

Mark Scheme (Results)

January 2012

PL Sport and Active Leisure
(SL303)

Paper 1 Science and Technology in
Sport and Active Leisure

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Answer	Mark
1(a) (i)	<p>Award 1 mark for each correct identification up to a maximum of three marks.</p> <ul style="list-style-type: none"> • X hip – Ball and Socket • Y knee - Hinge • Z ankle - Hinge 	(3)

Question Number	Answer	Mark
1(a) (ii)	<p>Award 1 mark for each correct point up to a maximum of 2 for each joint.</p> <p>Description X</p> <ul style="list-style-type: none"> • Extension at the hip as the leg moves back (1). Flexion at the hip as the leg moves forward (1) • A maximum of 1 mark if candidates merely identify that flexion and extension are taking place. <p>Description Y</p> <ul style="list-style-type: none"> • Extension at the knee as the leg straightens at the knee (1). Flexion at the knee as the leg bends at the knee (1). • A maximum of 1 mark if candidates merely identify that flexion and extension are taking place. <p>Description Z</p> <ul style="list-style-type: none"> • Dorsi flexion at the ankle as the foot is lifted up (1). Plantar flexion as the athlete pushes off their toes (1) • A maximum of 1 mark if candidates merely identify that plantar flexion and dorsi flexion are taking place. 	(4)

Question Number	Answer	Mark
1(b) (i)	<p>Award 1 mark for correct identification.</p> <ul style="list-style-type: none"> • Athlete B 	(1)

Question Number	Answer	Mark
1(b)(ii)	<p>Award 1 mark for each correct point up to a maximum of four marks.</p> <ul style="list-style-type: none"> • Athlete 2 has the greatest proportion of type 2b fibres (1). These fibres produce high levels of force (1) and contract quickly (1) enabling the athlete to sprint quickly (1) • Athlete 2 has a high proportion of type 2a fibres (1) and these fibres have some characteristics that are similar to those of fast twitch fibres (1) • Athlete 2 has the lowest proportion of type 1 fibres (1) which are suited for endurance events and not a sprint(1). 	(4)

Question Number	Answer	Mark
2(a)	<p>Award 1 mark for correct relationship.</p> <ul style="list-style-type: none"> • Growth hormone levels increase as the intensity of exercise increases (1) • When they train at low intensity growth hormone does not increase much, but when they train at high intensity it increases a lot (1) 	(1)

Question Number	Answer	Mark
2(b)	<p>Award 1 mark for each correct point up to a maximum of five marks.</p> <ul style="list-style-type: none"> • Higher levels of growth hormone lead to increase growth of muscle / hypertrophy (1). • Bones increase in density (1). • Increased strength of connective tissue (1) • The athlete becomes bigger and stronger and can produce more force (1). • Fat metabolism increases leading to reduced body fat levels (1). • Athletes less prone to injury (1) • Abnormally high levels of growth hormone (1) lead to gigantism (1). <p>Or any other realistic response.</p>	(5)

Question Number	Answer	Mark
3(a)	<p>Award 1 mark for each correct descriptive point up to a maximum of two marks.</p> <ul style="list-style-type: none"> • At greater speeds air breaks away from the surface of the ball sooner (1) resulting in increased turbulence or turbulent flow at the rear of the ball (1). <p>Awards marks for a diagram which shows the same descriptive points as above. Do not double credit diagram and text.</p>	(2)

Question Number	Answer	Mark
3(b)	<p>Award 1 mark for each correct descriptive point up to a maximum of four marks. Credit reference to one sport only. For example:</p> <p>Swimming</p> <ul style="list-style-type: none"> • The need to reduce drag in water to increase speed/reduce effort (1). A streamlined body or technique will reduce drag (1) by reducing turbulence at the back of the swimmer (1). Swimwear, hair removal, swim hat can be used to reduce drag(1) <p>Cricket</p> <ul style="list-style-type: none"> • Players can deliberately manipulate the ball to affect the flight of the ball(1) by making one side of the ball smooth/shiny and the other side rough (1) they create high pressure on one side and low on the other (1) one side will move faster through the air than the other causing it to spin (1) <p>Or any other realistic response for these and all other sports.</p>	(4)

Question Number	Answer	Mark
4(a)	<p>Award 1 mark for each correct identification point up to a maximum of four marks.</p> <ul style="list-style-type: none"> • Sarah is sprinting and a marathon is not a sprint (1) • Sarah's training is developing anaerobic fitness not cardiovascular endurance (1). • The work intervals are too short and intense (1). • The recovery periods are too long relative to the work interval (1) to effectively develop cardiovascular endurance. She is using her anaerobic energy system to provide energy (1) not her aerobic system (1) • 95% of MHR is too high, she should train at a lower HR (1) • She is working her fast twitch fibres and should be working her slow twitch (1). <p>A maximum of 2 marks for saying what she should be doing without stating why her training is inappropriate.</p>	(4)

Question Number	Answer	Mark
4(b)	<p>Award 1 mark for each correct point up to a maximum of four marks.</p> <p>Interval session (1)</p> <ul style="list-style-type: none"> • Long work intervals (1) so that the anaerobic energy systems aren't making such a significant contribution to the energy demands.(1) • Moderate work intensity (1) so that the aerobic energy system (1) makes a greater contribution to the energy demands. • Short rest intervals (1) so that she doesn't totally recover between work intervals (1). <p>Fartlek session (1)</p> <ul style="list-style-type: none"> • Use a fartlek session that is prolonged (1) and of low to moderate intensity (1) so that the aerobic energy system makes a significant contribution(1). Variation in intensity throughout, using active recoveries such as walking or jogging(1) to ensure session is primarily aerobic (1) <p>Continuous session (1)</p> <ul style="list-style-type: none"> • Use a session that is prolonged (1) and of low to moderate intensity (1) so that the aerobic energy system is making a significant contribution(1). Little or no variation in intensity (1). Training in the athlete's aerobic zone(1). <p>Or any other realistic response for a person of average fitness.</p>	(4)

Question Number		Indicative Content
4(c)		<p>Description of physical changes and affects on performance:</p> <p>Adaptations</p> <ul style="list-style-type: none"> • An increase in Stroke volume means that the heart can pump more blood per beat. • An increase in cardiac output means that the body can be supplied with a greater volume of blood every minute • Both of the above adaptations mean that working muscle can be supplied with oxygen and glucose/fatty acids more rapidly and carbon dioxide can be removed more rapidly. This means that athletes can work at a higher intensity aerobically. • An increase in vital capacity means that a greater volume of air can be inhaled and exhaled per breath. This means that more oxygen can diffuse into the blood stream. • An improved aerobic system may mean an athlete can work at a higher intensity before they experience the onset of blood lactate accumulation due to increased anaerobic respiration.
Level	Mark	Descriptor
	0	No rewardable material
1	1-3	Answers will include basic description of a limited range of adaptations and limited links of how they lead to improved performance.
2	4-6	Answers will include a sound description of a range of adaptations and there is a clear explanation of how the adaptations in the table lead to improved performance.
3	7-8	A detailed explanation of the adaptations and how they lead to improved performance. A sound use of appropriate scientific terms and scientific description of processes.

Question Number	Answer	Mark
4(d)	<p>Award 1 mark for each correct descriptive point up to a maximum of four marks.</p> <ul style="list-style-type: none"> • Increased risk of injury (1) as the body has insufficient time for repair and recovery (1). • Increased risk of illness (1) as the immune system can become suppressed (1). • Repeated movements can stress the same area (1) causing chronic injury (1) • Very low levels of fat (1) that could be unhealthy (1). • Example of chronic injury (1) • Very tired / fatigued (1). • Reduced performance (1) <p>Or any other realistic response.</p>	(4)

Question Number	Answer	Mark
5(a)	<p>Award 1 mark for identifying.</p> <ul style="list-style-type: none"> • Subjects ran faster in the new spikes 	(1)

Question Number	Answer	Mark
5(b)	<p>Award 1 mark for each correct descriptive point up to a maximum of five marks.</p> <ul style="list-style-type: none"> • The average change in time could be calculated(1). This would show any overall differences between them but not whether they are significant (1) Calculating the percentage would show how big the change was (1). • T-tests can be used to assess whether any differences (1) between two sets of data are significant (1). <p>Expansion of how a T-test works can be awarded up to 5 marks.</p>	(5)

Question Number	Indicative Content	
5(c)	<p>Strengths and weaknesses of testing:</p> <p>Strengths</p> <ul style="list-style-type: none"> • Testing was conducted on an athletics track the surface would have been the same on each occasion making results more reliable. • High environmental validity. • Testing was conducted over a valid distance. • Subjects are similar in terms of age and experience / level <p>Weaknesses</p> <ul style="list-style-type: none"> • A small number of subjects were tested meaning it may be less likely that any changes will be statistically significant. • Testing was conducted on different days meaning environmental conditions may have been different and this could have affected testing making results less reliable. 	
Level	Mark	Descriptor
	0	No rewardable material
1	1-3	Responses will include a basic identification of strengths and weaknesses.
2	4-6	Responses will include some evaluation of one or more factors that were strengths and weaknesses. Some limited evaluation of reliability and validity.
3	7-8	A detailed evaluation of the testing in which the principles of reliability and validity are clearly and accurately applied to the characteristics of the testing.

Question Number	Answer	Mark
5(d)	<p>Award 1 mark for each correct point up to a maximum of two marks.</p> <p>For example:</p> <ul style="list-style-type: none"> • Video analysis allows detailed analysis of movement patterns (1) so that clothing can be designed to enhance performance/maximise possible movement (1) • New light weight materials can be used in tennis rackets (1) to give maximum power with minimum effort(1) • New synthetic fabrics in raincoats (1) give water protection but are breathable, improving participants' experience(1) <p>Or any other realistic response.</p>	(2)

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