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| **Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**\_** | |
| logo | **Year 11 ATAR Phys Ed Studies** |
| **Task 2 Validation – Exercise Physiology** |

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| **Assessment type** | **Conditions** | **Task weighting** | **Marks allocated** | |
| Validation | 60 minutes | 2.5% | /33 | % |

**Question 1 (9 marks)**

Ariarne Titmus is the women’s national 400m swimming champion. To win the gold medal, she completed the race in 4 minutes and 01 second. During the race, Ariarne will activate all 3 energy systems. Identify each of the energy systems and explain how each will contribute to her energy output and her performance during the race.

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**Question 2 (24 marks)**

Excess Post Oxygen Consumption (EPOC) explains why a candidate is breathing heavily after vigorous exercise. Draw a fully labelled diagram and complete the following:

1. Fully labelled diagram (4 marks)
2. Define steady state and what energy pathway it is associated with? (2 marks)
3. Between the first 2 steady state areas of the graph a number of immediate

changes occur in the body, identify and describe nine (9) of these (18 marks)

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**Marking Key**

**Question 1 (9 marks)**

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| Description | 9 Marks |
| ATP-PC system:   * begins to resynthesise ATP immediately once Ariarne dives from the blocks * is the predominant energy system for the first 10 sec * fuels high intensity and explosive start off the blocks * fatigues very quickly all used by 10 – 15 sec mark   Lactic acid system:   * gradually increases ATP resynthesise as the race progresses * is the predominant energy system from the 10 sec point to 150 sec depending on training adaptations * high intensity work rate for the first 100-150m * will be used during tumble turn to get back up to speed * fatigues due to lactic acid produced   Aerobic system:   * gradually increases ATP resynthesise as the race progresses * is the predominant energy system from 150 second mark depending on training adaptations * moderate to high intensity work rate for the final 2 minutes of the race * Performance/speed will slow under the aerobic energy system * will not fatigue in this race * uses oxygen efficiently in producing energy | 1 mark for naming energy system  2 marks for application  1 mark for naming energy system  2 marks for application  1 mark for naming energy system  2 marks for application |

**Question 2 (24 marks)**

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|  | 1. Each label worth ½ mark (4 marks total)  * Label O2 axis * Label time axis * Resting steady state * Commencement of activity/exercise * O2 deficit * Exercise steady state * Completion of activity/exercise * EPOC/O2 debt |

b) 1 mark for definition and 1 mark for identification of correct energy system outlined below;

Steady state – a plateau in oxygen consumption indicating that oxygen delivery to the working muscle is at a sufficient level to provide adequate ATP production via the **aerobic energy system**

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| Description | 18 marks |
| ⇧ Heart Rate - Number of times the heart beats per minute  ⇧ Stroke Volume - Volume of blood ejected by the heart per beat  ⇧ Cardiac Output - Total blood flow circulated per minute, or HR x SV  ⇧ Systolic Blood Pressure - Pressure of blood on the artery walls whilst the heart is contracting  ⇧ Respiratory (Breathing) Rate - Number of breaths per minute  ⇧ Tidal Volume – Amount/volume of air breathing in with each breath  ⇧ Minute ventilation – Amount/volume of air inspired each minute  ⇧ Gas exchange – Increased rate of diffusion through capillary wall  ⇧ AVO2 Difference - Difference in oxygen concentration in the blood between the arteries and the veins  ⇧ Systolic blood pressure – Pressure of blood on the artery wall as heart contracts  Selective redistribution of blood – vasoconstriction and vasodilation control flow of blood to be directed to exercising muscles and away from other organs  Vasodilation/thermoregulation - Blood vessels to the skin dilate allowing for increased heat loss to control core temperature | 1 mark to identify  1 mark for correct description of each  factor |