



OFFICE OF TASMANIAN
ASSESSMENT, STANDARDS
& CERTIFICATION

Tasmanian Certificate of Education
External Assessment 2016

PLACE YOUR CANDIDATE
LABEL HERE

SPORT SCIENCE

(SPT315113)

PART 1

Time: 60 minutes

Pages:	16
Questions:	5

Candidate Instructions

1. You **MUST** make sure that your responses to the questions in this examination paper will show your achievement in the criteria being assessed.
2. Answer **ALL** questions.
3. Answers must be written in the spaces provided on the examination paper.
4. You should make sure you answer all parts within each question so that the criterion can be assessed.
5. This examination is 3 hours in length. It is recommended that you spend approximately 60 minutes in total answering the questions in this booklet.
6. All written responses must be in English.

On the basis of your performance in this examination, the examiners will provide results on each of the following criteria taken from the course statement:

- Criterion 1** Demonstrate knowledge and understanding of the physiological aspects of exercise.
- Criterion 4** Analyse and interpret sport science related data and information.
- Criterion 5** Demonstrate knowledge and understanding of interrelationships between exercise physiology, skill acquisition and sport psychology.

BLANK PAGE

Question 1

This question assesses Criterion 1.

Conditioning for physiological improvement should be an organised and adaptable process. It also needs to be designed to fit the needs of the individual athlete.

- (a) Define the terms 'aerobic capacity' and 'speed'. (2 marks)

.....

.....

.....

.....

- (b) In what phase(s) of a training year would you conduct fitness testing to measure aerobic capacity and/or speed? (2 marks)

.....

.....

.....

.....

- (c) List **FOUR** chronic, physiological adaptations of training to improve aerobic capacity. (2 marks)

.....

.....

.....

.....

- (d) Monitoring heart rate is often used to determine training intensity. A starting point is to calculate the maximum heart rate.

- (i) Calculate the maximum heart rate (MHR) for a reasonably conditioned 20 year old athlete. (1 mark)

.....

.....

- (ii) Explain why maximum heart rate (MHR) and the percentages of maximum heart rate are important considerations for an athlete. (2 marks)

.....

.....

.....

.....

Question 1 continues.

Question 1 (continued)

- (e) Explain why recovery intervals need to be longer if working at 85% of maximum heart rate (MHR) during work intervals than when working at 65% of MHR? (2 marks)

.....

.....

.....

.....

- (f) What type of recovery between work intervals may facilitate a slight reduction in recovery interval time following work at 85% of maximum heart rate (MHR)? (1 mark)

.....

.....

Question 2

This question assesses Criterion 1.

You have been asked to assist the coach of a local sporting team with the organisation of training. Your role will be to ensure the athletes can train effectively and safely and that each training session supports the gradual physiological improvement of each athlete.

- (a) Identify the sport you are working with. What are **THREE** fitness components necessary for an athlete in this sport? Provide a brief description of each component. (3 marks)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

- (b) Identify the **THREE** broad phases of a periodised training year. What should be the primary focus of each phase? (3 marks)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 2 (continued)

- (c) For **ONE** component of fitness describe how you could apply the training principles of specificity, progressive overload and variety. (3 marks)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

- (d) Identify the **THREE** accepted parts of a training session. (1 mark)

For **ONE** of these parts outline its main purpose. (1 mark)

Provide **TWO** examples of activities that would facilitate this purpose being achieved. (1 mark)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 3

This question assesses Criterion 1.

The Australian Institute of Sport (AIS) is actively seeking athletes for their elite programs who are currently involved in completely different sports. The AIS recognises that elements of physiology are transferable between sports.

- (a) The main energy system used in rowing would be beneficial to a rower wishing to become a triathlete. For this system, outline the major fuels used, the speed of ATP production and its limitations. (3 marks)

.....

.....

.....

.....

.....

.....

.....

- (b) Why would the main energy system used by a triathlete not be useful to a 100m track sprinter? Which energy system would be most useful to a 100m sprinter and what is its source of fuel? (2 marks)

.....

.....

.....

.....

.....

Question 3 (continued)

(c) A muscle biopsy can be used to assess different athletes' muscle fibre characteristics.

Complete the table below.

(4 marks)

Characteristics	100 Track Sprinter	Triathlete
Muscle capillary supply		
Muscle fibre proportion (%) Slow Twitch (Type I)		
Muscle fibre proportion (%) Fast Twitch (Type IIa)		
Muscle fibre proportion (%) Fast Twitch (Type IIb)		

(d) The AIS advises triathletes on the best way to recover between training sessions. Provide advice on recovery from continuous training that considers: (3 marks)

- approximate times for glycogen replenishment
- recommended foods and scheduling of eating this food to replenish glycogen
- rehydration requirements.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

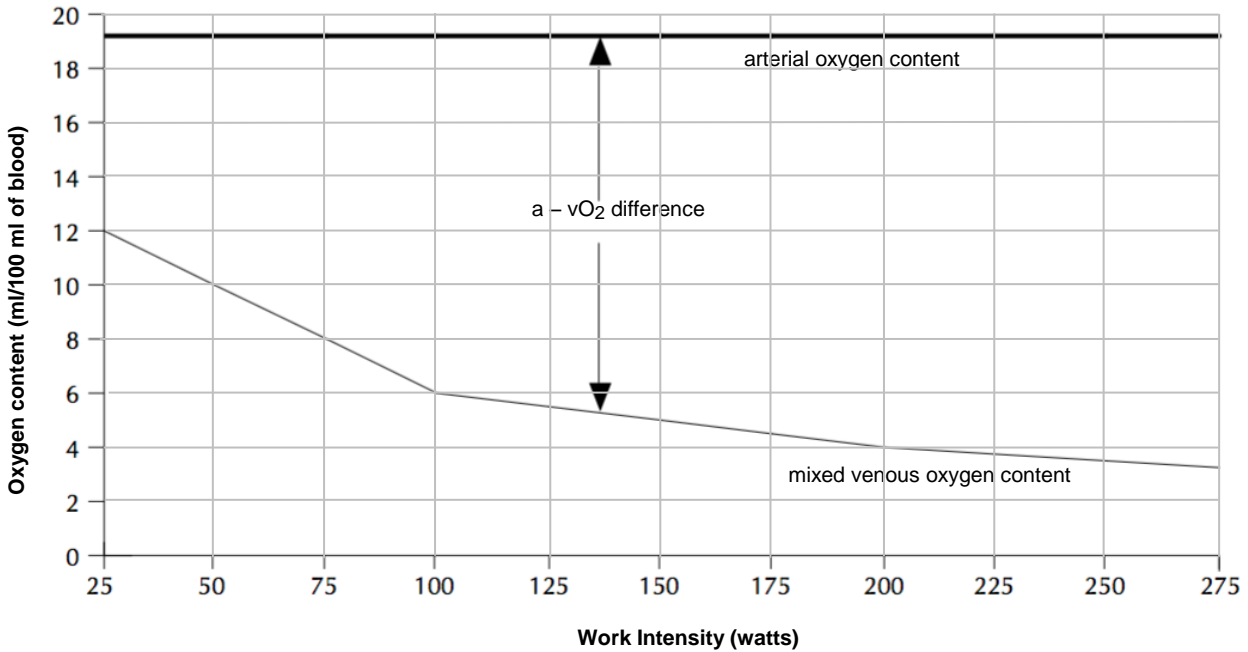
Question 4

This question assesses Criterion 4.

All answers to this question must make reference to the information that follows.

Graphs 1 and 2 indicate physiological changes in response to exercise on a cycle ergometer.

Graph 1 – Changes in arterial and mixed venous oxygen content with increasing intensity of work on a cycle ergometer



- (a) Identify the a – vO₂ difference at **both** 125 watts and at 225 watts. Refer to data in your answer. (2 marks)

.....

.....

.....

.....

- (b) Between which **TWO** work intensities does mixed venous oxygen content decrease at the greatest rate? What is the mixed venous oxygen content at each of these work intensities? Refer to data in your answer. (2 marks)

.....

.....

.....

.....

- (c) Which measure on the graph remains constant and what is its value? (1 mark)

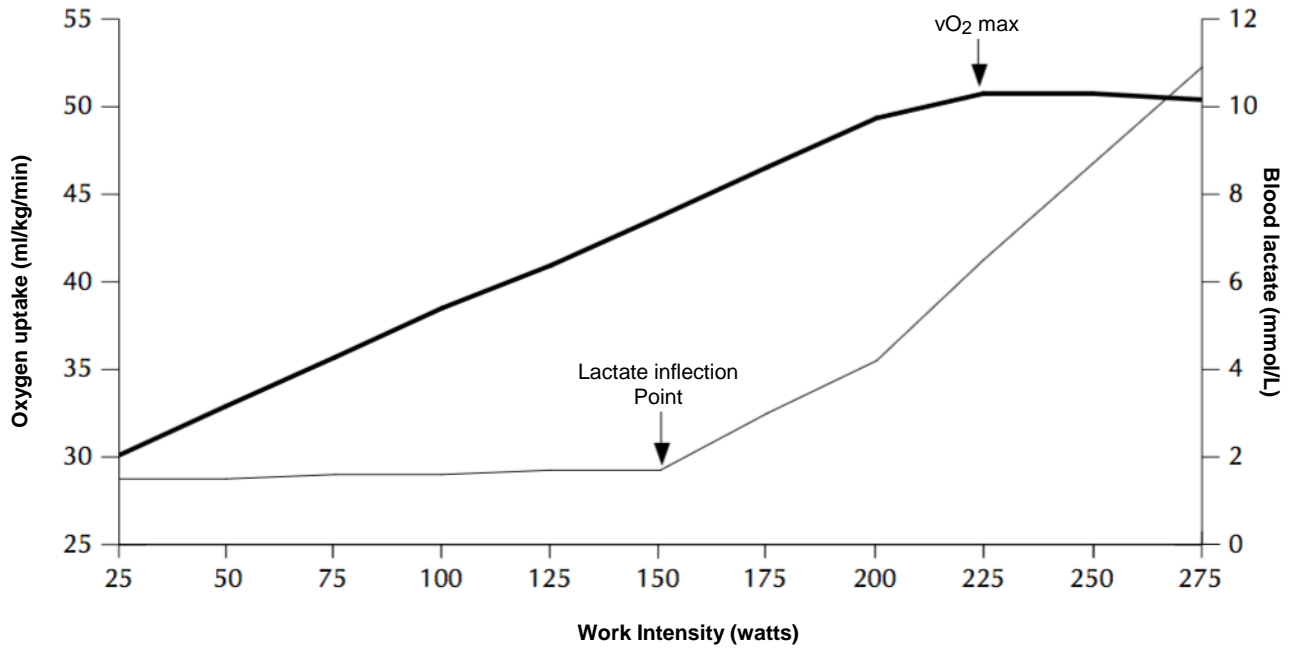
.....

.....

Question 4 continues.

Question 4 (continued)

Graph 2 – Changes in oxygen uptake and blood lactate concentrations with increasing intensity of work on a cycle ergometer



Key:

- Oxygen uptake
- Blood lactate

(d) At 100 watts what is the: (2 marks)

blood lactate reading?

oxygen update reading?

(e) At what work intensity is Lactate Inflection Point reached? What is the Oxygen uptake at this point? Refer to data in your answer. (1 mark)

.....

(f) Briefly describe what happens to blood lactate concentration at work intensities of 200 watts and greater. Refer to data in your answer. (2 marks)

.....

Question 4 continues.

Question 4 (continued)

(g) Refer to Graph 2 to complete the following table.

(2 marks)

Oxygen Uptake and Blood Lactate Concentration at Different Work Intensities

Work Intensity (watts)	Oxygen Uptake (ml/kg/min)	Blood Lactate (mmol/L)
50	33	
	45	
225		6.5

BLANK PAGE

BLANK PAGE



OFFICE OF TASMANIAN
ASSESSMENT, STANDARDS
& CERTIFICATION

This question paper and any materials associated with this examination (including answer booklets, cover sheets, rough note paper, or information sheets) remain the property of the Office of Tasmanian Assessment, Standards and Certification.