overlap causing I Band and H Zone to disappear	1
ATP releases energy causing myosin to detach from actin and cross-bridge is broken or Myosin detaches from actin and cross-bridge is broken or Calcium leaves the sarcomere or Sarcomere/muscle fibre relaxes due to neural impulse ending.	1
Total	8

Question 30

(15 marks)

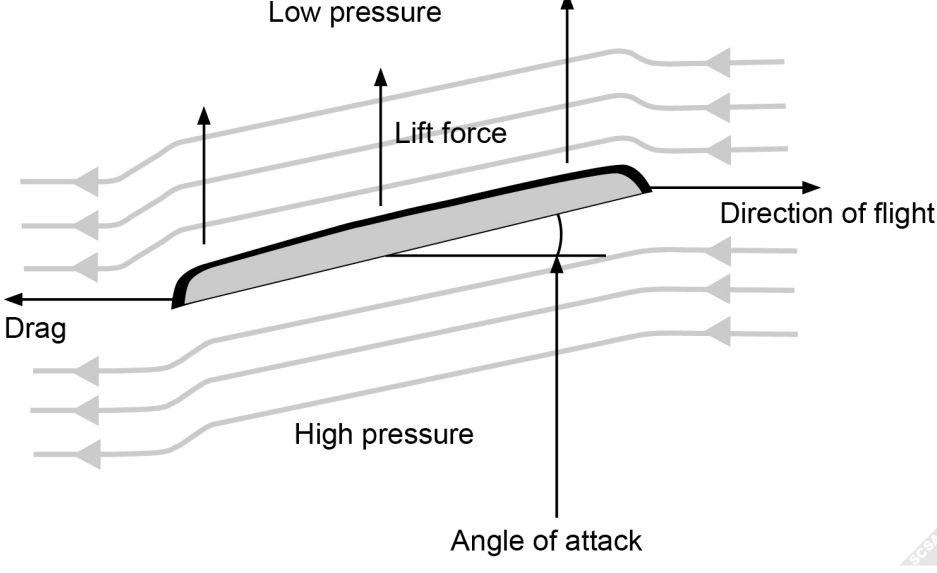
Cross-country skiers need to be sufficiently fueled to perform at their optimal level. Discuss the nutritional strategies the athlete should employ before, during and after the race to ensure that they perform at their best and assist in their recovery.

Description	Marks
1 mark for a dot point identified under each section (min 1 point for each section)	
<p>Before race</p> <ul style="list-style-type: none"> • Carbohydrate loading maximises athletes muscle glycogen stores prior to race. • Carbohydrate loading is used in conjunction with tapering. • Low GI foods/carbohydrate are used to carbohydrate load. • Low GI foods/carbohydrate release glucose slowly into the blood stream. • Athletes should consume 10 – 12 g of carbohydrate per kg of body mass to carbohydrate load effectively. • Pre-performance meal of low GI food/carbohydrate should be eaten 2-4 hours before race. • Immediately before the race the athlete can consume high GI food to top up blood glucose. • Avoid high fibre foods and/or avoid high fat foods. • Athlete needs to be hydrated/athlete drinks 200 – 600ml before event/up to 1l an hour before race. 	1–15
<p>During race</p> <ul style="list-style-type: none"> • Glycogen stores become depleted during the event and need to be replenished. • Athlete should consume 30 - 60 g carbohydrate per hour. • Carbohydrate should be high GI. • Avoid high fibre foods and/or avoid high fat foods. • 'Carbohydration' as the practice meeting the refuelling requirements outlined above, and at the same time replaces any fluids lost through sweat. • Ingest electrolytes to decrease cramps/dehydration. • Athletes need to maintain hydration by consuming 500 - 1000 ml of fluid per hour (200-300 ml every 15-20 mins). 	
<p>After the race</p> <ul style="list-style-type: none"> • Athlete must consume carbohydrate immediately after the event or be within 30 mins of completion. • Carbohydrate should be high GI. • Low GI meal should be consumed 4-6 hours after event to further replenish glycogen stores. • Protein needs to be consumed to aid in the repair of muscle tissue. • Ingest electrolytes to replace essential minerals and assist recovery • Athlete replaces lost fluid. 	
Total	15

Question 31

(15 marks)

- (a) A key element of the game is the frisbee flying smoothly through the air. In reference to the frisbee's performance in the air, explain how Bernoulli's principle assists in keeping the frisbee in the air longer and thus enhancing the distance it travels. Draw and label a diagram to assist your explanation. (5 marks)

Description	Marks
 <p>The diagram shows a frisbee flying from left to right. Air flow lines are shown curving around the frisbee. The top surface is labeled 'Low pressure' and the bottom surface is labeled 'High pressure'. An upward arrow from the center of the frisbee is labeled 'Lift force'. A horizontal arrow pointing left from the front of the frisbee is labeled 'Drag'. An arrow at the bottom indicates the 'Direction of flight' to the right. The angle between the horizontal flight direction and the top surface of the frisbee is labeled 'Angle of attack'.</p> <ul style="list-style-type: none"> Identifies low and high pressure correctly in diagram Correctly labels lift force in diagram. (Diagram can show frisbee flying horizontal) <p>NOTE: diagram must have direction of flight/travel identified</p>	<p>1-2</p>
Discussion of explanation contains:	
<ul style="list-style-type: none"> Bernoulli's principle states the velocity of the fluid flow determines the pressure system. (For objects moving through a fluid - fast velocity = low pressure and slow velocity = high pressure). High pressure systems move to low pressure system causing a lift force on the frisbee. 	<p>1-2</p>
<p>Either one of the following:</p> <ul style="list-style-type: none"> Shape of the frisbee allows low velocity and high pressure to be created underneath and high velocity and low pressure on top. The angle of attack is required to create lift. 	<p>1</p>
Total	5

- (b) Discuss the elements of periodisation the coaches would apply to the training program, starting from the end of the National Tournament and going through to the World Championships. (10 marks)

Description	Marks
<ul style="list-style-type: none"> • States a macro cycle is the whole training program over the 12 months broken up into blocks of time/weeks consisting of off-season, pre-season and in-season. 	1
<ul style="list-style-type: none"> • States a micro cycle is the shortest training cycle, typically lasting a week with a number of micro cycles making up a training season/phase e.g. off-season, pre-season and in-season. 	1
<p>Discussion of off-season</p> <ul style="list-style-type: none"> • Off-season is the phase of training designed to provide the athlete with both a physiological and psychological rest from the rigors of competition and training. • Athletes should remain reasonably active through involvement in a range of recreational and low-intensity training activities. • If athletes have been injured during in-season, off-season is the time to focus on their rehabilitation and focus on how they can prevent the injury reoccurring in the next in-season. • A coach could review/evaluate previous season to make changes for upcoming season. 	1–3
<p>Discussion of pre-season</p> <ul style="list-style-type: none"> • The purpose of pre-season training is to prepare the athletes for the demands of the upcoming season. • Pre-season should be designed to focus on improving aerobic conditioning (fitness) plus the specific components of fitness required for the team to successfully compete at World Championships. 	1–2
<p>Discussion of in-season</p> <ul style="list-style-type: none"> • The in-season training phase occurs over the week of the World Championships. • The in-season training phase will be developing and refining strategies, tactics and game plans for the championships. • A taper leading into the world championships will occur with the volume of training during the championships decreasing. 	1–3
Total	10

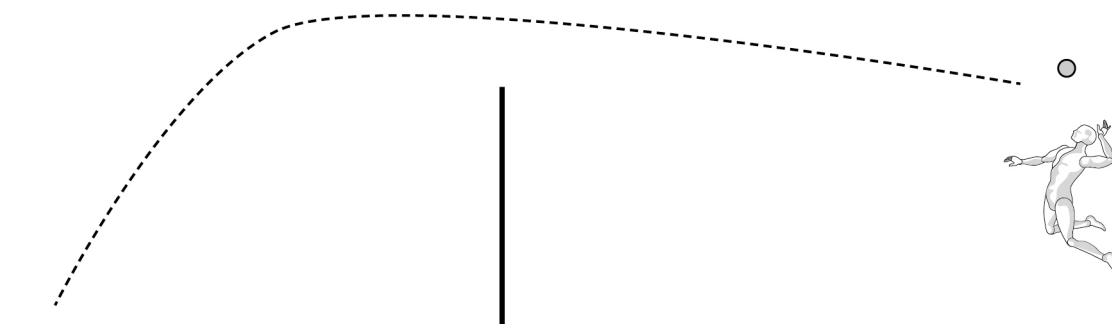
Question 32

(15 marks)

- (a) Discuss how environmental, leadership and personal factors in Carron’s model of group cohesion may have helped the Hornets and Pearls to have a successful 2017 season. (9 marks)

Description	Marks
One mark for a dot point identified under each factor (min of 1 point for each factor)	
<p>Environmental</p> <ul style="list-style-type: none"> • Normative forces that bring a team together. • Factors binding members to a team such as –strict selection process. • Western Australia’s (WA) Volleyball Culture/Governance – WA’s reputation in Volleyball means players have a strong sense of pride associated with playing for the State. • Eligibility to represent the State. • Opportunities for socialising (team training camps and social events). • Group size – Volleyball have a small number of players in a team hence a greater opportunity for players to interact and form relationships with others (or easier to learn to be more cohesive quickly). • Contracts outlining commitment to team. 	1-9
<p>Personal</p> <ul style="list-style-type: none"> • Individual characteristics of team members such as motives for participating – e.g. pride in being recognised as a member of WA’s elite volleyball teams. • Aspirations of being a part of a national team through recognition of representing the state. • Individual differences (abilities to play certain positions to fulfill roles and responsibility). • Self-motivation, affiliation related to being a Hornet or Pearl. • Task motivation related to being a Hornet or Pearl. 	
<p>Leadership</p> <ul style="list-style-type: none"> • The style of leadership used by coaches’ and leaders must meet the expectations of the players. • Relationships are valued by the team, players respect the coach and captain as leadership style meets need of team. • High level/good communication skills of coach and captain influence the development of group cohesion. • The Hornets and Pearls would have a formal leadership group (captain and vice-captains). 	
Total	9

- (b) During a game of volleyball, players can serve by hitting the ball with topspin. On the diagram below, draw the trajectory of a ball served with topspin and write an explanation of how the flight path is affected by the spin of the ball. (6 marks)



Description	Marks
Correct curve of flightpath	1
Explanation includes the following points	
<ul style="list-style-type: none"> Player creates topspin by applying an eccentric force above the centre of the ball. 	1
<ul style="list-style-type: none"> On the top side of the ball the boundary layer of air will be colliding with the oncoming air (or air on top of ball will have low velocity) this creates a high pressure area on the top of the ball. 	1
<ul style="list-style-type: none"> On the bottom side of the ball the boundary layer of air will be moving in the same direction as the air passing by, so there is no collision. (or air on bottom of the ball will have high velocity) this creates a low pressure area on the bottom of the ball. 	1
<ul style="list-style-type: none"> The pressure differential, causes the ball to move in the direction of high pressure to low pressure. 	1
<ul style="list-style-type: none"> The movement from high to low pressure creates a lift force called the Magnus force/effect. 	1
Total	6

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