



ATAR course examination, 2020

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: 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	58	50
Section Three Extended answer	4	2	50	30	30
Total					100

Instructions to candidates

- The rules for the conduct of the Western Australian external examinations are detailed in the *Year 12 Information Handbook 2020: Part II Examinations*. Sitting this examination implies that you agree to abide by these rules.

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

- 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.

- 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)

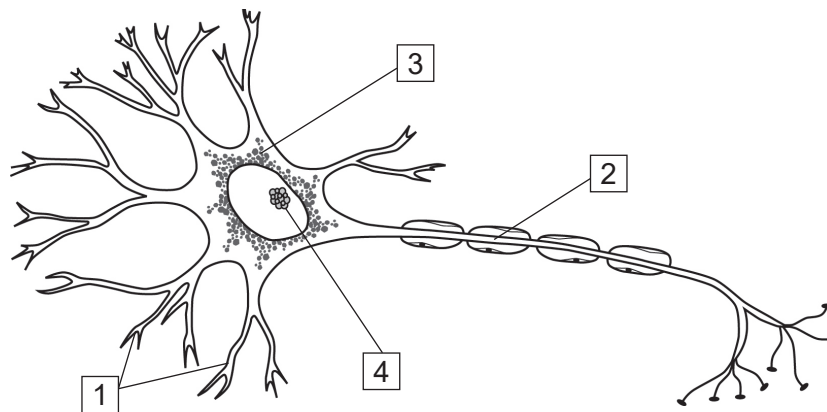
This section has **20** questions. Answer **all** questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that 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.

1. A motor unit is defined as

- (a) all of the motor neurons that innervate a muscle fibre.
- (b) the total number of muscle fibres within a muscle.
- (c) a motor neuron and the number of muscle fibres it innervates.
- (d) the muscle movement created by a nerve impulse.

2. The following diagram is of a motor neuron. Which label represents the axon?



- (a) 1
- (b) 2
- (c) 3
- (d) 4

3. The four stages of a model for qualitative analysis are

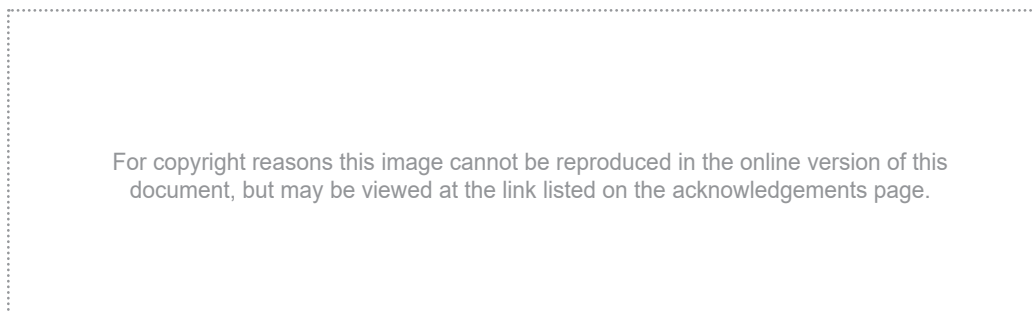
- (a) preparation, intervention, evaluation and feedback.
- (b) feedback, preparation, evaluation and observation.
- (c) observation, intervention, evaluation and diagnosis.
- (d) preparation, observation, evaluation and intervention.

4. A coach may reduce social loafing in their team by

- (a) appointing a well-respected captain for the team.
- (b) having key performance indicators for individuals in the team.
- (c) ensuring teams train in large groups as often as possible.
- (d) setting easily-achievable goals requiring minimal effort from team members.

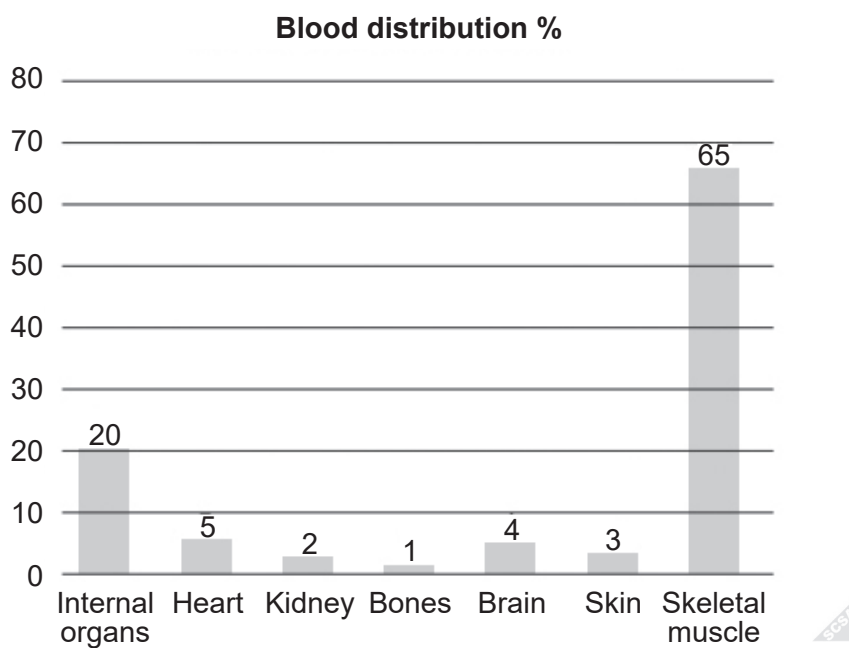
See next page

5. What does X represent in the diagram below?



- (a) muscle fibre
- (b) epimysium
- (c) myofibril
- (d) perimysium

6. In which environment does the graph below represent a person exercising?



- (a) cold
- (b) hot
- (c) ambient
- (d) humid

7. When an athlete matches the energy demands, intensity and duration of their sport during practice conditions, which category of transfer of learning is this better known as?

- (a) skill to skill
- (b) training to competition
- (c) theory to practice
- (d) practice to game

See next page

8. Lana represented her school at the Australian Volleyball Schools Cup held on the Gold Coast, Queensland. The conditions in which she played were hot and very humid. Which mechanism for heat loss would be affected adversely by these conditions?
- (a) evaporation
 - (b) radiation
 - (c) conduction
 - (d) convection
9. Which of the following training activities would a primary school physical education teacher most likely use to teach the triple jump?
- (a) dynamic
 - (b) chaining
 - (c) shaping
 - (d) complex
10. When training in very hot temperatures, an athlete's body will experience a decrease in
- (a) heart rate.
 - (b) skin temperature.
 - (c) blood pressure.
 - (d) blood plasma volume.
11. Luge is a sport at the Winter Olympic Games in which an athlete travels down an icy track at speeds in excess of 130 km/h. Which of the statements below is correct if the athlete wishes to maximise their speed?



- (a) form drag is increased and surface drag is decreased
- (b) form drag is increased and surface drag is increased
- (c) form drag is decreased and surface drag is decreased
- (d) form drag is decreased and surface drag is increased

See next page

12. In order to produce the greatest amount of torque, which of the following statements is correct?
- (a) Apply more force at an increased perpendicular distance from the axis of rotation.
 - (b) Apply less force at an increased perpendicular distance from the axis of rotation.
 - (c) Apply less force at a decreased perpendicular distance from the axis of rotation.
 - (d) Apply more force at a decreased perpendicular distance from the axis of rotation.
13. Which of the following strategies would the coach of a team utilise in order to improve group cohesion?
- (a) communicate frequently with the players
 - (b) avoid giving feedback to the players so they are not offended
 - (c) separate the team into small groups based on player height
 - (d) have each player set individual goals
14. When comparing the characteristics of Type IIA and Type IIB muscle fibres, which of the following tables is correct?

- (a)
- | Type IIA | Type IIB |
|--|---|
| High oxidative capacity
Medium capillary density
High glycolytic capacity
Medium fatigue resistance | Low oxidative capacity
Low capillary density
High glycolytic capacity
Low fatigue resistance |
- (b)
- | Type IIA | Type IIB |
|--|--|
| Low oxidative capacity
Low capillary density
High glycolytic capacity
Medium fatigue resistance | High oxidative capacity
High capillary density
High glycolytic capacity
High fatigue resistance |
- (c)
- | Type IIA | Type IIB |
|--|---|
| High oxidative capacity
Medium capillary density
High glycolytic capacity
High fatigue resistance | Low oxidative capacity
High capillary density
High glycolytic capacity
High fatigue resistance |
- (d)
- | Type IIA | Type IIB |
|--|---|
| Medium oxidative capacity
Medium capillary density
High glycolytic capacity
Medium fatigue resistance | Low oxidative capacity
Low capillary density
High glycolytic capacity
Low fatigue resistance |

15. A sign of overtraining for a middle-distance runner would be a decrease in
- (a) resting heart rate.
 - (b) personal best times.
 - (c) appetite.
 - (d) perceived effort during training.
16. Which athlete would benefit **most** from using anabolic steroids?
- (a) 1500 m runner
 - (b) shot put thrower
 - (c) high jumper
 - (d) 400 m hurdler
17. Protein powders are used by athletes in training because they increase
- (a) heart rate.
 - (b) VO_2 max.
 - (c) muscle size.
 - (d) number of mitochondria.
18. Which is **not** of benefit to a coach when using video analysis?
- (a) It provides footage in slow motion.
 - (b) It provides footage for future reference.
 - (c) It provides immediate feedback to the athlete.
 - (d) It provides a performance routine to the athlete.
19. Which is the most effective strategy for athletes using altitude training?
- (a) live high – train low
 - (b) live high – train high
 - (c) live low – train low
 - (d) live low – train high
20. According to the Glycemic Index (GI), a food with a GI of 32 increases blood glucose
- (a) faster than a food with a GI of 64.
 - (b) slower than a food with a GI of 20.
 - (c) slower than a food with a GI of 54.
 - (d) faster than a food with a GI of 47.

End of Section One

See next page

Section Two: Short answer

50% (58 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

(6 marks)

At the 2019 US Open Tennis Championship, Novak Djokovic had his private hyperbaric oxygen chamber set up in a trailer parked outside the courts at Flushing Meadows. As a post-match recovery strategy, he sat in the chamber breathing an increased percentage of oxygen under pressurised conditions.

- (a) Explain a physiological benefit to Novak of using this chamber as a recovery strategy. (3 marks)

- (b) Novak is renowned for using a performance routine of bouncing the tennis ball a number of times before he serves to his opponent. Outline another mental skill strategy he could use during his matches, identifying the benefit of using the strategy and provide an example of how Novak would apply this during a match. (3 marks)

See next page

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Question 22

(10 marks)

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On 12 October 2019, Eliud Kipchoge became the first person to run under two hours for a marathon (42.2 km), clocking 1 hour 59 minutes and 40 seconds in Vienna, Austria.

- (a) What is the predominant muscle fibre type Eliud would have in his legs? (1 mark)

- (b) Outline **two** characteristics of the muscle fibre type to support your answer in part (a). (4 marks)

One: _____

Two: _____

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See next page

Question 22 (continued)

- (c) Name and explain the biomechanical principle behind having foam in the sole of running shoes and identify the benefit to a runner. (5 marks)

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Question 23

(5 marks)

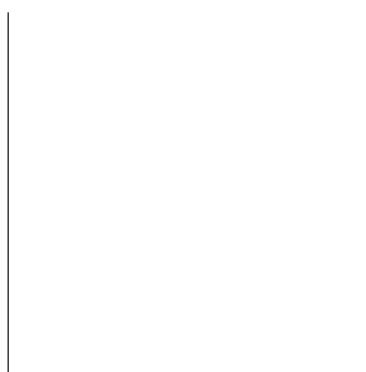
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At the 2019 Australian Junior Powerlifting Championships, Western Australian Dylan Hellriegel, astonished the weightlifting world by becoming the first person to Squat 1000 lb (455 kg) and Deadlift 900 lb (410 kg) on the same day. He won the championships with the following results:

Event	Result
Squat	455 kg
Bench Press	240 kg
Deadlift	410 kg
Total	1105 kg

In the space provided draw a graph of the force – velocity relationship for muscle contraction and explain how Dylan applied this relationship to his power lifting events.



See next page

Question 24

(12 marks)

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Emma Philippe is a Western Australian athlete who has represented Australia at the World Youth Championships and World Under 20 Championships in pole vaulting. She recently switched events and is focusing her training on the 400 m hurdles and 800 m track events.

- (a) From among the three events, for which one could Emma use altitude training to enhance her performance? Justify your answer. (5 marks)

Emma's coach, Alex Parnov, is highly regarded as one of the best pole vaulting coaches in the world. He has coached Australian Olympians Steve Hooker, Tatiana Grigorieva and Emma George.

- (b) Describe the predominant leadership style Alex Parnov would use as the coach of these elite Australian athletes and provide a reason why he would use this style. (3 marks)

- (c) Describe **two** methods Alex Parnov would use during a training session for pole vaulting to analyse Emma Philippe's movement skills to identify errors and provide corrections to improve her performance. (4 marks)

One: _____

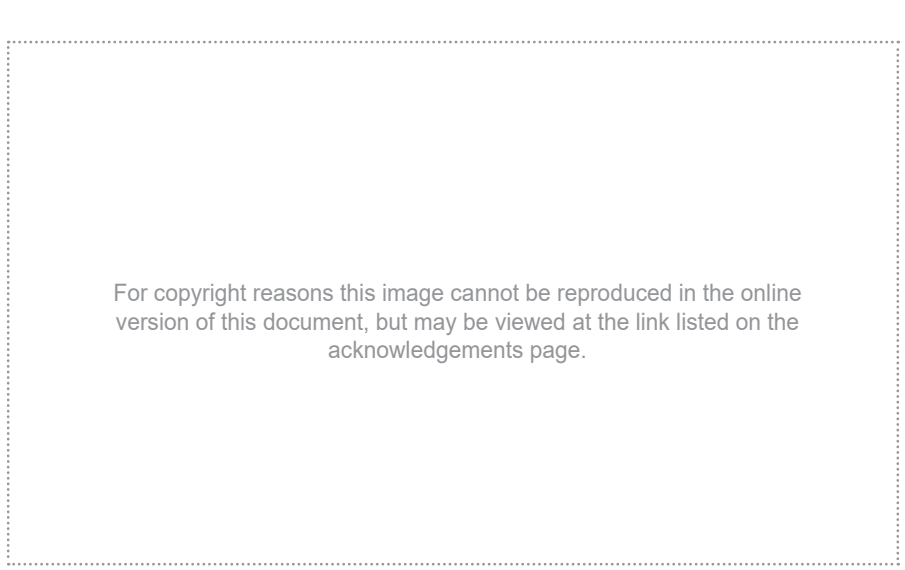
Two: _____

Question 25

(8 marks)

(a) Identify the class of lever used in the image below.

(1 mark)



(b) Using the labels in the image, identify the components of the lever.

(3 marks)

Force	
Axis	
Resistance	

(c) Define 'wave drag' and provide **two** features of the stand-up paddle board that reduce wave drag.

(4 marks)

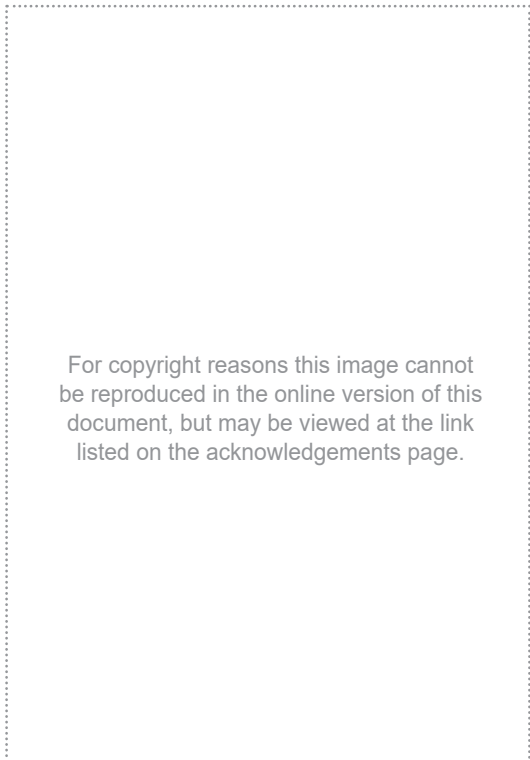
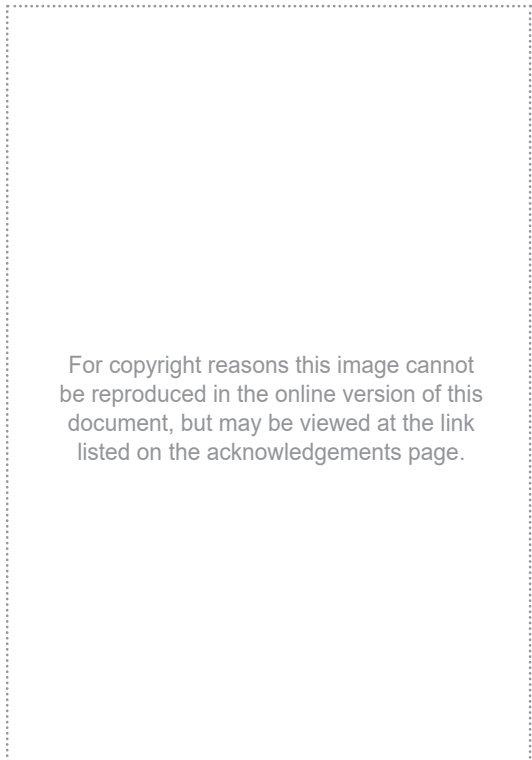
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See next page

Question 26

(8 marks)



Olivia Vivian is a talented gymnast who represented Australia at the 2008 Olympics and won a silver medal at the 2014 Commonwealth Games. In 2017, Olivia switched sports to compete in *Australian Ninja Warrior*, in which athletes complete obstacle courses involving swinging, climbing and jumping while being timed.

- (a) Define 'transfer of learning' and describe why Olivia was successful switching from gymnastics to becoming a Ninja Warrior by applying transfer of learning. (4 marks)

- (b) Define the 'All or None' principle and describe its relevance to Olivia producing maximum force in her muscles. (4 marks)

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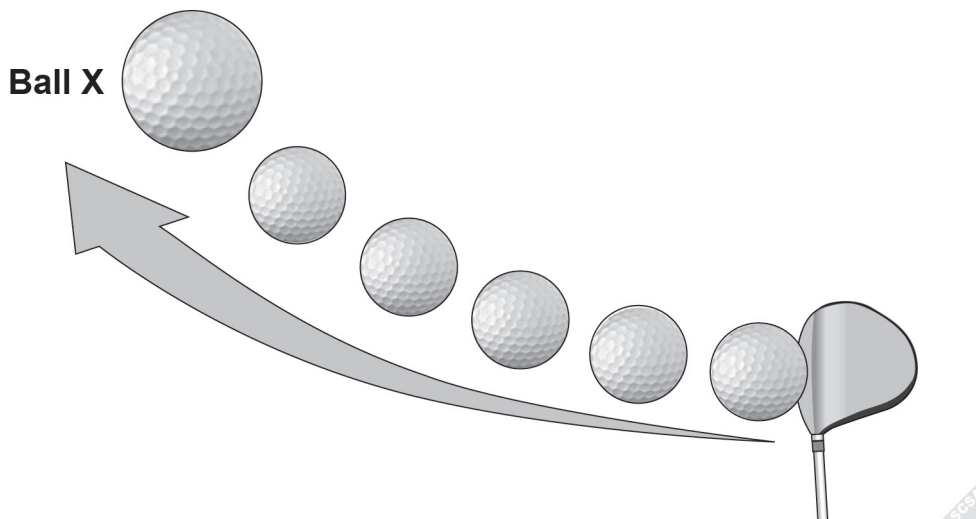
See next page

Question 27

(9 marks)

Western Australian, Hannah Green, won the 2019 Women's PGA Championship becoming the third Australian woman to win a major golf tournament. She is exceptionally proficient with her swing and can control the direction the ball travels by intentionally placing spin on it.

- (a) The following image shows the flight path for Hannah's tee shot. On **Ball X**, draw the direction of the spin of the ball and in the space below explain why the ball's flight path curves. (5 marks)



- (b) Explain why golf balls with dimples travel further than smooth golf balls. (4 marks)

End of Section Two

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Section Three: Extended answer

30% (30 Marks)

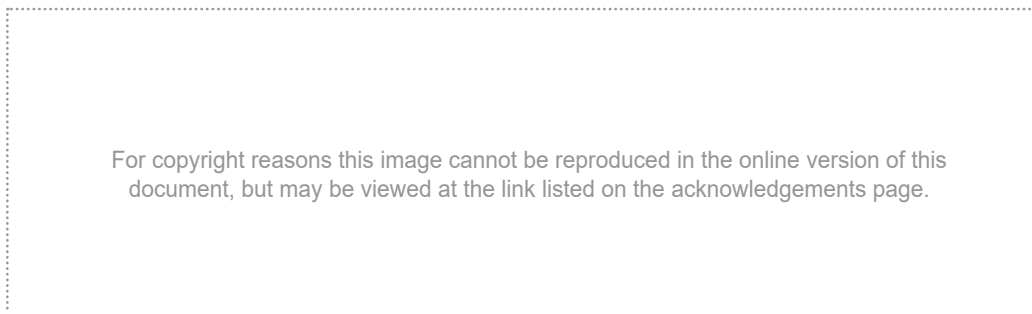
This section contains **four** questions. You must answer **two** questions. Write your answers in the spaces provided.

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)



In 2019, Australian Kelsey-Lee Barber won the gold medal for the javelin event at the World Athletics Championship in Doha, Qatar. Above is a sequence of a javelin throw.

Analyse Kelsey’s javelin throw in relation to the following biomechanical principles:

- Bernoulli’s principle
- optimal projection
- segmental interaction.

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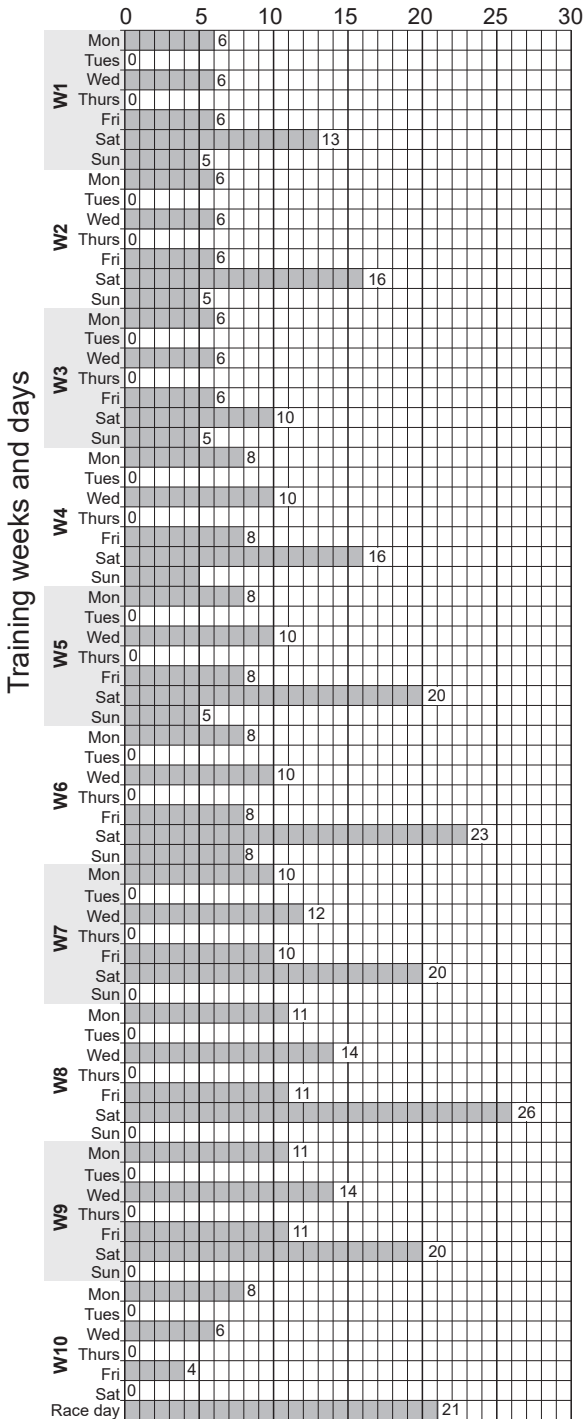
Question 29

(15 marks)

Jamieson, Mihar and Frida are Year 11 students who have decided to compete in the Busselton Half Ironman event as a team. Frida is a State-level swimmer who will easily cover the 1.9 km swim leg, whereas Jamieson and Mihar play hockey for their school and local community teams. The two boys decide that Mihar will complete the 21 km run leg and Jamieson will ride the 90 km cycle leg. Each boy has designed his personal 10 week training program, shown in the graphs below.

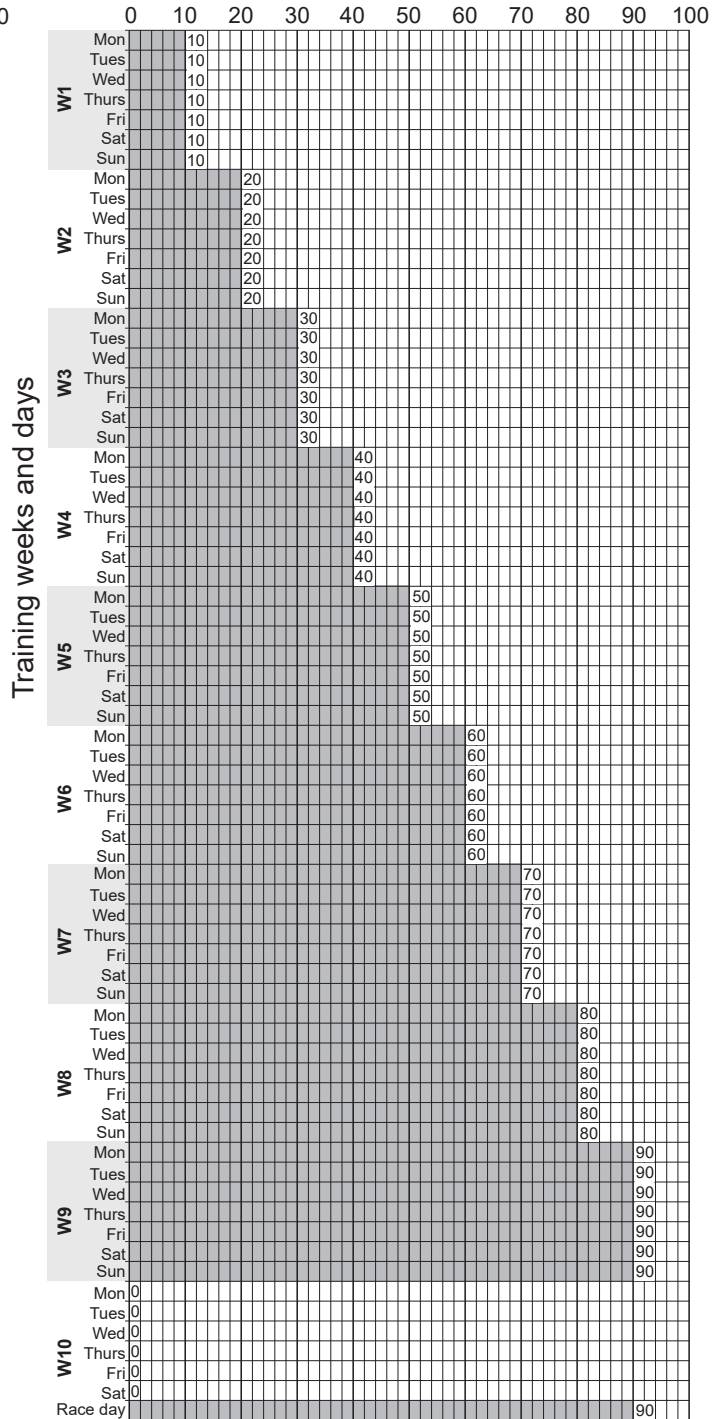
Mihar's training program

Kilometres run



Jamieson's training program

Kilometres ridden



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Question 30

(15 marks)

Kurt Fearnley is one of Australia's greatest athletes. He has won medals in the 5000 m and marathon wheelchair events at the Paralympics in Sydney (2000), Athens (2004), Beijing (2008), London (2012) and Rio (2016). He has also won seven world championships and more than 30 marathons around the world. Kurt's last Australian representation was at the 2018 Gold Coast Commonwealth Games, at which he won the marathon.



Discuss the nutritional strategies Kurt would have employed pre-competition (training period and prior to race), during and after a marathon event that allowed him to perform at his best and assist in his post-race recovery.

See next page

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Table tennis is a sport in which a player can place spin on the ball to keep it in play or produce a shot to win the rally.

- (b) Identify **three** types of spin a player could place on the ball during a rally and give a reason why the player would choose to use each type of spin. (6 marks)

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End of questions

Supplementary page

Question number: _____

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ACKNOWLEDGEMENTS

- Question 2** Adapted from: Dorland, W. (2000). Dendrites in a multipolar neuron [Diagram]. In D. Anderson (ed.). *Dorland's illustrated medical dictionary* (29th ed.). Philadelphia: Saunders.
- Question 5** Adapted from: *Characteristics of skeletal muscle-macro structures* (Image). (n.d.). Retrieved April, 2020, from https://www.google.com/imgres?imgurl=https%3A%2F%2Fi.ytimg.com%2Fvi%2FDY2v0w_3rE0%2Fmaxresdefault.jpg&imgrefurl=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DDY2v0w_3rE0&tbid=_TyZCTcVcqQghM&vet=12ahUKEwjyi-7WlorpAhWHGCsKHbBxB9EQMygAegUIARDqAQ..i&docid=Nqp0DgjfY6so0M&w=1280&h=720&q=skeletal%20muscle%20macro%20structures&ved=2ahUKEwjyi-7WlorpAhWHGCsKHbBxB9EQMygAegUIARDqAQ
- Question 11** Helbig, T. (2015). *Luge - Oberhof*. Retrieved January, 2020, from <https://search.creativecommons.org/photos/ee43fe0d2b4c-4080-bcc7-5ba5c272e07f>
Used under a Creative Commons Attribution-NonCommercial 2.0 Generic licence.
- Question 22** Foeger, L. (2019). *Kenya's Eliud Kipchoge, the marathon world record holder, runs wearing Nike Vaporfly shoes during his attempt to run a marathon in under two hours in Vienna, Austria, October 12, 2019*. Retrieved April, 2020, from <https://www.abc.net.au/news/2019-10-12/eliud-kipchoge-runs-marathon-in-under-two-hours/11597186>
- Question 23** Left image from: [Photograph of Dylan Hellriegel deadlifting 900lbs]. (n.d.). Retrieved April, 2020, from <https://www.facebook.com/powerliftingworld1/photos/dylan-hellriegel-has-become-the-first-lifter-in-history-to-squat-1000lbs-and-dea/556659428178495/>
Right image from: Mark Bell—Super Training Gym. (2019, March, 21). *First guy to squat 1000lb & deadlift 900lb in the same meet! | Dylan Hellriegel*. [Still from video]. YouTube. Retrieved from, April, 2020, <https://www.youtube.com/watch?v=-4HbZ3iuSMM>
- Question 24(a)** Left image from: [Photograph of Emma Philippe running]. (2018). Retrieved April, 2020, from <https://thewest.com.au/sport/cricket/talented-twins-emma-philippe-dominates-athletics-track-while-josh-makes-waves-in-big-bash-league-ng-b881419073z>
Right image from: Kane, P. (2016). *Emma Philippe of Western Australia competes in the women's pole vault u20 event during the Australian Junior Athletics Championships at the WA Athletics Stadium on March 11, 2016 in Perth, Australia* [Photograph]. Retrieved April, 2020, from <https://www.gettyimages.com.au/detail/news-photo/emma-philippe-of-western-australia-competes-in-the-womens-news-photo/514748412?adppopup=true>

Information from: Raynor, B. (2019). *Talented twins: Emma Philippe dominates athletics track while Josh Philippe makes waves in big bash league*. Retrieved April, 2020, from <https://thewest.com.au/sport/cricket/talented-twins-emma-philippe-dominates-athletics-track-while-josh-makes-waves-in-big-bash-league-ng-b881419073z>

Question 25 Ruiz, J. (n.d.). [Photograph of stand-up paddle boarder]. Retrieved April, 2020, from <https://jenonajetplane.com/benagil-sea-cave-algarve-portugal/>

Question 26 Left image from: Santi, S. (2019). *Perth gymnast Olivia Vivian opens up on family's gambling 'curse' and why Ninja Warrior success ended friendships*. Retrieved June, 2020, from <https://www.dailymail.co.uk/news/article-3623017/Olympic-gymnast-Olivia-Vivian-26-lands-head-falling-uneven-bars-Melbourne.html>

Right image from: Nine Digital. (2018). [Photograph of Olivia Vivian during Australian Ninja Warrior]. Retrieved April, 2020, from <https://coach.nine.com.au/ninja/olivia-vivian-ninja-warrior-final/37700252-a4f6-4264-98eb-0efdb20e32b0>

Information from: Olivia Vivian. (2019). In *Wikipedia*. Retrieved April, 2020, from https://en.wikipedia.org/wiki/Olivia_Vivian
Used under Creative Commons Attribution-ShareAlike 3.0 Unported Licence.

Question 28 Image adapted from: [Graphic of a sequence of a javelin throw]. (n.d.). Retrieved June, 2020, from https://www.google.com/imgres?imgurl=https%3A%2F%2Fi.pinimg.com%2Foriginals%2F75%2F7c%2Ff7%2F757cf71a3df3507232d4fccd95d4c70c.jpg&imgrefurl=https%3A%2F%2Fwww.pinterest.com%2Fpin%2F573927546250687270%2F&tbnid=91t4ZqAMVBd6JM&vet=12ahUKEwivsfG62IXqAhWtKbcAHX2sAEUQMygAegUIARCDQAQ..i&docid=YMvLQ69mvhK7_M&w=564&h=352&q=throwing%20a%20javelin%20step%20by%20step&ved=2ahUKEwivsfG62IXqAhWtKbcAHX2sAEUQMygAegUIARCDQAQ

Question 30 Paralympics Australia. (n.d.). *Marathon silver medallist Kurt Fearnley* [Photograph]. Retrieved from <https://www.theflindersnews.com.au/story/4172961/kurt-fearnleys-agonising-near-miss-for-wheelchair-marathon-gold/>

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