Government of **Western Australia**
School Curriculum and Standards Authority

WACE
Western Australian Certificate of Education

Western Australian Certificate of Education Examination, 2014

Question/Answer Booklet

PHYSICAL EDUCATION STUDIES

Stage 3

Please place your student identification label in this box

Student Number: In figures | | | | | | | | | |

In words _____

_____

Time allowed for this paper

Reading time before commencing work: ten minutes
Working time for paper: 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

Number of additional answer booklets used (if applicable): ☐

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 the WACE examinations

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 notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

2016/60482
Web version of 2014/41194

Ref: 14-112

Structure of the examination

The WACE Physical Education Studies examination consists of a written component worth 70 per cent of the total examination score and a practical (performance) component worth 30 per cent of the total examination score.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of total exam
Section One: Multiple-choice	15	15	30	15	14
Section Two: Short answer	10	10	70	70	35
Section Three: Extended answer	4	2	50	30	21
				Total	70

Instructions to candidates

1. The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2014*. Sitting this examination implies that you agree to abide by these rules.

2. 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. 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.

   Sections Two and Three: Write your answers in this Question/Answer Booklet.

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

4. Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.
   - Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
   - Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

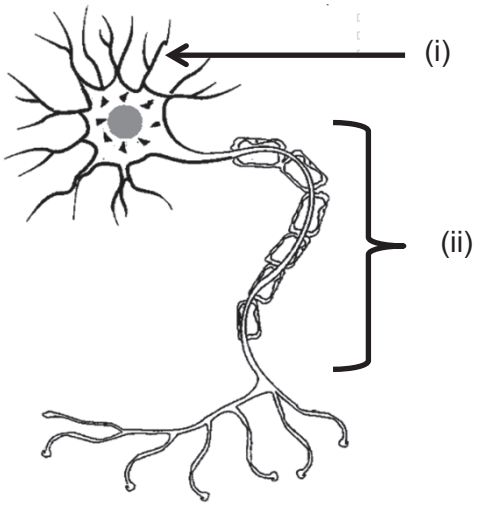
See next page

Section One: Multiple-choice **14% (15 Marks)**

This section has **15** 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.

Questions 1 and 2 relate to the diagram below.



1. What is the part of the motor neuron labelled (i)?

   (a) dendrite
   (b) axon
   (c) motor endplate
   (d) nucleus

2. What is the definition of the part of the motor neuron labelled (ii)?

   (a) a branched protoplasmic extension of a nerve cell that conducts impulses from adjacent cells inward toward the cell body
   (b) the flattened end of a motor neuron that transmits neural impulses to a muscle
   (c) a large, membrane-bound, protoplasmic structure within a living cell
   (d) a long threadlike extension of a nerve cell that conducts nerve impulses from the cell body

3. Athletes who perform in hot weather will often observe that after they reach steady state, their heart rate begins to increase. The physiological reason this occurs is that

   (a) stroke volume decreases.
   (b) blood plasma volume increases.
   (c) core body temperature decreases.
   (d) ventilation decreases.

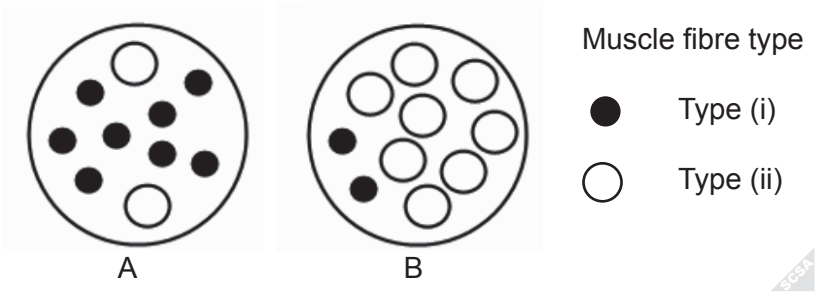
See next page

4. Using the list of the structure of skeletal muscle, identify the correct order from the most external part to the most internal part of a skeletal muscle.

(i) muscle fibre
(ii) fascicle
(iii) epimysium
(iv) perimysium
(v) myofibril

(a) i, ii, iii, iv, v
(b) iii, iv, ii, i, v
(c) iii, iv, v, i, ii
(d) i, ii, v, iii, iv

5. The diagram below represents a cross-section of muscle taken from two different athletes. Identify the type of athlete each sample was taken from.



(a) Sample A – triathlete, Sample B – marathon runner
(b) Sample A – 100 m runner, Sample B – 50 m swimmer
(c) Sample A – 1500 m swimmer, Sample B – long jumper
(d) Sample A – shot put thrower, Sample B – road race cyclist

6. In which of the following environments would a coach be **most** concerned about an athlete increasing their core body temperature during exercise?

(a) cold and high altitude
(b) cold and humid
(c) hot and high altitude
(d) hot and humid

7. Which of the following athletes would use passive recovery?

(a) 400 m runner
(b) long jumper
(c) 1500 m swimmer
(d) triathlete

See next page

8. A person participating in a long-distance swimming event with water temperatures of around 15 degrees Celsius (considered a cold temperature) would **most** likely have which of the following physiological effects during the event?

(a) increased vasodilation of blood vessels in the skin and heart
(b) increased blood flow toward the skin
(c) decreased breathing ventilation
(d) increased vasoconstriction of blood vessels in the skin and heart

9. When defining the pre-season goals, the coach sets out the fitness benchmarks that the A-grade players will have to reach when they return from the off-season. She makes it clear to the squad that any player failing to meet the benchmarks will be relegated immediately to the C-grade squad. This leadership style is identified as

(a) assertive.
(b) laissez-faire.
(c) authoritarian.
(d) democratic.

10. Greg is a naturally talented, self-confident 14-year-old swimmer with a laid-back 'go-with-the-flow' personality. Up to now he has won his age-group races without much application or dedication to his training, compared with his peers. His coach realises Greg's talent will not be developed unless he takes steps to get his mental approach in order. Which of the following mental skills strategies is **most** likely to assist Greg to achieve greater success with his swimming?

(a) goal setting
(b) relaxation
(c) imagery
(d) self-talk

11. Mary is given a video clip of her gymnastics floor routine, in which she stumbles on landing and falls on her knees after a somersault. Which part of the video is the **most** effective way of highlighting the cause of this error?

(a) stumbled landing, because the coach wants her to see the outcome of the skill error
(b) run-up to the take off into the somersault
(c) run-up, take-off, aerial phase and landing
(d) whole two minutes of the floor routine to place the somersault within the routine's structure

See next page

12. Which statement regarding motor units is correct in relation to precise, fine motor skill control, such as making a soft underhand drop shot in badminton?

Muscles for fine motor skill control have motor units that

(a) comprise of a large number of muscle fibres each.
(b) fire at different times when the neuron is stimulated in order to grade the response in the motor unit.
(c) are made up of a relatively small number of muscle fibres each.
(d) rely on motor units with high stimulation thresholds to avoid muscles responding too readily and causing muscle tremor.

13. In teaching eight-year-olds how to do the triple jump in athletics, a teacher

(i) teaches the hop and has them practise.
(ii) teaches the skip and has them practise.
(iii) teaches the jump and has them practise.
(iv) then links the three parts together and has the students practise the entire triple jump.

Which coaching principle is the teacher applying?

(a) simple to complex practice
(b) static to dynamic practice
(c) shaping
(d) chaining

14. Protein powders are considered performance enhancing because they

(a) increase muscle catabolism (breakdown).
(b) increase rate of muscle recovery.
(c) decrease muscle protein synthesis.
(d) decrease muscle glycogen storage.

15. The Magnus effect supports the concept that a ball with ‘top spin’ would have a lift force directed

(a) downward.
(b) upward.
(c) toward the left.
(d) toward the right.

End of Section One

See next page

Section Two: Short answer **35% (70 Marks)**

This section has **10** questions. Answer **all** questions. Write your answers in the spaces provided in this Question/Answer Booklet. Wherever possible, confine your answers to the lines provided. Use a blue or black pen (**not** pencil) for this section.

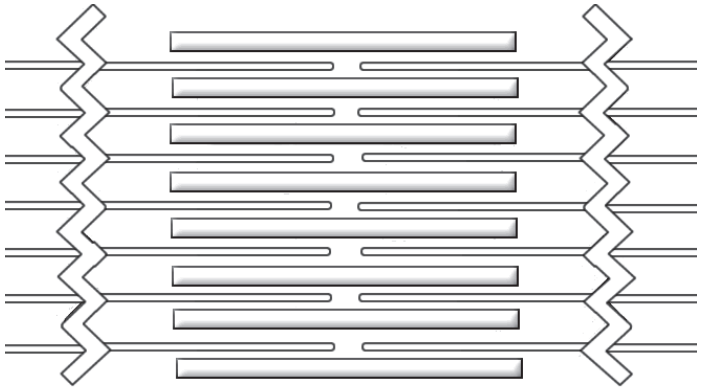
Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

- Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
- Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

Suggested working time: 70 minutes.

Question 16 **(5 marks)**

Label the myofilaments in the diagram below of a sarcomere and describe the sliding filament theory with respect to the interaction between these myofilaments.



See next page

Question 17 **(5 marks)**

(a) Identify the relationship between the duration of muscle contraction and the force exerted by the muscle. (2 marks)

(b) The force of a muscle contraction is also dependent on the starting length of the muscle. Explain the relationship between muscle length and force of contraction. (3 marks)

See next page

Question 18 **(8 marks)**

As part of its pre-season preparations, an Australian Football League team travels to a training camp situated 2100 m above sea level.

(a) Identify **four** physiological effects the players may experience on their arrival at the training camp, due to the high altitude environment. (4 marks)

(b) Explain the benefits of **four** physiological adaptations the athletes would achieve after attending the camp for three weeks. (4 marks)

See next page

Question 19 **(7 marks)**

In a pool-based swimming event, competitors have to dive off the starting blocks as quickly as possible.

(a) From the instant of the starter's signal to diving off the blocks, explain the process of the nerve function, with respect to the sensory neuron, spinal cord and motor neuron in causing the muscle contraction to perform the dive. (3 marks)

(b) At the 2009 World Swimming Championships in Rome, forty-three world records were broken. This is attributed to the performance enhancing full body swimsuits that were worn by athletes. With reference to biomechanics, explain **two** reasons why these suits improved swimmers' times. (4 marks)

See next page

Question 20 **(9 marks)**

The Hopman Cup is an annual international tennis tournament held in Perth. It is a team event in which a male and a female player represent each country. Each player plays a singles match and then the two players combine to play a mixed doubles match.

(a) Former winners of the tournament have come from countries that have paired players who are cohesive. Define and apply **two** types of group cohesion to teams in the Hopman Cup, according to Carron's model. (4 marks)

(b) The International Tennis Federation (ITF) regulations state that a tennis ball must bounce to a height of between 135 cm and 147 cm when dropped from a height of 254 cm. Identify and explain the biomechanical principle behind this rule. (3 marks)

See next page

Question 20 (continued)

(c) Low glycemic index (GI) meals are usually consumed by tennis players before their matches and high GI foods after them. Explain why this is such a widely accepted nutritional strategy in terms of maximising performance and recovery. (2 marks)

See next page

Question 21 **(7 marks)**

Question 21 refers to the photograph below.

(a) Name the type of recovery these football players are undertaking on the morning after their high intensity game. (1 mark)

(b) Explain the benefit to the muscular system of these players undertaking this type of recovery. (2 marks)

(c) Identify and explain the benefits of **two** other recovery techniques these athletes could use to enhance the recovery process for the muscular system. (4 marks)

See next page

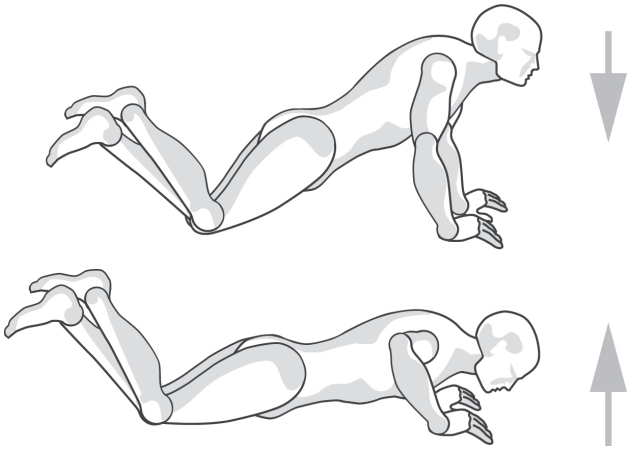
Question 22 **(7 marks)**

(a) Identify the lever system being used in the push-up shown in the diagram below and on the diagram label the fulcrum, resistance and effort. (4 marks)

Type of Lever: _____

For copyright reasons this image cannot be reproduced in the online version of this document, but may be viewed at www.menshealth.com/mhlists/international-pushup-variations/printer.php

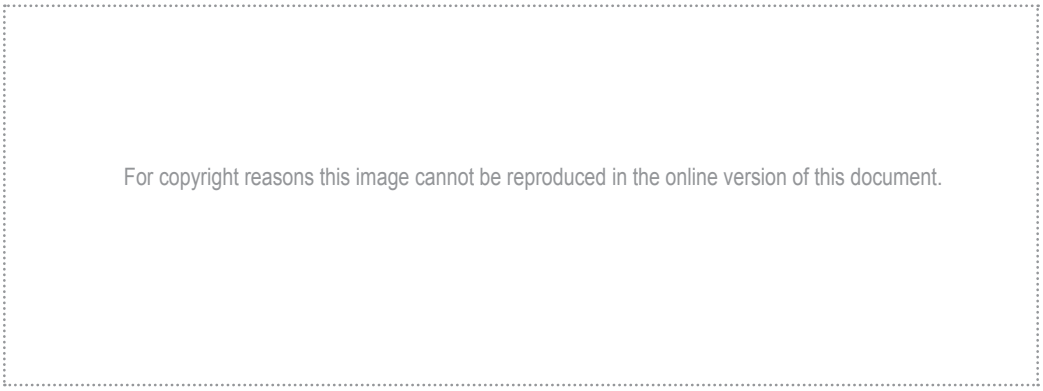
(b) From a biomechanical perspective, explain **three** changes that cause the push-up in the image below to be easier than the push-up in the image above. (3 marks)



See next page

Question 23 **(7 marks)**

Western Australian Kim Mickle set a new Australian record of 66.83 m for the female javelin event in March 2014.

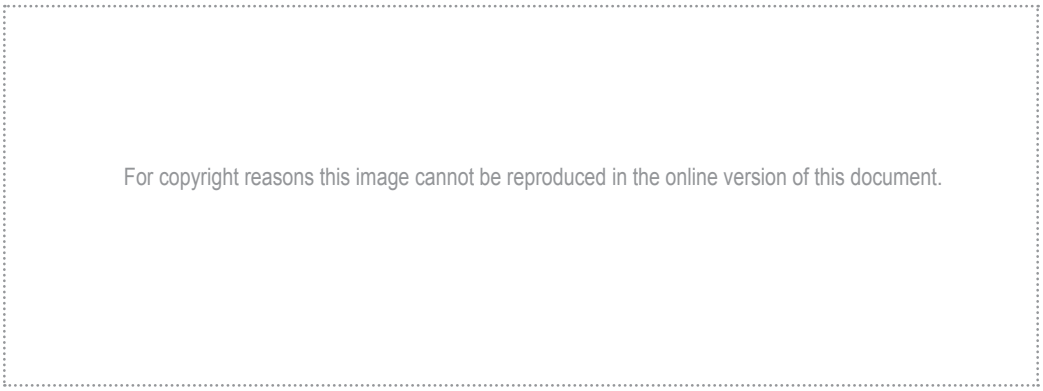


(a) In the space below, draw a labelled diagram to assist your explanation of how the javelin generates lift force after Kim has thrown it. (5 marks)

(b) Justify which predominant muscle fibre type Kim would have. (2 marks)

See next page

Question 24 **(8 marks)**



At the 2012 Olympic Games, Team USA's Gabrielle Douglas fell off the beam during the artistic gymnastics women's beam final.

(a) Identify and explain **one** mental skill strategy Gabrielle could use after her fall before she resumes her routine on the beam. (2 marks)

(b) Identify and explain another mental skill strategy she could use prior to her next apparatus, the uneven bars. (2 marks)

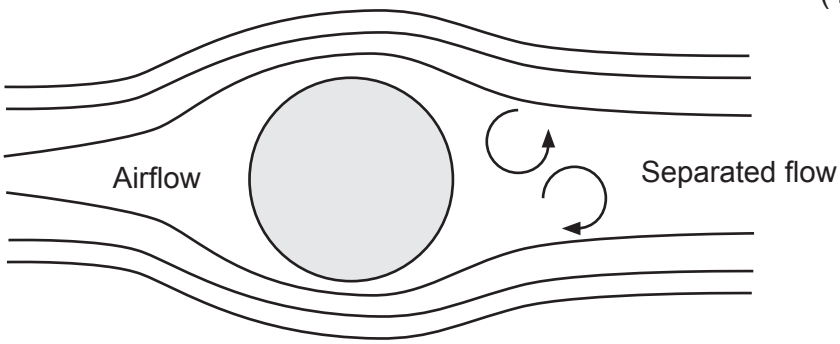
(c) A method Gabrielle's coach could use to correct and improve her performance is analysis. Draw a model outlining the **four** key tasks the coach would perform in analysing Gabrielle's technique. (4 marks)

See next page

Question 25 **(7 marks)**

In sports such as cycling, decreasing the amount of drag experienced by an athlete is a major goal in the design of equipment and the types of material used, as well as the athlete's positioning on the bike.

(a) On the diagram below, label turbulent flow and laminar flow and provide a definition of each. (4 marks)



Turbulent Flow: _____

_____

_____

Laminar Flow: _____

_____

_____

(b) State the type of drag that is being minimised for each of the following situations. (3 marks)

Intervention	Type of drag most affected
Change the position of the rider to being bent over the handlebars.	
Have the athlete wear a tight fitting body suit.	
Modify the helmet to taper toward the back.	

End of Section Two

See next page

Section Three: Extended answer **21% (30 Marks)**

This section contains **four (4)** questions. You must answer **two (2)** questions. Write your answers in the spaces provided.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

- Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
- Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

Suggested working time: 50 minutes.

Question 26 **(15 marks)**

In 2001, Frenchman Arnaud Tournant became the first man to go under one minute for track cycling's one km time trial. His time of 58.9 s was achieved at La Paz, Bolivia, which is located at 3650 m above sea level. In 2013, Tournant's record was bettered by François Pervis who rode a time of 56.3 s at Aguascalientes, Mexico, which is at an altitude of 3050 m above sea level.

(a) Why have these world records **not** been bettered at sea level? (5 marks)

(b) Athletes can use a variety of altitude training regimes in preparation for their events. Describe these regimes, explaining their application, identifying the most appropriate regime and justifying which type of athletes obtain the greatest benefit from altitude training. (10 marks)

See next page

See next page

Question 27 **(15 marks)**

A skilled coach understands that skills from different sports may have similar basic movement patterns. Many coaches use these similarities to enhance athletes' learning of new skills. Consider the basic underarm movement pattern illustrated in the three images below.

(i)

For copyright reasons this image cannot be reproduced in the online version of this document, but may be viewed at www.nnsl.com/sports/jan15_13badT.html

(ii)

For copyright reasons this image cannot be reproduced in the online version of this document, but may be viewed at www.oda.edu/uploaded/12-13/Summer_2013/Summer_Camp_Blog_Photos/DSC_4769.jpg

(iii)

(a) Demonstrate your knowledge of the principle of transfer of learning by defining the principle and explaining the main categories and possible resulting effects. Apply the principle to the skills shown in the three images by identifying at least **one** similarity and **one** difference that a coach would highlight. (9 marks)

See next page

See next page

Question 27 (continued)

Sarah's softball club is short of coaches for its junior teams and therefore training for these teams has involved practice sessions with large numbers of teenagers. A new coach is appointed who is aware of the phenomenon of social loafing and applies new strategies to minimise its effect at training.

(b) Define social loafing and give an example of what the coach would observe in a player demonstrating this. Discuss **four** strategies the coach could apply to reduce the effect of social loafing and enhance the junior teams' training. (6 marks)

See next page

Question 28 **(15 marks)**

The Perth Angels are a cheerleading team who have successfully represented Western Australia at the National and World Cheerleading Championships.

Part of their routine involves athletes being thrown high in the air by team members to complete flips, turns and somersaults.

There are three critical components to a successful routine; the first is the ability of the 'base' athletes to throw the 'flyer' athlete high in the air; the second is the ability of the 'flyer' athlete to control their rotations while in the air; and the third is the 'base' athletes successfully catching the 'flyer' athlete.

(a) Describe the biomechanical principles of projectile motion, moment of inertia and impulse and explain how each applies to the achievement of a successful performance in cheerleading. (9 marks)

See next page

See next page

Question 28 (continued)

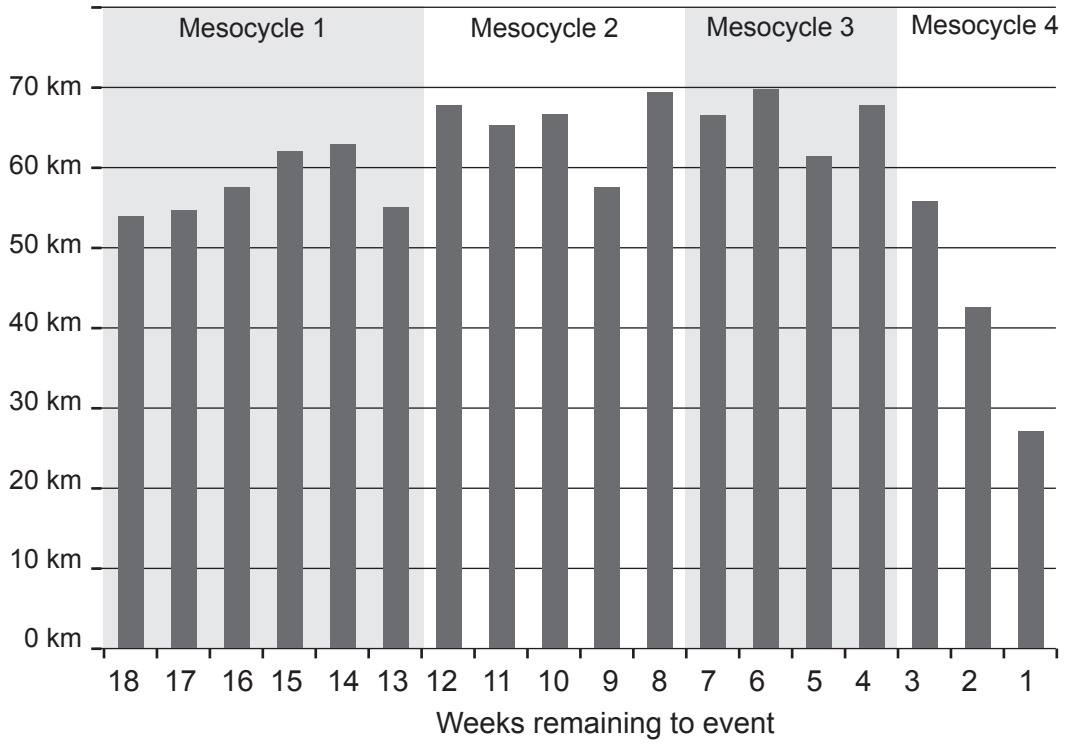
The coach of the Perth Angels is also the coach of a beginners' squad of 10-year-olds.

(b) Identify the leadership style the coach could use for each squad and justify your choice by describing **two** characteristics of each squad that would indicate the appropriateness of the leadership style. (6 marks)

See next page

Question 29 **(15 marks)**

Richard is an experienced runner whose longest race to date has been the Perth Half Marathon (21 km). He has decided to compete in the Perth Marathon (42 km). The graph below is a representation of his weekly training volume (distance) for the final 18 weeks of his training program.



(a) With reference to the above graph, discuss the following aspects of training design that Richard has considered in maximising his ability to run the Perth Marathon successfully:

- periodisation
- tapering
- recovery. (9 marks)

See next page

See next page

Question 29 (continued)

(b) A significant risk associated with training for a marathon is over-training. Define over-training and identify **five** symptoms Richard could display that could indicate he had over-trained. (6 marks)

End of questions

Spare answer page

Question number: _____

Spare answer page

Question number: _____

Spare answer page

Question number: _____

Spare answer page

Question number: _____

Spare answer page

Question number: _____

ACKNOWLEDGEMENTS

Section One

Questions 1–2 ArnoldReinhold. (2005, August 3). *Nerve.nida* [Image]. Retrieved from www.docstoc.com/docs/126546251/color-and-label-the-motor-neuron-below

Section Two

Question 16 Muskopf, S. (n.d.). *Sarcomere* [Image]. Retrieved from www.biologycorner.com/resources/sarcomere_coloring_Zline.gif Used under a Creative Commons Attribution-Noncommercial 3.0 United States License.

Question 21 Cunningham, L. (2013, July 30). *Recovery training session* [Image]. Photo: Lachlan Cunningham/AFL Media. Retrieved from www.carltonfc.com.au/gallery/2013-07-30/recovery-session-tuesday-30-july#bc58b7d332230410VgnVCM200000986bb70aRCRD

Question 22(a) Adapted from: Standard push up [Image]. In M. Rooney. (n.d.). *8 variations of the pushup*. Retrieved from www.menshealth.com/mhlists/international-pushup-variations/printer.php

Question 22(b) Adapted from: Mckibillo [McKible, Josh]. (2010). *Bent knee push up* [Image]. Retrieved from http://aimandachieve.blogspot.com.au/2012_06_01_archive.html

Question 23 Denholm, G. (2014, March 22). Kim Mickle takes aim [Image]. (Getty Image 480008511). Photo by Graham Denholm/Getty Images. In M. Gleeson. (2014, March 22). Mickle meets hero, then passes her. *Sydney Morning Herald*. Retrieved from www.smh.com.au/sport/athletics/mickle-meets-hero-then-passes-her-20140322-35amx.html

Question 24 Regan, M. (2012, August 7). Even champs have their down days [Image]. (Getty Image 149931951). In L. Boyle. (2012, August 14). The agony of defeat. *Daily Mail*. Retrieved from http://www.dailymail.co.uk/news/article-2187749/Olympic-Games-2012-The-athletes-crash-competition.html

Question 25(a) Image of aerodynamic drag around a sphere from: sigma. (2011, May 24). *The aerodynamics of model rockets part 2 – parasite drag and air flow types* [Web log post]. Retrieved March 27, 2013, from www.sigmarockets.com/blog/2011/05/the-aerodynamics-of-model-rockets-part-2-parasite-drag-and-air-flow-types/

Question 25(b) Veage, J. (2013, January 30). *Michael Hepburn on his way to winning* [Image]. Retrieved from http://tracknationals.subaru.com.au/2013/elite/photos/2013-subaru-cycling-australia-track-national-championships-session-2/

Section Three

Question 27

Image 1 YellowMonkey. (2010, February 8-9). *Sarah Elliott fielding 3* [Image]. Retrieved from http://images.ookaboo.com/photo/m/Sarah_Elliott_fielding_3_m.jpg Used under the Creative Commons Attribution-ShareAlike 3.0 Unported licence.

Image 2 Vela, T. (2013, January 15). *Sujal Shrestha goes for a serve* [Image]. Thandiwe Vela/NNSL photo. Retrieved from www.nnsl.com/sports/jan15_13badT.html

Image 3 *Volleyball players* [Image]. (2013). Retrieved from www.oda.edu/uploaded/12-13/Summer_2013/Summer_Camp_Blog_Photos/DSC_4769.jpg

Question 28 *Back tuck basket toss* [Image]. (n.d.). Retrieved from www.angelfire.com/falcon/cheer06/stunt_pics.html

Published by the School Curriculum and Standards Authority of Western Australia
303 Sevenoaks Street
CANNINGTON WA 6107