



ATAR course examination, 2019

Question/Answer booklet

PHYSICAL EDUCATION STUDIES

Place one of your candidate identification labels in this box.
Ensure the label is straight and within the lines of this box.

WA student number: In figures

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In words

Number of additional
answer booklets used
(if applicable):

Time allowed for this paper

Reading time before commencing work: ten minutes
Working time: two and a half hours

Materials required/recommended for this paper

To be provided by the supervisor

This Question/Answer booklet
Multiple-choice answer sheet

To be provided by the candidate

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener,
correction fluid/tape, eraser, ruler, highlighters

Special Items: non-programmable calculators approved for use in this examination

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.



Structure of the examination

The Physical Education Studies ATAR course examination consists of a written component and a practical (performance) component.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of written examination
Section One Multiple-choice	20	20	30	20	20
Section Two Short answer	8	8	70	74	50
Section Three Extended answer	4	2	50	30	30
Total					100

Instructions to candidates

1. The rules for the conduct of the Western Australian external examinations are detailed in the *Year 12 Information Handbook 2019*. Sitting this examination implies that you agree to abide by these rules.

2. Write your answers in this Question/Answer booklet preferably using a blue/black pen. Do not use erasable or gel pens.

3. Answer the questions according to the following instructions.

Section One: Answer all questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Section Two: Write your answers in this Question/Answer booklet. Wherever possible, confine your answers to the line spaces provided.

Section Three: Consists of four questions. You must answer two questions. Write your answers in this Question/Answer booklet.

4. You must be careful to confine your answers to the specific questions asked and to follow any instructions that are specific to a particular question.

5. Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

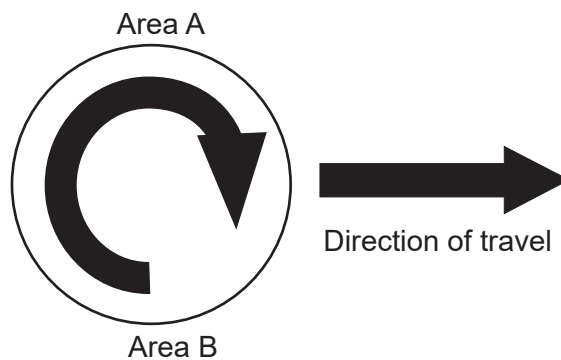
See next page

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

This section has **20** questions. Answer **all** questions on the separate Multiple-choice answer sheet provided. For each question shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 30 minutes.

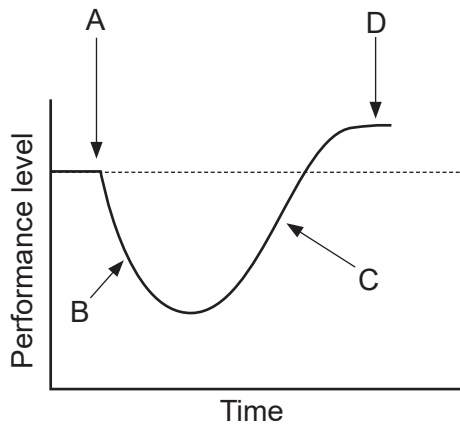
1. In relation to the diagram below, which statement is correct?



- (a) Area A has high pressure with low velocity.
 (b) Area B has low velocity with high pressure.
 (c) Area A has high velocity with high pressure.
 (d) Area B has low pressure with low velocity.
2. Which of the following are physiological effects of the use of anabolic steroids?
- i increase in aggressive behaviour
 ii depression
 iii high blood pressure
 iv acne
 v liver damage
 vi lowered sperm count in males
- (a) iii and iv only
 (b) i, ii, and iv only
 (c) iii, iv, v and vi only
 (d) i, iii, iv, v, and vi
3. Herb Elliott won a gold medal at the 1960 Olympics in the 1500 m race. As part of his training, Herb used a 30 metre sand dune to run up and down a number of times. His coach gradually increased the number of times he ran on the sand dune. This is an example of
- (a) peaking.
 (b) overtraining.
 (c) tapering.
 (d) progressive overload.

See next page

The following diagram represents how training affects an athlete's body and indicates the best time at which progressive overload should be applied.



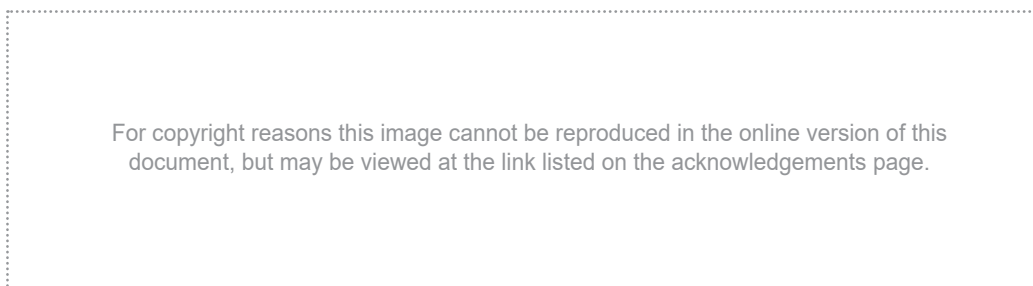
4. Which statement is correct in relation to the diagram above?

	Label A	Label B	Label C	Label D
(a)	training stimulus	adaptation	recovery	fatigue
(b)	training stimulus	fatigue	recovery	adaptation
(c)	training stimulus	fatigue	adaptation	recovery
(d)	training stimulus	recovery	fatigue	adaptation

5. Which of the following altitude training strategies would you advise the members of the West Coast Fever netball team to use to improve their aerobic capacity?

- (a) live high, train high
- (b) live low, train low
- (c) live low, train high
- (d) live high, train low

When tackling, gridiron players apply a force to destabilise the ball carrier and bring them to ground.



6. Which biomechanical concept is the tackler applying to destabilise their opponent in the photograph above?

- (a) torque
- (b) inertia
- (c) Magnus effect
- (d) impulse

See next page

7. For the statements below, identify the correct order of events for the Sliding Filament Theory of muscle contraction.
- i calcium leaves the sarcomere
 - ii actin reveals binding site for myosin head to connect
 - iii breakdown of ATP releases energy to stimulate cross bridges
 - iv calcium enters the sarcomere
 - v Z line is pulled closer together
- (a) i, ii, iii, v, iv
 - (b) i, iii, ii, v, iv
 - (c) iv, ii, iii, v, i
 - (d) iv, iii, ii, v, i

Pawel Poljanski took the following photograph of himself immediately after completing the sixteenth stage of the 2017 Tour de France.

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8. What is the physiological reason for the appearance of Pawel's legs?
- (a) increased vasodilation to allow greater heat loss via conduction and evaporation
 - (b) increased vasodilation to allow greater heat loss via convection and radiation
 - (c) increased vasoconstriction to minimise heat loss via conduction and evaporation
 - (d) increased vasoconstriction to minimise heat loss via convection and radiation
9. Australian Sam Willoughby won a silver medal in the BMX event at the 2012 London Olympic Games. In a freak training accident in 2016 he became a tetraplegic, losing the use of all four limbs and torso. His loss of muscle function in his arms and legs is due to
- (a) damage to the synapse, which prevents calcium from entering the sarcomere.
 - (b) his brain no longer being able to send neural impulses.
 - (c) neural impulses not being able to be sent along the spinal cord to the motor neurone.
 - (d) damage to the dendrites that prevents them sending neural impulses through to the synapse.

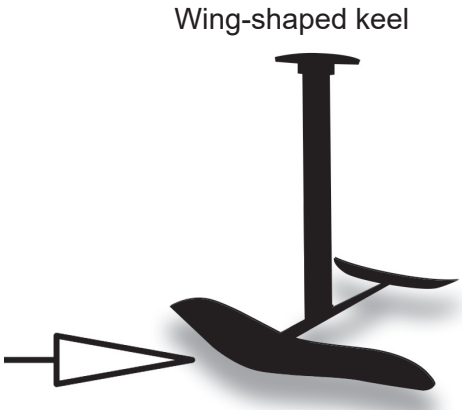
Following the first time-trial of the 2017 Tour de France, rival teams complained that the jerseys worn by Team Sky had been designed to illegally boost aerodynamics. The complaints centred around little bubble pads that were seen on the upper arms of the riders.

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10. A possible reason this jersey may have improved aerodynamics is because it reduces form drag due to
- (a) an increase in turbulent flow on the surface of the jersey, causing earlier boundary layer separation.
 - (b) a decrease in turbulent flow on the surface of the jersey, causing earlier boundary layer separation.
 - (c) an increase in turbulent flow on the surface of the jersey, causing later boundary layer separation.
 - (d) a decrease in turbulent flow on the surface of the jersey, causing later boundary layer separation.

A foilboard is a sailboard with a wing-shaped keel that allows the board to rise out of the water when it moves forward with speed.

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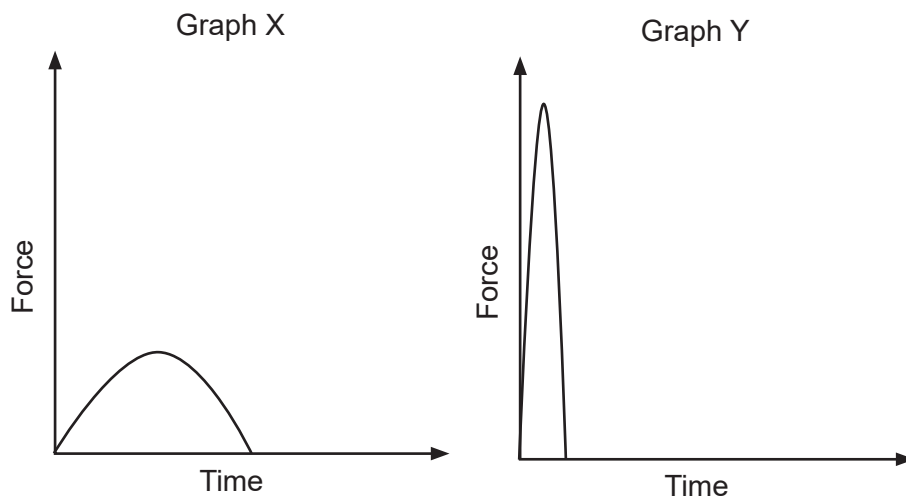
11. The _____ of _____
- (a) Bernoulli's principle, which refers to the effect of the shape of the keel and subsequent pressure differences around it.
 - (b) Bernoulli's principle, which refers to the interaction of the layers of laminar fluid flowing around the keel.
 - (c) Magnus effect, which refers to the effect of the shape of the keel and subsequent pressure differences around it.
 - (d) Magnus effect, which refers to the interaction of the layers of laminar fluid flowing around the keel.

See next page

On 30 November 2018, Craig Moller made history when he debuted for the Australian men's basketball team, the Boomers. This was a historic moment, because he previously played Australian Rules football (AFL) for the Fremantle Dockers, making him the first person to have played both AFL and basketball.

12. Which of the following categories of transfer of learning would Craig have benefited **most** from in playing for the Boomers?
- skill to skill and theory to competition
 - theory to practice and skill to competition
 - skill to skill and training to competition
 - theory to practice and training to competition
13. During the pre-season, a number of AFL teams have training camps, with players, coaches and support staff often travelling interstate or overseas. According to Carron's Model of Group Cohesion, this is an example of which factor?
- personal
 - team
 - leadership
 - environmental

The graphs below represent the impulse-momentum relationship for two sports.



14. Identify the graph that corresponds to the correct sporting application.
- Graph X = drive in golf; Graph Y = penalty kick in soccer
 - Graph X = penalty kick in soccer; Graph Y = wicketkeeper taking a catch
 - Graph X = drive in golf; Graph Y = wicketkeeper taking a catch
 - Graph X = wicketkeeper taking a catch; Graph Y = drive in golf
15. Which statement **best** describes the immediate physiological effect of competing in the extreme cold?
- Peripheral vasoconstriction occurs and the body depletes glycogen stores.
 - Peripheral vasodilation occurs and the body depletes glycogen stores.
 - Peripheral vasoconstriction occurs and the body conserves glycogen stores.
 - Peripheral vasodilation occurs and the body conserves glycogen stores.

See next page

16. In skeletal muscle, which is the correct order from superficial (closest to the skin) to deep?
- (a) epimysium, fascicle, perimysium, muscle fibre, myofibril
 - (b) epimysium, perimysium, fascicle, myofibril, muscle fibre
 - (c) epimysium, perimysium, fascicle, muscle fibre, myofibril
 - (d) perimysium, epimysium, fascicle, muscle fibre, myofibril
17. The coach of a Year 10 interschool netball team is concerned that two of the players are social loafing and not taking training seriously enough. This is affecting the team's performance on game day. What should the coach do to improve this situation?
- (a) Make the team train together as a group.
 - (b) Set team goals for skill and/or fitness targets for training sessions.
 - (c) Discipline the whole squad by having all players run laps of the courts.
 - (d) Do all of the above.

In elite sports, players may use the recovery technique of cryotherapy, whereby players stand for three minutes in a chamber with the temperature hovering around $-130\text{ }^{\circ}\text{C}$.

18. Cryotherapy as a recovery technique enables
- (a) vasodilation to occur and reduces muscle soreness.
 - (b) vasodilation to occur and increases dispersal of waste products in the blood.
 - (c) vasoconstriction to occur and increases dispersal of waste products in the blood.
 - (d) vasoconstriction to occur and reduces inflammation in muscles.
19. Match the body action with the correct lever.

Body action	Type of lever
Plantar flexion to standing on tip-toes	A
Elbow flexion to do a bicep curl	B

- (a) A = second class and B = first class
 - (b) A = second class and B = third class
 - (c) A = third class and B = second class
 - (d) A = first class and B = third class
20. Professional athletes often have access to a high-pressure (hyperbaric) oxygen chamber to aid their recovery. Which of the following physiological responses will result from an athlete using a hyperbaric oxygen chamber?
- (a) reduction of red blood cells
 - (b) reduction of protein synthesis
 - (c) reduction of swelling in muscles
 - (d) reduction in mitochondria

End of Section One

See next page

Section Two: Short answer

50% (74 Marks)

This section has **eight** questions. Answer **all** questions. Write your answers in the spaces provided.

Use a blue or black pen. Do **not** use erasable or gel pens.

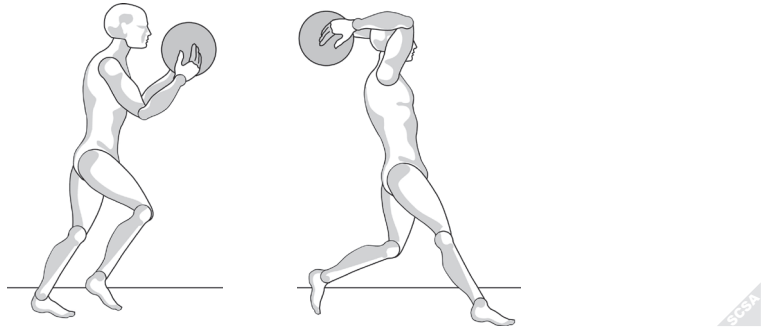
Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 70 minutes.

Question 21

(9 marks)

During the 2018 International Federation of Association Football (FIFA) World Cup, Denmark employed Thomas Grønnemark as a specialist coach for teaching players how to get distance when throwing a soccer ball from the sideline.

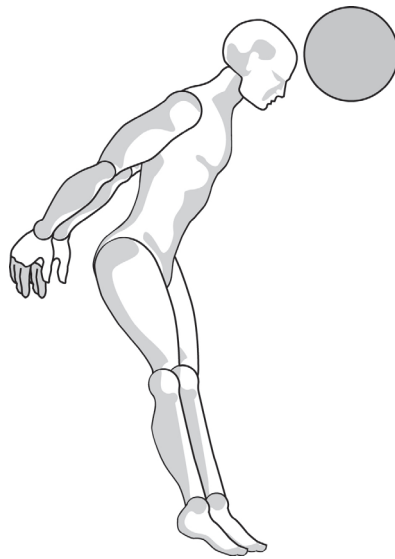


- (a) Identify what type of spin Thomas would suggest the players place on the ball to increase the distance of their throw. Explain how the spin affects the ball’s flight path. (5 marks)

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Question 21 (continued)

Of the 169 goals scored at the 2018 FIFA World Cup, 32 were scored from a player heading the ball.



- (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)

Class of lever: _____

Question 22**(7 marks)**

In 2012, Boxing Australia imposed a six-month sporting ban on a female boxer for the presence and use of stimulants.

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

One: _____

Two: _____

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

One: _____

Two: _____

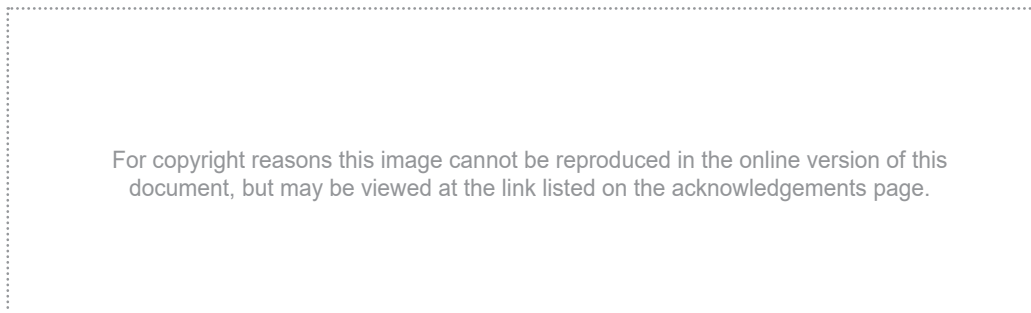
Three: _____

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Question 23

(10 marks)

During the 2018 AFL season, television coverage of a Brisbane Lions game showed footage of the players standing shirtless in the dressing room, prior to putting on their jumpers in unison before the commencement of the game. They did this before each game for the majority of the season.



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

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

Environmental: _____

Personal: _____

Leadership: _____

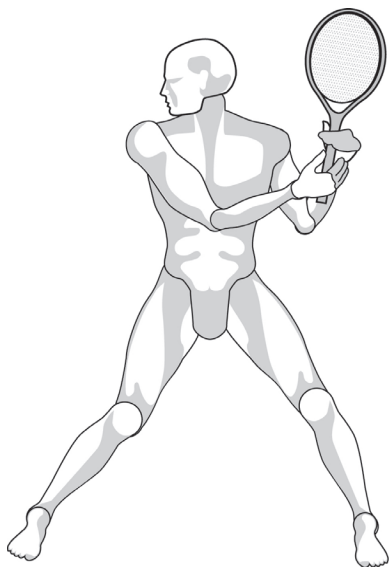
Team: _____

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Question 24

(9 marks)

Use the information below to answer part (a).

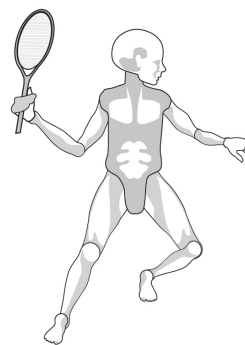


Player A



Tennis ball 1

(Coefficient of restitution = 0.49)



Player B



Tennis ball 2

(Coefficient of restitution = 0.79)

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

(4 marks)

Player A should use tennis ball: _____ Player B should use tennis ball: _____

See next page

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A tennis player's success depends on their rapid detection of the ball and the fast reflexes of their central nervous system (CNS) to produce body movements to intercept and hit the ball.

- (b) Outline the function of the following components of the neuromuscular system that are involved in producing a successful shot. (5 marks)

Dendrites of sensory neurons: _____

Axons of motor neurons: _____

Neuron: _____

Spinal cord: _____

Motor unit: _____

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In the game of rugby union, teams are often involved in a scrum to restart play after a stoppage. This involves the players applying force collectively to move the opposing team.

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

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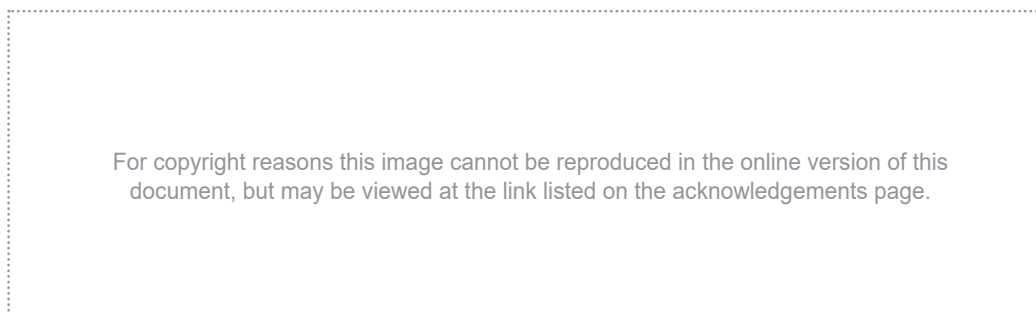
Question 26

(9 marks)

Roger Federer and Victoria Azarenka said that when they were learning to play tennis their coach had them practising forehand by hitting a ball against a wall to themselves.

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

In 1989, the Austrian tennis player, Thomas Muster, was hit by a car. The ligaments in his left knee were damaged severely and required surgery. He was unable to play tennis for five months. Thomas' coach decided to have him use the wooden device as seen in the photograph below.



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

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- (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 follow-through would be the **best**. Explain why you chose this option. (4 marks)

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See next page

Question 27

(11 marks)

In the men’s 100 m backstroke final at the 1988 Seoul Olympics, the eventual medallists gained an advantage over their opponents by swimming the first 35 m of the race underwater. Following this event, the International Swimming Federation (FINA) introduced a rule to restrict swimmers to swim a maximum of 10 m underwater.

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

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

One: _____

Two: _____

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Swimming long course world records

Men		
Athlete	Event	Time
César Cielo	50 m freestyle	20.91 (sec)
Sun Yang	1500 m freestyle	14:31.02 (min)

Women		
Athlete	Event	Time
Sarah Sjöström	50 m freestyle	23.67 (sec)
Katie Ledecky	1500 m freestyle	15:20.48 (min)

- (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)

50 m freestyle: _____

1500 m freestyle: _____

Question 28

(10 marks)

In August 2018, the Carlton Football Club announced that Chloe Dalton and Brooke Walker had signed contracts with the club’s Australian Football League Woman’s (AFLW) team for the 2019 season. The talented duo had previously played with the Australian Womens Rugby 7s team.

- (a) Describe the effect of transfer of learning most likely involved when Chloe and Brooke changed codes. Provide an example to support your answer. (3 marks)

Below is a table showing information about Chloe and Brooke’s training program.

	Off-season	Pre-season	In-season
Intensity of training	low → medium	medium → high	high
Duration of phase	12 weeks	18 weeks	10 weeks
Volume of training	low	high	medium
Nutritional considerations	60% carbohydrates 30% fat 10% protein	65% carbohydrates 22% fat 13% protein	70% carbohydrates 13% fat 17% protein

- (b) Provide **three** reasons for the differences in intensity and volume among the three periods of time. (3 marks)

One: _____

Two: _____

Three: _____

See next page

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

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End of Section Two

See next page

Section Three: Extended answer

30% (30 Marks)

This section contains **four** questions. You must answer **two** questions. Write your answers in the spaces provided.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 50 minutes.

Question 29

(15 marks)

A talented young Western Australian rugby league player died of organ failure brought on by hyperthermia after he collapsed during training when the temperature reached 44.4 °C.

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

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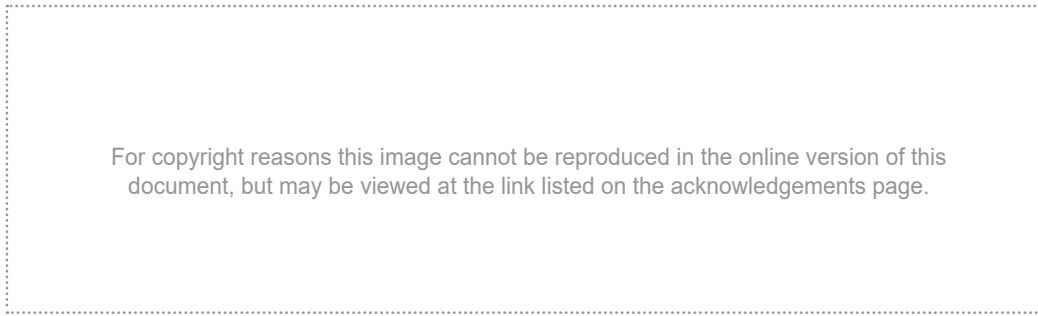
- (b) Outline **five** strategies the coach could have used to ensure that the players were training safely in these hot conditions. (5 marks)

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See next page

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)

See next page

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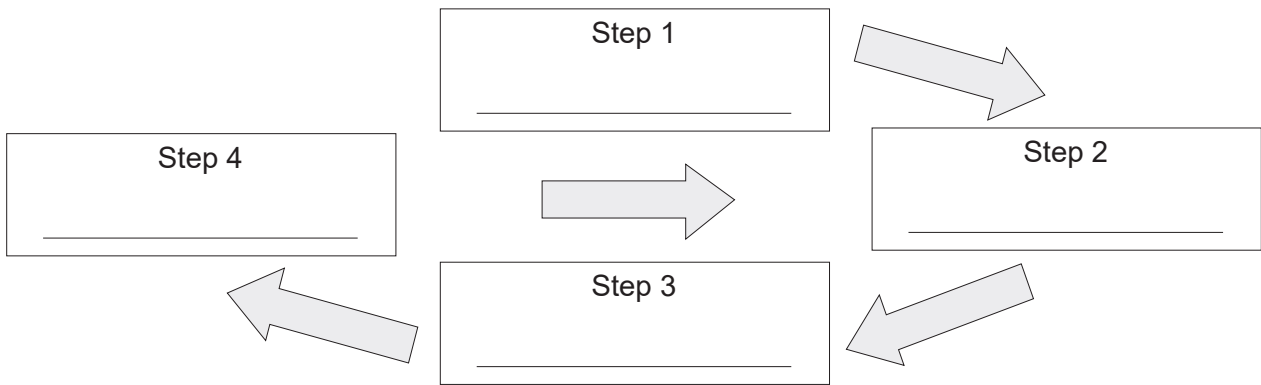
See next page

Question 32

(15 marks)

During round 17 of the 2018 AFL season, Nic Naitanui of the West Coast Eagles tore the anterior cruciate ligament (ACL) in his right knee when he landed awkwardly during a ruck contest.

- (a) Discuss how the West Coast Eagles' trainer would use qualitative analysis for Nic's rehabilitation program to return him 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)



See next page

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Nic Naitanui's teammate, Andrew Gaff is renowned throughout the club as a running machine: his average distance covered per game is 15 kilometres. In comparison to Andrew, Nic doesn't cover as much distance but he is the third fastest player over a sprint and holds the AFL's Draft Testing record for the running vertical jump (102 cm).

- (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)

See next page

Question 32 (continued)

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Supplementary page

Question number: _____

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ACKNOWLEDGEMENTS

- Question 6** Image adapted from: Greule, O. Jr. (2011). *Wide receiver Roddy White is tackled [...]* [Photograph]. Retrieved April, 2019, from <https://www.gettyimages.com.au/detail/news-photo/wide-receiver-roddy-white-of-the-atlanta-falcons-is-tackled-news-photo/127943826>
- Question 8** Image adapted from: p.poljanskiofficial. (2017, July 19). *After sixteen stages I think my legs look tired #tourdefrance* [Instagram photograph]. Retrieved April, 2019, from https://www.instagram.com/p/BWshQ0FhGhY/?utm_source=ig_embed
- Question 10** Image adapted from: Graythen, C. (2017). *Chris Froome of Great Britain and Team Sky crosses the finish line [...]* [Photograph]. Retrieved April, 2019, from <https://www.gettyimages.com.au/detail/news-photo/chris-froome-of-great-britain-and-team-sky-crosses-the-news-photo/805357506?adppopup=true>
- Question 11** Image adapted from: Naish International. (2018). *2018 Naish thrust WS 1 foil & hover 122 foilboard* [Still from video]. Retrieved April, 2019, from <https://vimeo.com/231167177>
- Question 23** Image adapted from: Fox Sports Australia. (2018). *Highlights: Hawthorn v Brisbane* [Still from video]. Retrieved April, 2019, from <https://www.afl.com.au/news/2018-07-14/five-talking-points-hawthorn-v-brisbane>
- Question 25(c)** Image adapted from: quintinsmith_ip. (2015). New Zealand vs Tonga 2015 RWC scrum [Photograph]. In *Wikipedia*. Retrieved April, 2019, from https://commons.wikimedia.org/wiki/File:New_Zealand_vs_Tonga_2015_RWC_scrum.jpg
Used under Creative Commons Attribution 2.0 Generic Licence
- Question 26(b)** Image adapted from: ullstein bild. (1989). *Der österreichische Tennisspieler Thomas Muster trainiert trotz seines Gipsbeines [...]* [Photograph]. Retrieved April, 2019, from <https://www.gettyimages.com.au/detail/news-photo/der-%C3%B6sterreichische-tennisspieler-thomas-muster-trainiert-news-photo/540695325>
- Question 26(c)** Image adapted from: Tennis Australia. (n.d.). *The moment of contact in tennis* [Photograph]. Retrieved May, 2019, from <https://www.feeltennis.net/how-to-hit-a-tennis-ball/>
- Question 30** Image adapted from: Nelson, T. (2018). *We love all awesome things, like this awesome shot of @jackkellner_ on his home turf @spiritmtduluth taken by @nelson_7six3 [...]* [Instagram photograph]. Retrieved April, 2019, from <https://www.instagram.com/p/BhFODRWBoQ3/>

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