



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

Western Australian Certificate of Education ATAR course examination, 2016

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.
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Student number: In figures

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In words

Time allowed for this paper

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

Number of additional
answer booklets used
(if applicable):

Materials required/recommended for this paper

To be provided by the supervisor

This Question/Answer booklet
Multiple-choice answer sheet

To be provided by the candidate

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

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

Important note to candidates

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

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Ref: 16-065



PES

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	10	10	70	78	50
Section Three Extended answer	4	2	50	30	30
				Total	100

Instructions to candidates

- The rules for the conduct of the Western Australian Certificate of Education ATAR course examinations are detailed in the *Year 12 Information Handbook 2016*. 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. 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: 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.
- Additional working space pages at the end of this Question/Answer booklet are for planning or continuing an answer. If you use these pages, indicate at the original answer, the page number it is planned/continued on and write the question number being planned/continued on the additional working space page.

See next page

Section One: Multiple-choice

20% (20 Marks)

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

Suggested working time: 30 minutes.

1. Which one of the following strategies is **least** likely to assist an archer to reduce their anxiety during an event?
 - (a) goal-setting
 - (b) relaxation
 - (c) self-talk
 - (d) imagery

2. What is the name of the functional unit in the contraction of skeletal muscle?
 - (a) myofibril
 - (b) cross bridges
 - (c) z-band
 - (d) sarcomere

3. The maximum force that can be developed in a concentric contraction by a skeletal muscle is
 - (a) independent of the ratio of muscle fibre types.
 - (b) dependent on the number of motor units innervated.
 - (c) dependent on the muscle shortening at its maximum rate.
 - (d) independent of the cross-sectional area of the muscle.



4. The ice skater above is in a fast spin with her arms held tightly to her body. When she extends her arms, which one of the following statements is **true**?
 - (a) She decreases her moment of inertia.
 - (b) She increases her angular speed.
 - (c) Her moment of inertia remains constant.
 - (d) Her total angular momentum remains constant.

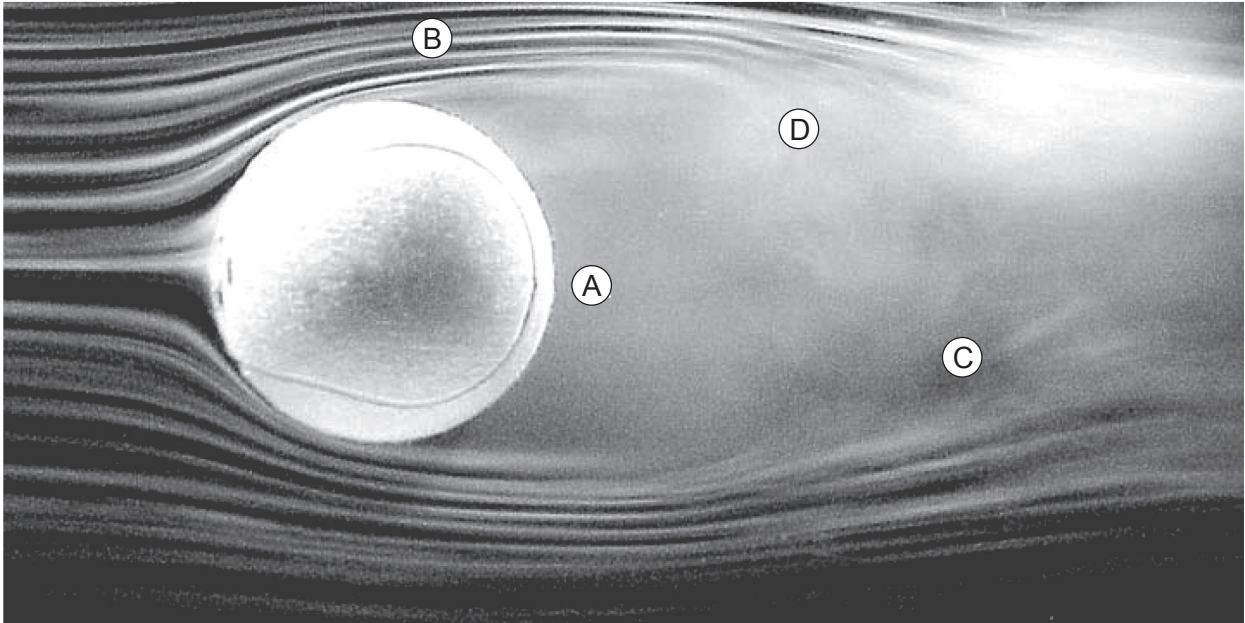
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5. Which one of the following statements regarding the muscle fibre contraction is **not** true?
- (a) Muscles used for precision movements have many muscle fibres innervated by each motor unit.
 - (b) When stimulated, the motor unit response is graded in direct proportion to the strength of the stimulation.
 - (c) In order for muscle fibre contraction to occur, the nerve impulse must exceed the stimulus threshold.
 - (d) The strength of the resultant whole muscular contraction is independent of the number of motor units recruited.
6. What is the name of the connective tissue layer that surrounds individual fascicles?
- (a) endomysium
 - (b) myosin
 - (c) perimysium
 - (d) epimysium
7. The concept that people are prone to exert less effort on a task if they are working in a group compared to when they work alone is social
- (a) cohesion and is more likely to occur with a large group size.
 - (b) loafing and is more likely to occur with a large group size.
 - (c) cohesion and is less likely to occur with a large group size.
 - (d) loafing and is less likely to occur with a large group size.
8. Two weeks out from the State Swimming Championships, Jane adjusts her training program to taper for her event. Which is the **most** appropriate way she could do this over the two-week period?
- (a) decrease the distance she swims in each session while maintaining the intensity
 - (b) maintain the distance she swims in each session while maintaining the intensity
 - (c) decrease the distance she swims in each session and decrease the intensity
 - (d) maintain the distance she swims in each session and decrease the intensity
9. A fascicle is **best** described as a bundle of
- (a) myofibrils.
 - (b) sarcomeres.
 - (c) muscle fibres.
 - (d) myofilaments.

10. An aspiring cricketer is seeking to add an element of variation to his leg spin bowling repertoire. In experimenting with a new delivery, he finds that he is able to develop a significant increase in the amount of topspin imparted to the ball during flight. Compared to his other deliveries, what should he expect to see when the ball hits the pitch?
- (a) The ball will bounce higher and kick on faster.
 - (b) The ball will bounce higher and slow down.
 - (c) The ball will bounce lower and kick on faster.
 - (d) The ball will bounce lower and slow down.
11. A golfer adjusts the range of motion of his swing by increasing the length of his backswing. This change will **most** likely
- (a) improve accuracy and increase the distance of the hit.
 - (b) reduce accuracy and increase the distance of the hit.
 - (c) improve accuracy and decrease the distance of the hit.
 - (d) reduce accuracy and decrease the distance of the hit.
12. Which of the following is **unlikely** to enhance physical recovery after an intense training session?
- (a) compression garments, hydrotherapy
 - (b) hydration, sleep, rest
 - (c) warm-down, nutrition, stretching
 - (d) additional fitness sessions, video analysis
13. An elite track athlete's motivation and self-confidence begins to wane, as repeated injuries occur at training in year two of the four-year Olympic cycle and leads to their withdrawal from a number of interim competitions. Which of the following mental skill strategies would **most** assist this athlete?
- (a) self-talk
 - (b) imagery
 - (c) goal-setting
 - (d) performance routine
14. The Cross Country Mountain Bike event at the Olympics lasts for approximately 90 minutes. In relation to the glycemic index of foods, which of the following statements is relevant to a cyclist in this event? The athlete should ingest a
- (a) high GI meal in the lead-up to the event and high GI foods during and immediately afterwards.
 - (b) low GI meal in the lead-up to the event and low GI foods during and immediately afterwards.
 - (c) low GI meal in the lead-up to the event and high GI foods during and immediately afterwards.
 - (d) high GI meal in the lead-up to the event and low GI foods during and immediately afterwards.

15. A junior cricketer is consistently being caught in the slips when batting because she is not strong enough to sufficiently control her favourite bat. Her coach recommends that she select a different bat. Which of the following alternatives would allow her to swing with **greatest** control?
- (a) a longer bat with the same mass
 - (b) a shorter bat with less mass
 - (c) a heavier bat with the same length
 - (d) a lighter bat with the same length
16. In Rio de Janeiro, the average relative humidity for the month of August is 71 per cent. What would be the impact of this on an athlete participating at the Rio Olympic Games?
- Their core body temperature will increase and stroke volume will
- (a) increase as will their heart rate.
 - (b) decrease as will their heart rate.
 - (c) increase while their heart rate will decrease.
 - (d) decrease while their heart rate will increase.
17. In relation to altitude training, which one of the following statements is **true**? Physiological adaptations will occur
- (a) after two to three weeks and will last forever on return to sea level.
 - (b) while the athlete remains at altitude and disappear when the athlete returns to sea level.
 - (c) after two to three weeks and will last for up to two months on return to sea level.
 - (d) immediately on arrival at altitude and will last for up to six months on return to sea level.
18. Many athletes take caffeine in an effort to improve their performance. A benefit of caffeine for athletes is it
- (a) improves glycogen sparing.
 - (b) increases the capacity of myofilaments to contract.
 - (c) prevents dehydration.
 - (d) delays the increase of the heart rate during exercise.

19. Which statement is **incorrect**? The coefficient of restitution is a
- (a) measure of the relative velocity between two bodies before and after they collide.
 - (b) number between 0 (perfectly elastic collision) and 1 (inelastic collision) inclusive.
 - (c) number that indicates how much kinetic energy (energy of motion) remains after a collision of two objects.
 - (d) comparison of the rebound height to release height of a ball.



20. For the above photograph, which one of the labels indicates the **best** example of laminar flow around the tennis ball?
- (a) A
 - (b) B
 - (c) C
 - (d) D

End of Section One

See next page

Section Two: Short answer**50% (78 Marks)**

This section has **10** questions. Answer **all** questions. Write your answers in the spaces provided. Use a blue or black pen (**not** pencil) for this section.

Additional working space pages at the end of this Question/Answer booklet are for planning or continuing an answer. If you use these pages, indicate at the original answer, the page number it is planned/continued on and write the question number being planned/continued on the additional working space page.

Suggested working time: 70 minutes.

Question 21**(10 marks)**

- (a) In the space below, draw a fully-labelled graph to represent the relationship between the velocity of muscle contraction and the amount of force produced in a concentric contraction. Provide a description of the relationship. (5 marks)

See next page

- (b) In the space below, draw a fully-labelled graph to represent the relationship between the length of a muscle and the amount of force exerted in a concentric contraction. Provide a description of this relationship. (5 marks)

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Question 22

(8 marks)

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At the end of the 2015 Australian Football League (AFL) season, the Carlton Football Club signed Matt Korcheck (pictured above) as an international rookie from America. He previously played basketball for the University of Arizona and had very little experience of Australian Rules football.

- (a) Name and define **two** coaching activities the Carlton coaches could use to teach Matt the skill of kicking an AFL ball. (4 marks)

One: _____

Two: _____

- (b) Name and outline **two** different methods the coaching staff could use to correct and improve Matt's skill of kicking an AFL ball. (4 marks)

One: _____

Two: _____

See next page

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Question 23

(7 marks)

- (a) On the photograph below of Nathan Walker, mark where the fulcrum, force and resistance would be in the action of hitting the puck. (3 marks)



- (b) Name the type of lever system that is used in the action of hitting the puck. (1 mark)

- (c) In playing ice hockey Nathan requires good balance. Identify **three** ways in which he can increase his stability. (3 marks)

One: _____

Two: _____

Three: _____

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Question 24

(10 marks)



Stephanie Gilmore is one of Australia's best surfers; she first learned to surf at the age of ten.

- (a) For her first lesson, the surfing instructor had Stephanie lay on her board while it was stationary on the sand and had her pretend to paddle and then push up into the correct standing position for surfing. Identify the coaching activity the instructor used and justify your answer. (3 marks)

- (b) The physics of fluid mechanics can be applied to surfing. Identify and define **two** types of drag that surfboard manufacturers need to consider and how they are applied in the design of a surfboard. (6 marks)

One: _____

Two: _____

- (c) Bernoulli's Principle can also be applied in the design of surfboards. Define this principle. (1 mark)

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- (b) Within the first hour after completing a 100 km stage in the Tour de France, a cyclist eats food to speed up their recovery. Identify the type of nutritional content and its effect for a cyclist consuming the following: (4 marks)

- (i) two slices of toast/bread with jam

- (ii) 95 gram can of tuna.

Question 26

(7 marks)



For 13 years, Melissa Barbieri was the goalkeeper for the Matildas (Australia’s female soccer team) until her retirement at the end of 2015.

- (a) Melissa’s success as a goalkeeper depended on her rapid detection of the ball and the fast reflexes of her central nervous system (CNS) to produce movements to intercept the ball. Identify the function of the following components of the neuromuscular system that are involved in producing a successful save of goal. (4 marks)

Dendrites of sensory neurons

Axons of motor neurons

Spinal cord

Motor unit

See next page

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- (b) Melissa's success as a goalkeeper can also be attributed to the coaching she received as a junior athlete. Her first coach used a checklist to analyse her performance. Identify the **three** steps in the process for a coach using a checklist to assist an athlete to improve. (3 marks)

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Question 27

(8 marks)

The backhand push is a table tennis stroke that allows the player to impart a large amount of backspin to the ball.

- (a) Identify the flight path of a table tennis ball hit with backspin. (1 mark)

- (b) In the space below, draw a fully-labelled diagram that illustrates how backspin affects the ball's flight path. (5 marks)

In contrast, the forehand drive is a stroke that imparts a significant amount of topspin to the ball.

- (c) Identify the flight path of a table tennis ball hit with topspin. (1 mark)

- (d) Provide a reason why a player would intentionally hit a ball with topspin during a rally. (1 mark)

See next page

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Question 28**(4 marks)**

Below is a table that includes key properties for the three types of muscle fibre. Fill in the missing information for the **unshaded** boxes.

Property	Muscle fibre types		
	Type IIb	Type IIa	Type I
Number of mitochondria			
Contractile speed			
Resistance to fatigue			
Force/tension generated			

Question 29**(6 marks)**

Protein powders, anabolic steroids and stimulants are three performance enhancers an AFL player may be encouraged to use. Identify **two** physiological effects for each of these performance enhancers that could have a negative physiological effect on a player's health. Fill in the table below.

Performance enhancers	Negative physiological effect	
	One	Two
Protein powder		
Anabolic steroid		
Stimulant		

See next page

Question 30

(9 marks)

Chelsea Gubecka is one of Australia’s best open water swimmers; she swims 10 km in under two hours. As part of her preparation for the 2016 Rio Olympic Games, she attended a two-week training camp where she spent at least 14 hours a day inside a house that was fitted out to mimic living at altitude.

- (a) Identify **three** physiological adaptations Chelsea would have achieved by living in the altitude house and how they would be of advantage to her performance. (6 marks)

One: _____

Advantage: _____

Two: _____

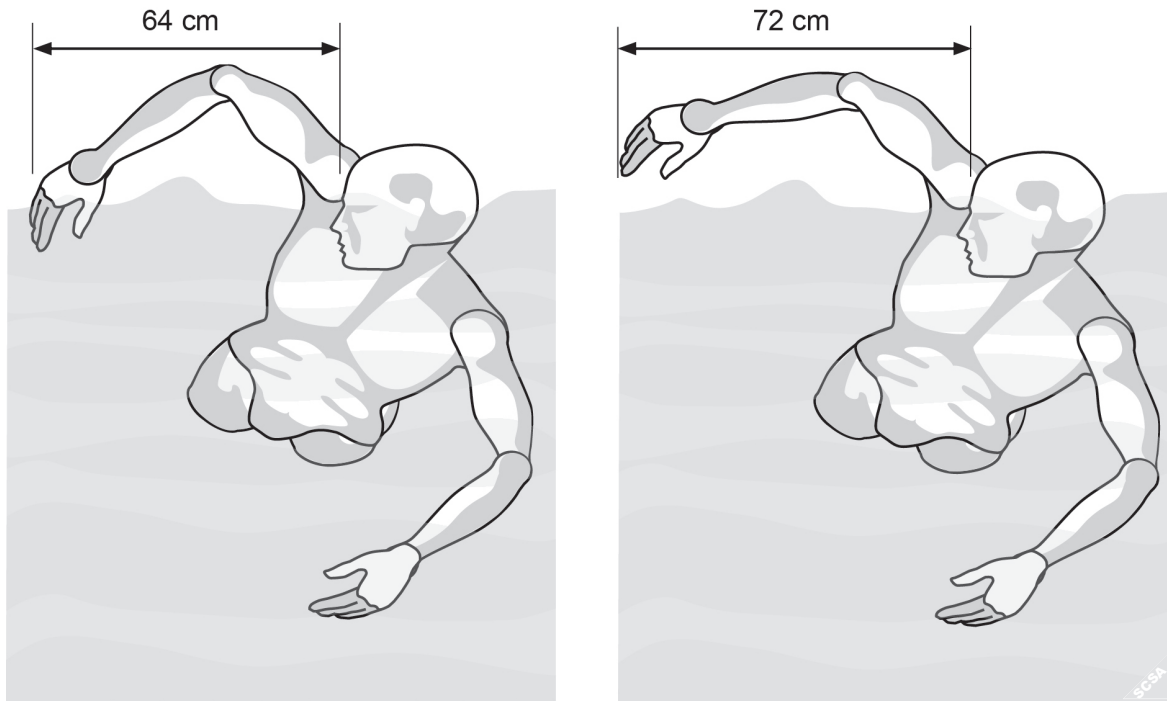
Advantage: _____

Three: _____

Advantage: _____

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- (b) Chelsea swims with a high elbow recovery in comparison to a recreational swimmer, who swims with an almost straight-arm recovery, as can be seen in the picture below. Identify and explain the biomechanical principle that Chelsea applies when swimming with this technique. (3 marks)



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End of Section Two

See next page

Section Three: Extended answer

30% (30 Marks)

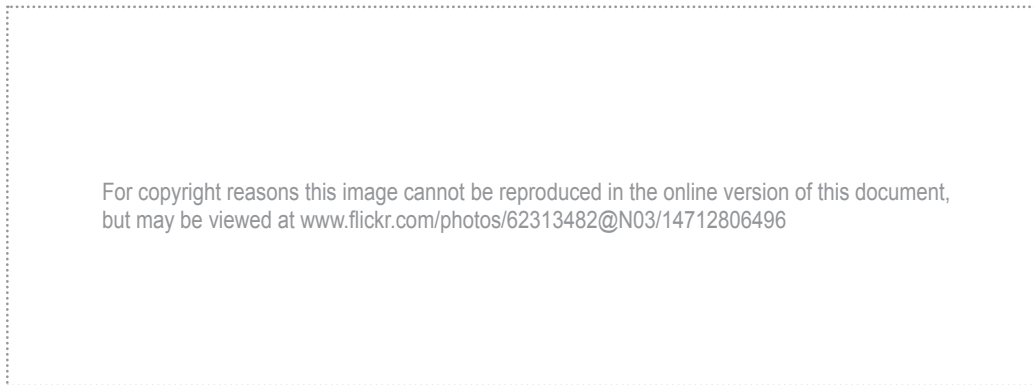
This section contains **four (4)** questions. You must answer **two (2)** questions. Write your answers in the spaces provided.

Additional working space pages at the end of this Question/Answer booklet are for planning or continuing an answer. If you use these pages, indicate at the original answer, the page number it is planned/continued on and write the question number being planned/continued on the additional working space page.

Suggested working time: 50 minutes.

Question 31

(15 marks)



Jarryd Hayne has twice won the National Rugby League’s (NRL) Dally M Medal, awarded to the best NRL player. At the start of 2015, he went to the USA to try out for the American Football (gridiron) team the San Francisco 49ers. Both sports require teams to move a ball downfield into an area marked at the end of the field to score points. In doing this, players carrying the ball need to avoid being tackled by the opposition. Jarryd believes there is a transfer of learning that allows him to switch from rugby to gridiron.

- (a) Define transfer of learning and identify **three** possible effects of transfer of learning. In addition, identify **one** category of transfer of learning that can be applied to Jarryd’s situation and say why. (6 marks)

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ACKNOWLEDGEMENTS

- Question 20** Image: NASA. (2015, April 29). *Tennis ball test*. Retrieved May, 2016, from www.nasa.gov/sites/default/files/thumbnails/image/edu_wind_tunnels_tennis_ball.jpg
- Question 22** **Image 1**
Miller, J.R. (2013, December 18). *Matt Korcheck* [Image]. Retrieved May, 2016, from http://tucson.com/matt-korcheck/image_6e57666e-02c7-50bf-9f01-affaa18e002c.html
- Image 2**
Trafford, A. (2015, November 18). *Michael Korcheck of the blues in action during the Carlton Blues training session at Ikon Park* [Image]. Retrieved May, 2016, from www.carltonfc.com.au/gallery/2015-11-19/training-november-18#f1adda800fc11510VgnVCM100000976bb70aRCRD
- Question 23** Image: NHL Enterprises. (n. d.). *Walker trying to become first Australian in NHL*. Retrieved May, 2016, from www.russianmachineneverbreaks.com/tag/nathan-walker/page/2/
- Question 24** Image: Scholtz, K. (2014, March 7). *Steph Gilmore scores through to the semis in style*. Retrieved May, 2016, from <http://resources0.news.com.au/images/2014/03/07/1226847/706572-bbb46a-a57a-11e3-900e-99186aa12c4d.jpg>
- Question 25** Image: Bonaventure, L. (2012, July 18). *Thomas Voeckler*. Retrieved May, 2016, from www.taipeitimes.com/images/2012/07/20/thumbs/P20-120720-334r.jpg
- Question 26** Image: Kolbe, M. (2011, August 23). *Melissa Barbieri*. Retrieved May, 2016, from www3.pictures.zimbio.com/gi/Australian+Matildas+Training+Session+Cf4pDIFupDjl.jpg
- Question 31** Images: Gannet Satellite Information Network. (2015, August 17). *Hayne – Header*. Retrieved May, 2016, from <https://usatftw.files.wordpress.com/2015/08/hayne-header.jpg?w=1000&h=600&crop=1>
- Question 32(a)** Image: Steele, I. (2014, July 24). *Aus v Mal 7*. Retrieved May, 2016, from www.flickr.com/photos/62313482@N03/14712806496
- Question 32(b)** Images: Sports Media Group. (n.d.). *Ciriello drag flick*. Retrieved May, 2016, from www.youtube.com/watch?v=RLj5fGoMuAE

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