Western Australian Certificate of Education
Examination, 2014

Question/Answer Booklet

PHYSICAL EDUCATION STUDIES
Stage 3

Student Number: In figures

In words

Please place your student identification label in this box

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

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.
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

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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.
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.
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
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
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.

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- 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.
Question 17  (5 marks)

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

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(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)

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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)
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.  

(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.  

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)
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)
Question 21 (7 marks)

Question 21 refers to the photograph below.

For copyright reasons this image cannot be reproduced in the online version of this document, but may be viewed at www.carltonfc.com.au/gallery/2013-07-30/recovery-session-tuesday-30-july#bc58b7d332230410VgnVCM200000986bb70aRCRD

(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)
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: ________________________________

(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

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)
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)
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)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Type of drag most affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change the position of the rider to being bent over the handlebars.</td>
<td></td>
</tr>
<tr>
<td>Have the athlete wear a tight fitting body suit.</td>
<td></td>
</tr>
<tr>
<td>Modify the helmet to taper toward the back.</td>
<td></td>
</tr>
</tbody>
</table>

End of Section Two
Question 26  

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)
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)  
(ii)  
(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)
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)
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)
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)
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)
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)
Spare answer page

Question number: ____________
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ACKNOWLEDGEMENTS

Section One

Questions 1–2

Section Two

Question 16
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Question 21

Question 22(a)

Question 22(b)

Question 23

Question 24

Question 25(a)

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.  


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