



# ATAR course examination, 2022

## 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

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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: up to three calculators, which do not have the capacity to create or store programmes or text, are permitted in this ATAR course 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.

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## 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	7	7	70	56	50
Section Three Extended answer	4	2	50	30	30
<b>Total</b>					100

## Instructions to candidates

- The rules for the conduct of the Western Australian external examinations are detailed in the *Year 12 Information Handbook 2022: Part II Examinations*. Sitting this examination implies that you agree to abide by these rules.
- 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 preferably using a blue/black pen. Do not use erasable or gel pens. 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 preferably using a blue/black pen. Do not use erasable or gel pens.

- 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.
- 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. 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.

Suggested working time: 30 minutes.

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1. A drop shot played in tennis would be **best** executed by placing which type of spin on the ball?
  - (a) side spin
  - (b) no spin
  - (c) back spin
  - (d) top spin
  
2. If the fulcrum of a first-class lever is closer to the resistance, it
  - (a) makes it harder to lift the load.
  - (b) requires the same amount of force the load is applying.
  - (c) is easier to lift the load.
  - (d) means no force is required to lift the load.
  
3. The main function of a sensory neuron is to
  - (a) detect a stimulus and send electrical signals via the spinal cord.
  - (b) transmit electrical signals to the motor neuron.
  - (c) receive information from the dendrites and send them to the motor neuron.
  - (d) detect a stimulus and send the information to the brain for processing.
  
4. With regard to transfer of learning, which of the following **best** describes a coach's aim to continue training in the rain?
  - (a) skill to skill
  - (b) training to competition
  - (c) practice to theory
  - (d) wet-weather training
  
5. Foods with a low glycaemic index rating will release
  - (a) glucose into the bloodstream slowly.
  - (b) glycogen into the bloodstream slowly.
  - (c) glucose into the bloodstream quickly.
  - (d) glycogen into the bloodstream quickly.

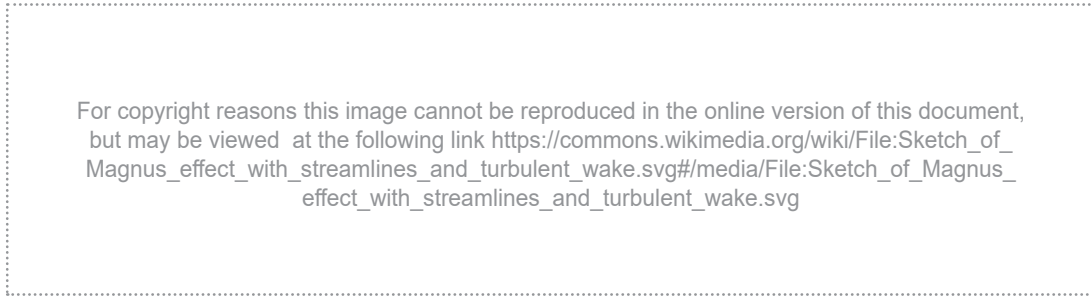
6. When monitoring their progress over time, and planning for future improvement, an athlete would refer to
- (a) a questionnaire.
  - (b) their reflective journal.
  - (c) sensory feedback.
  - (d) a video of an elite player.
7. Which of the following is **not** considered an environmental factor in Carron's model of group cohesion?
- (a) player contracts
  - (b) age of players
  - (c) size of playing group
  - (d) personal desire of players
8. A person serving during a game of volleyball contacts the ball at position X.

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- As a result of this serve the ball will
- (a) dip quickly over the net.
  - (b) float in a straight line over the net.
  - (c) rise going over the net.
  - (d) wobble going over the net.
9. Which structure is the sheath of connective tissue that surrounds the muscle belly?
- (a) myomysium
  - (b) endomysium
  - (c) epimysium
  - (d) perimysium

10. Which part of the skeletal muscle is the largest?
- actin
  - fascicle
  - muscle fibre
  - myosin
11. With reference to the diagram below of a spinning ball, which of the following is correct?

Area (i)



Area (ii)

	Area (i)	Area (ii)
(a)	high pressure, high velocity air	low pressure, low velocity air
(b)	low pressure, high velocity air	high pressure, low velocity air
(c)	high pressure, low velocity air	low pressure, high velocity air
(d)	low pressure, low velocity air	high pressure, high velocity air

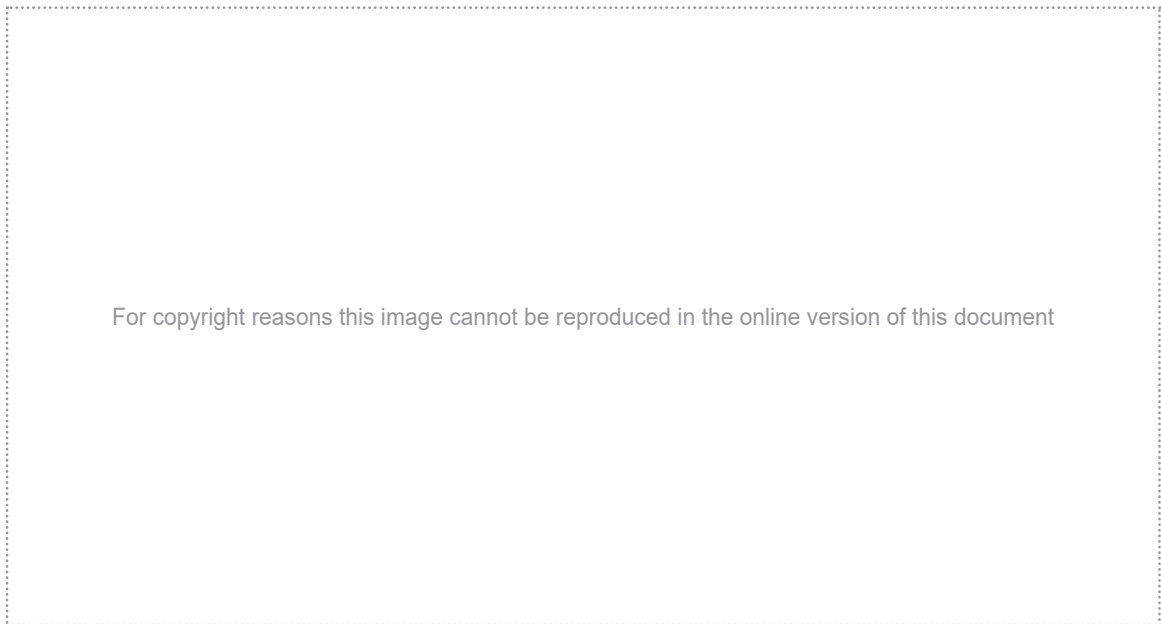
12. A biopsy from a quadriceps muscle of a track athlete found the following characteristics:
- moderate mitochondrial density
  - intermediate capillary density
  - high glycolytic capacity.

Which of the following options is correct?

	Fibre type	Athlete's event
(a)	Ia	400 m
(b)	Ia	100 m
(c)	Ib	400 m
(d)	Ib	100 m

See next page

13. Keegan Palmer won the Men's Park Skateboarding gold medal at the Tokyo Olympic Games. His success hinged on his ability to manage tricks repeatedly that involved spinning in the air. Which of the following remained constant throughout his spinning manoeuvres?
- (a) radial speed
  - (b) angular velocity
  - (c) moment of inertia
  - (d) angular momentum
14. An increased chance of an athlete suffering from osteoporosis is a side effect of which performance enhancer?
- (a) stimulant
  - (b) protein powders
  - (c) anabolic steroids
  - (d) altitude training
15. The graph below shows the typical projectile motion curves of a ball hit by four different golf clubs.

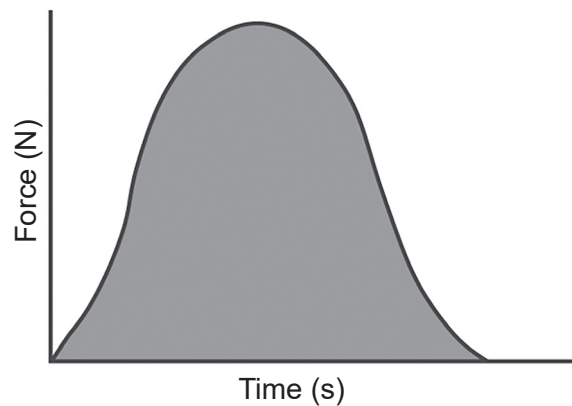


Which statement is correct?

- (a) Club 1 has a greater height of release than Club 3.
- (b) Club 4 has a greater angle of release than Club 2.
- (c) Club 2 has a greater angle of release than Club 3.
- (d) Club 3 has a greater height of release than Club 1.

See next page

16. The Avon Descent is a two-day, 124 kilometre, adventure river race from Northam to Bayswater, in which competitors race in a power boat, kayak or ski. Which is the predominant heat loss mechanism for competitors capsizing during the race and being submerged in the water?
- (a) convection
  - (b) conduction
  - (c) evaporation
  - (d) radiation
17. Which statement is correct in reference to different altitude training regimes?
- (a) Live low – train high is the most beneficial regime, as it develops physiological adaptations to enhance the body's capacity to transport and use oxygen.
  - (b) Live high – train low allows for physiological adaptations to occur plus the benefit of training with intensity.
  - (c) Live high – train high is highly recommended for athletes involved in endurance events.
  - (d) Live low – train low is the most beneficial regime as it allows for physiological adaptations to occur more quickly due to the ability to train with high intensity.
18. The shaded area in the graph below represents



- (a) velocity.
- (b) momentum.
- (c) inertia.
- (d) impulse.

19. The reason an athlete would sit in an ice bath is because it
- (a) elevates the heart rate and increases muscle glycogen.
  - (b) causes vasodilation in the muscles to reduce inflammation.
  - (c) causes vasoconstriction in the muscles to reduce inflammation.
  - (d) reduces respiration rate allowing more oxygen to repair muscles.

Refer to the following training program for Question 20.

Mesocycle	1				2				3				4			5				
<b>Training methods</b>	<ul style="list-style-type: none"> <li>▪ Continuous</li> <li>▪ Interval</li> <li>▪ Resistance</li> </ul>				<ul style="list-style-type: none"> <li>▪ Continuous</li> <li>▪ Resistance</li> <li>▪ Fartlek</li> <li>▪ Interval</li> </ul>				<ul style="list-style-type: none"> <li>▪ Continuous</li> <li>▪ Interval</li> <li>▪ Resistance</li> <li>▪ Interval</li> <li>▪ Fartlek</li> </ul>				<ul style="list-style-type: none"> <li>▪ Continuous</li> <li>▪ Fartlek</li> <li>▪ Interval</li> </ul>			<ul style="list-style-type: none"> <li>▪ Continuous</li> </ul>				
No. of training sessions	3	3	3	3	4	4	4	4	5	5	5	5	5	3	2	1	1	1	1	1
Intensity	100%																			
	90%																			
	80%																			
	70%																			
	60%																			
	50%																			
	40%																			
	30%																			
	20%																			
	10%																			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

20. The training program was devised for an athlete aiming to run in the 12 km City to Surf race.

Which statement about the program is correct?

- (a) A taper is in weeks 17–20, with the race at the end of week 20.
- (b) There is no taper in the program.
- (c) The principle of recovery is not planned for.
- (d) A taper is in weeks 14–16, with the race at the end of week 16.

End of Section One

See next page

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**Section Two: Short answer**

**50% (56 Marks)**

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

Use a blue or black pen (**not** pencil) for this section.

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.

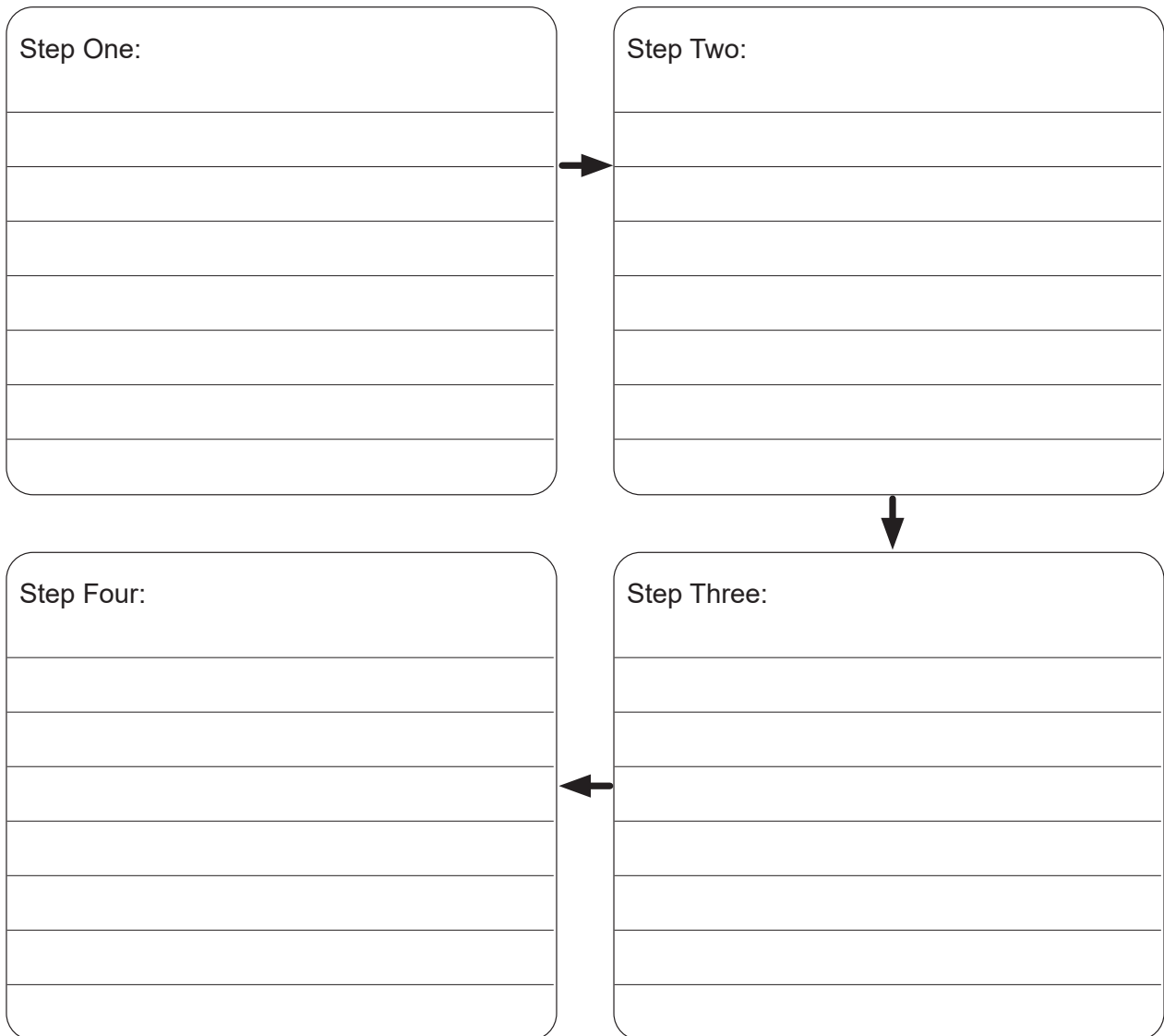
Suggested working time: 70 minutes.

**Question 21**

**(8 marks)**

A physical education teacher is teaching a class of Year 1 students how to throw a ball.

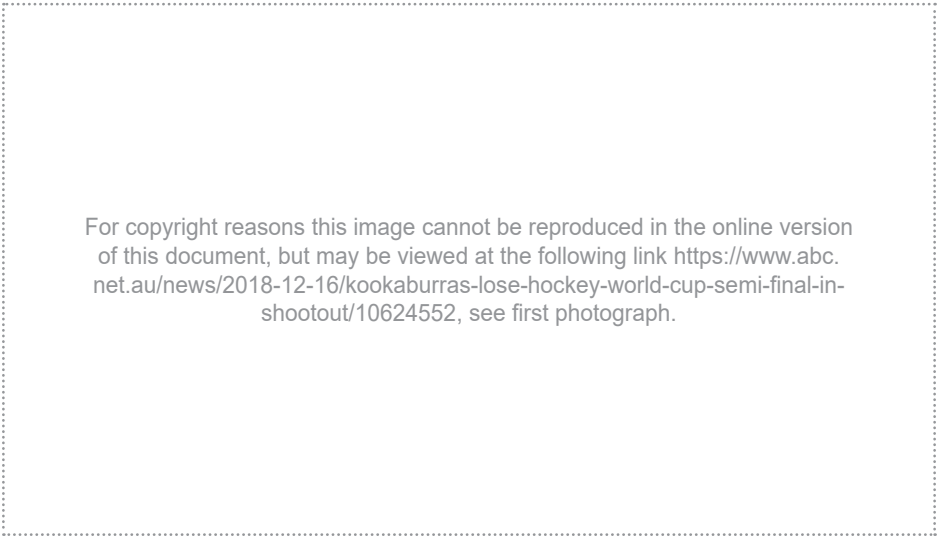
Complete the diagram below by describing each stage of the qualitative analysis process the teacher would use to improve a student's technique in throwing a ball.



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Question 22

(9 marks)



In 2018, the Australian hockey team, the Kookaburras, missed their chance at a historic third straight World Cup title after losing a semi-final to the Netherlands 4-3 in a penalty shootout.

During an interview, the Kookaburras' coach Colin Batch said he was confident with the five players he picked in the shootout and the decision to change the goalkeeper to defend the penalties. He conceded to the journalist he might change the line-up if presented with the same situation again.

- (a) (i) Identify the predominant leadership style Batch used in this situation. (1 mark)

\_\_\_\_\_

- (ii) Outline **three** advantages and **one** disadvantage that the above leadership style can have on a team or athletes. (4 marks)

Advantages

One: \_\_\_\_\_

\_\_\_\_\_

Two: \_\_\_\_\_

\_\_\_\_\_

Three: \_\_\_\_\_

\_\_\_\_\_

Disadvantage

\_\_\_\_\_

\_\_\_\_\_

See next page

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After the loss, the Australian team were quite deflated. Divisions began to show in their connection as a team and some players' efforts and standards began to decline.

- (b) (i) Define the term 'social loafing' and provide an example. (2 marks)

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- (ii) Outline **two** strategies Batch could use to restore the Kookaburras' group cohesion. (2 marks)

One: \_\_\_\_\_

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Two: \_\_\_\_\_

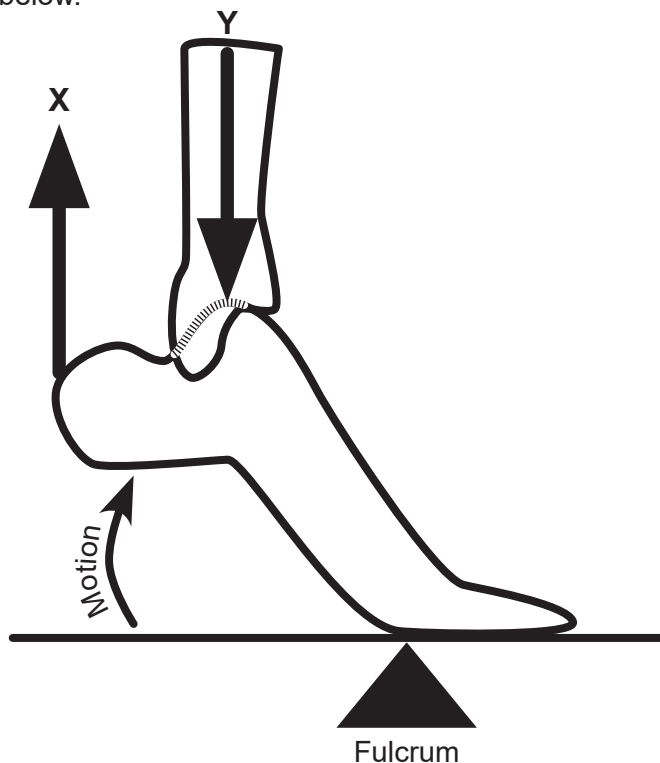
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Question 23

(9 marks)

Australian Brooke Stratton came seventh in the Long Jump event at the 2020 Tokyo Olympic Games. In the take-off phase of the long jump, she used a second-class lever at the ankle, as shown in the diagram below.



- (a) Identify the parts of the lever labelled: (2 marks)

X: \_\_\_\_\_

Y: \_\_\_\_\_

- (b) Describe why a second-class lever system has a high mechanical advantage. (2 marks)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- (c) Brooke's coach often uses a tablet device to record her jumps during training and competition. Outline **five** benefits of using video analysis. (5 marks)

One: \_\_\_\_\_

\_\_\_\_\_

Two: \_\_\_\_\_

\_\_\_\_\_

Three: \_\_\_\_\_

\_\_\_\_\_

Four: \_\_\_\_\_

\_\_\_\_\_

Five: \_\_\_\_\_

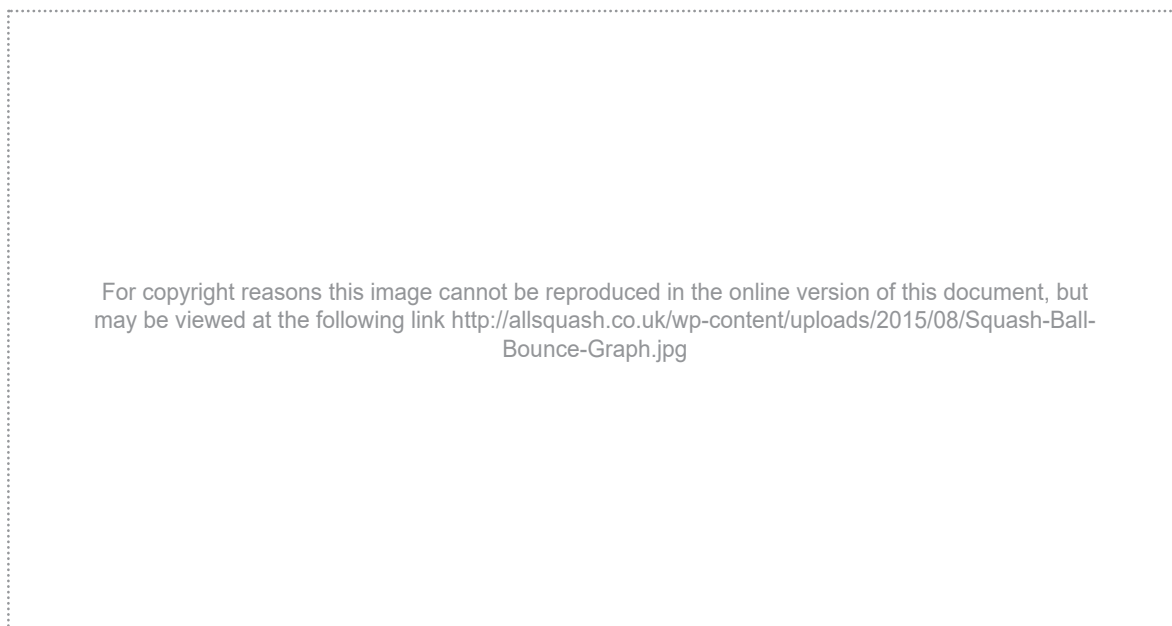
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**Question 24**

**(5 marks)**

A squash ball manufacturer makes four types of squash balls for adults; they are labelled A, B, C and D. Below is a graph that demonstrates the difference in the bounce of the squash balls.



The squash balls are designed around the biomechanical concept of coefficient of restitution.

- (a) Define 'coefficient of restitution'. (2 marks)

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Ball D has been designed for use by beginners, and involves the concept of shaping.

- (b) Define what shaping is and outline how it differs from chaining. (3 marks)

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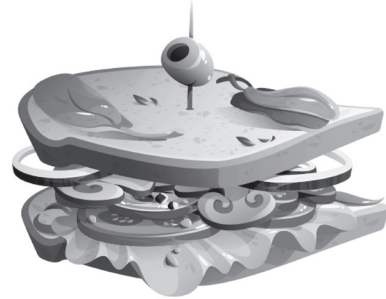
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**Question 25****(9 marks)**

An elite triathlete has purchased the following foods to use as part of their competition nutrition strategy:

**Gel shot****Chocolate milk****Salad sandwich**

Complete the table by matching each food to the most appropriate time that it should be ingested. Justify your selection.

<b>Timing</b>	<b>Food selection</b>	<b>Justification</b>
1 to 2 hours before competition		
During competition		
Shortly after competition		

See next page

Question 26

(7 marks)

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Gear set A

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Gear set B

Pictured above are two different single-speed systems for a track bicycle.

- (a) Identify which gear set requires the least effort to ride with. (1 mark)

\_\_\_\_\_

- (b) Identify and explain the biomechanical principle that justifies your choice of gear set. (3 marks)

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\_\_\_\_\_

- (c) Cyclists need to have good balance. Define this biomechanical principle and outline the key factor someone learning to ride needs to consider to avoid falling over. (3 marks)

Definition: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Key factor: \_\_\_\_\_  
\_\_\_\_\_



**Question 27****(9 marks)**

Cricket fast bowlers can deliver the ball at speeds above 140 km/hr. They typically begin their delivery by running up to 20 m at full speed before releasing the ball through a well-coordinated bowling action that uses the biomechanical principle of segmental interaction.

- (a) Outline **five** key factors of segmental interaction that influence a bowler's ability to bowl a fast delivery. (5 marks)

One: \_\_\_\_\_

\_\_\_\_\_

Two: \_\_\_\_\_

\_\_\_\_\_

Three: \_\_\_\_\_

\_\_\_\_\_

Four: \_\_\_\_\_

\_\_\_\_\_

Five: \_\_\_\_\_

\_\_\_\_\_

Cricket spin bowlers act to deceive batters by varying the flight path and bounce of the ball by placing spin on it.

- (b) Describe the relative flight path and bounce of a delivery with top spin and one with back spin. (4 marks)

Top spin: \_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

Back spin: \_\_\_\_\_

\_\_\_\_\_

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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 28**

**(15 marks)**

Retired Australian Diamonds Netball head coach, Lisa Alexander, had an impressive 81% winning record. As part of her role as head coach she was responsible for using periodisation to plan the training program for the squad leading up to the World Championships.

- (a) Describe the characteristics of each part of the Diamonds' training program and identify an objective Lisa may have had. (9 marks)

Pre-season: \_\_\_\_\_

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In-season: \_\_\_\_\_

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Off-season: \_\_\_\_\_  
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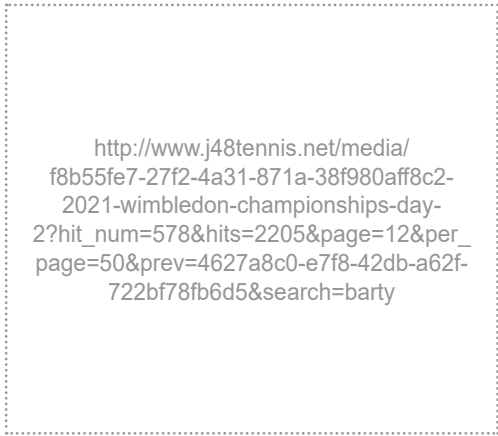
- (b) Another of Lisa’s responsibilities was ensuring her squad did not suffer from overtraining. Describe what is meant by ‘overtraining’ and outline **four** symptoms the Diamonds’ players may experience if they are overtraining. (6 marks)

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Question 29

(15 marks)



In 2021 Ash Barty became only the third Australian woman to win Wimbledon.

- (a) Identify **two** mental skill strategies Ash may have used prior to serving the ball to maintain her focus and concentration, and outline how she would have applied each of them. (6 marks)

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- (b) Explain **three** nutritional strategies Ash may have employed at each of the following times to ensure she played at her best and recovered well. (9 marks)

2 to 4 hours before the match: \_\_\_\_\_

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During the match: \_\_\_\_\_

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After the match: \_\_\_\_\_

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Question 30

(15 marks)



Australian, Bree Walker qualified to compete in the Monobob competition at the 2022 Winter Olympics. Success in this event requires the athlete to push their 170 kg sled as quickly as possible over the 50 m run up to get the best start.

- (a) Identify the predominant muscle fibre type Bree would have, and describe **three** characteristics of this fibre type to support your answer. (7 marks)

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The Monobob is the first Olympic Bobsleigh competition in which all competitors use the same type of standard sleigh to minimise the influence of drag reduction technology on determining the results.

- (b) Identify and define **two** types of drag. Describe how each influences the design of a sleigh. (8 marks)

Lined area for writing the answer.

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**Question 31**

**(15 marks)**

At the Ski Jumping World Cup in Norway in 2017, the world record for the longest jump was set by an Austrian, Stefan Kraft, who landed an incredible 253.5 m jump.

- (a) (i) The biomechanical principle that enhanced Stefan’s flight to achieve a world record jump was Bernoulli’s principle. Explain Bernoulli’s principle and describe how Stefan used it to enhance his jump. (5 marks)

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- (ii) On the diagram below, draw the lines of airflow and label it to demonstrate your understanding of how Bernoulli’s principle assists a ski jumper. (4 marks)



**See next page**

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- (b) Identify and explain the principle related to muscle contraction and nerve function that allowed Stefan to generate maximum force in his muscles to take off from the ramp.  
(6 marks)

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Supplementary page

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## ACKNOWLEDGEMENTS

- Question 8** [Graphic of volleyball]. (n.d.). Retrieved June, 2022, from [https://www.transparentpng.com/details/volleyball-free-download-transparent\\_14389.html](https://www.transparentpng.com/details/volleyball-free-download-transparent_14389.html)
- Question 11** Adapted from: Rdurkacz. (2012). *Sketch of magnus effect with streamlines and turbulent wake*. Retrieved March, 2022, from [https://commons.wikimedia.org/wiki/File:Sketch\\_of\\_Magnus\\_effect\\_with\\_streamlines\\_and\\_turbulent\\_wake.svg#/media/File:Sketch\\_of\\_Magnus\\_effect\\_with\\_streamlines\\_and\\_turbulent\\_wake.svg](https://commons.wikimedia.org/wiki/File:Sketch_of_Magnus_effect_with_streamlines_and_turbulent_wake.svg#/media/File:Sketch_of_Magnus_effect_with_streamlines_and_turbulent_wake.svg)
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