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Mark Scheme (Results)

Summer 2012

Principal Learning Sport and Active Leisure (SL303)
Unit 3: Science and Technology in Sport and Active Leisure

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Question Number	Answer	Mark
1(a) (i)	Award 1 mark for each correct identification up to a maximum of three marks. X - Quadriceps Y - Hamstrings Z - Gastrocnemius / calf muscle (not calf)	**(3)**

Question Number	Answer	Mark
1(a) (ii) **1(a) ii1** **1(a) ii2** **1(a) ii3** **1(a) ii4**	Award 1 mark for each correct point up to a maximum of 4 marks. Knee – Extension (1) Knee – Quadriceps (1) Knee – Prime mover/agonist (1) Knee – Concentric contraction (1)	**(4)**

Question Number	Answer	Mark
1(b)(i)	Award 1 mark for each correct point up to a maximum of two marks. **eg** Using a high resistance (1) and performing a small number of repetitions (1) can be used to develop strength. Rest intervals between sets will be long (1). Or **eg** Use a resistance to overload muscle (1) so that they experience hypertrophy (1) / grow bigger and stronger (1).	**(2)**

Question Number	Answer	Mark
1(b)(ii)	Award 1 mark for each correct point up to a maximum of two marks. **eg** Using a low or moderate resistance (1) and performing a high number of repetitions (1) can be used to develop muscular endurance. Recoveries will be short (1). Or Use resistance training to make muscle work anaerobically (1) so that it becomes more able to tolerate the presence of lactic acid (1) and work anaerobically for longer periods of time (1)	**(2)**

Question Number	Answer	Mark
1(b)(iii)	Award 1 mark for correct point up to a maximum of four marks. **eg** Resistance training results in micro tears (1) in skeletal muscle and the muscle will grow back a little bit thicker (1). This process is called hypertrophy (1). Over time this leads to muscle getting bigger and stronger (1). Connective tissue will also become thicker and stronger (1). Bone density will increase (1)	**(4)**

Question Number	Answer	Mark
2	Award 1 mark for correct point up to a maximum of 4 marks. • When breathing in, the air pressure in the lungs is lowered as the diaphragm contracts/moves down (1) and the external intercostal muscles contract to pull the ribs up/out (1) to enlarge the thoracic cavity (1). • When breathing out, the air pressure in the lungs is increased as the diaphragm relaxes/moves up (1) while the ribs move down/in (1) to reduce the volume of the thoracic cavity (1)	**(4)**

Question Number	Answer	Mark
3(a)	Award 1 mark for each correct descriptive point up to a maximum of one mark. Testosterone levels fall as males age.	**(1)**

Question Number	Answer	Mark
3(b)	Award 1 mark for each correct descriptive point up to a maximum of two marks. Testosterone is the male sex hormone (1) It is responsible for the development of male secondary sexual characteristics (1). Androgenic effects include deepening of voice, facial hair, pubic hair etc (1). Testosterone is produced by the testes in men and ovaries in women (1).	**(2)**

Question Number	Answer	Mark
3(c)	Award 1 mark for each correct descriptive point up to a maximum of six marks. **eg** Male athletes' levels of strength and aggression will fall as they age (1). Younger athletes with high levels of testosterone will be bigger and stronger (1). They will have bigger stronger muscle and bones and will therefore have an advantage in sports where strength or power are important (1). High testosterone levels will also make younger athletes more aggressive (1) which will be an advantage in contact sports (1). Stronger muscles and increased bone density will reduce the risk of injury to younger athletes (1). Younger athletes will be able to train harder (1) and recover more quickly (1).	**(6)**

Question Number	Answer	Mark
4(a)	Award 1 mark for each correct descriptive point up to a maximum of two marks. **eg** • The athlete is leaning to the side (1) so his centre of gravity will have moved away from the centre of his body towards the same side (1). • The athlete's feet position means he has a narrow base of support (1) meaning that the centre of gravity will be close to its edge or outside of the base (1).	**(3)**

Question Number	Answer	Mark
4(b)	Award 1 mark for each correct descriptive point up to a maximum of three marks. **eg** The athlete's centre of gravity is outside, or near the edge, of his base of support (1), meaning that he will be less stable (1) and it will be easier for him to change direction (1). His body will fall towards or move towards his centre of gravity (1)	**(3)**

<table>
<tr><th colspan="2">Question Number</th><th>Indicative Content</th></tr>
<tr><td colspan="2">5</td><td>Explanation of methods used to acclimatise to hot conditions and high altitudes:

Methods
• Heat chamber or acclimatisation camp.
• Altitude acclimatisation camp or hypoxic chamber.

Explanation of how physiological adaptations will lead to improved performance:

Adaptations to heat acclimatisation
• Increased sweat rates
• Sweating starts at lower core temperatures
• Faster heat loss through radiation and convection
• Increased plasma volume
• Decreased heart rate
• Lower core body temperature
• Altered fuel metabolism
• Increased oxygen consumption
• Increased sodium chloride retention

Adaptations to altitude
• Increased production of red blood cells
• Capillarisation
• Increased mitochondria
• Increased myoglobin</td></tr>
<tr><th>Level</th><th>Mark</th><th>Descriptor</th></tr>
<tr><td></td><td>0</td><td>No rewardable material</td></tr>
<tr><td>1</td><td>1-4</td><td>Answers will include a limited explanation of one method that could be used to prepare. Little or no technical information of how the methods work. Answers will include a limited explanation of how physiological adaptations lead to improved performance.</td></tr>
<tr><td>2</td><td>5-7</td><td>Answers will include some analysis of the use of one or more methods. Some reference to technical information and the principles involved. Answers will include a sound explanation of the relationship between physiological acclimatisation and improved performance. Some application to the stimulus material.</td></tr>
<tr><td>3</td><td>8-10</td><td>A detailed explanation of the use of at least one method for acclimatising to hot conditions and one method for acclimatising to altitude. Technical information of how the methods work is present and accurate. Answer clearly applied to the stimulus material. A detailed explanation of how acclimatising to both hot conditions and altitude will lead to improved performance. Answer is clearly applied to the stimulus material.</td></tr>
</table>

Question Number		Indicative Content
6		The use of quantitative and qualitative coaching techniques: **Quantitative** • Use of biomechanics to quantify performance. • Fitness test results. • Results, times, distances etc. • Motion or notational analysis **Qualitative** • Feedback. • Questionnaires • Observations • Interviews • Reflections
Level	Mark	Descriptor
	0	No rewardable material
1	**1-3**	Responses will include a basic evaluation of how quantitative and qualitative methods are used to improve performance.
2	**4-6**	Responses will a sound evaluation of how quantitative and qualitative coaching methods can be used to improve performance. There will be clear explanation of how the methods used can lead to improved performance.
3	**7-8**	A detailed evaluation of how quantitative and qualitative coaching methods can be used to improve performance. Evaluation will include the advantages and disadvantages of the methods discussed.

Question Number		Indicative Content
7		The use of technological developments in equipment used: **Examples of how technology has led to the development of equipment that can improve performance** **Eg.** • More reliable equipment • Light weight equipment • More aerodynamic equipment • Safer equipment • More accurate equipment • More comfortable equipment
Level	Mark	Descriptor
	0	No rewardable material
1	**1-3**	Responses will include a basic explanation of how technology has been used to produce equipment that can improve performance. Limited technical information to explain how equipment improvements lead to improved performance.
2	**4-6**	Responses will include a sound evaluation of how technology has been used to develop equipment, and how that equipment has improved performance. Specific examples may be used to illustrate points made.
3	**7-8**	A detailed evaluation of how technological developments in equipment have led to improved performance. There will be technical detail of how the equipment improves performance.

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