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## Mark Scheme (Results)

October 2020

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In Physical Education (8PE0/01)

Paper 1: Scientific Principles of Physical Education

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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.

## Section A

Question Number	Answer	Additional Guidance	Mark
<b>1</b>	<ul style="list-style-type: none"> <li>• (Horizontal) flexion</li> <li>• (Horizontal) extension</li> <li>• Abduction</li> <li>• Adduction</li> <li>• (Medial/lateral) Rotation</li> <li>• Circumduction</li> </ul>	<p>1 mark for each bullet point</p> <p>Maximum of 3 marks</p>	<b>(3)</b>

Question Number	Answer	Additional Guidance	Mark
<b>2</b>	<p>E.g.</p> <p>At the elbow joint:</p> <ul style="list-style-type: none"> <li>• to cause flexion the (biceps brachii) contracts/shortens is the agonist</li> <li>• to cause extension the biceps brachii relaxes/lengthens is the antagonist</li> </ul>	<p>Accept any correct example of an antagonistic pair e.g. biceps/triceps, hamstring group/quadricep group, hip flexors/gluteals gastrocnemius/tibialis anterior pectoralis major/latissimus dorsi</p> <p>No mark if the answer does not include an example</p>	<b>(2)</b>

Question Number	Answer	Additional Guidance	Mark
<b>3a</b>	<ul style="list-style-type: none"> <li>• 200m hurdles</li> <li>• 400m</li> <li>• 800m</li> </ul>		<b>(1)</b>

Question Number	Answer	Additional Guidance	Mark
<b>3b</b>	<ul style="list-style-type: none"> <li>• These fibres contain a large number of mitochondria and myoglobin</li> <li>• They manufacture and split ATP at a fast rate</li> <li>• Utilise both aerobic and anaerobic metabolism</li> <li>• Produce fast muscle contractions</li> <li>• Produce strong muscle contractions</li> <li>• Fatigue slower than type 2x</li> </ul>		<b>(3)</b>

Question Number	Answer	Additional Guidance	Mark
4	<p>Smoking because it:</p> <ul style="list-style-type: none"> <li>• accelerates hardening and narrowing of arteries</li> <li>• increases blood pressure</li> <li>• increases blood clots</li> <li>• can lead to heart attack/stroke</li> <li>• increases risk of lung cancer</li> <li>• leads to destruction of lung tissue</li> </ul> <p>Alcohol because it:</p> <ul style="list-style-type: none"> <li>• increases blood pressure</li> <li>• weakens heart muscle</li> <li>• can lead to heart attack/stroke</li> <li>• can lead to an irregular heart beat</li> </ul> <p>Poor diet because it:</p> <ul style="list-style-type: none"> <li>• increases blood pressure</li> <li>• increases cholesterol build up/clogging of arteries</li> <li>• can lead to heart attack/stroke/diabetes</li> </ul> <p>Lack of exercise because it:</p> <ul style="list-style-type: none"> <li>• increases blood pressure</li> <li>• weakens heart muscle</li> <li>• can lead to heart attack/stroke</li> <li>• weakens respiratory muscles</li> <li>• can lead to breathing difficulties</li> </ul>	<p>Lifestyle must be linked to cardiorespiratory system as linked points</p> <p>Accept other unhealthy lifestyle factors with linked effect</p>	(6)

Question Number	Answer	Additional Guidance	Mark
5	<ul style="list-style-type: none"> <li>• The diaphragm and external intercostal muscles contract</li> <li>• The ribs and sternum are elevated</li> <li>• The volume of the thoracic cavity/lungs increases</li> <li>• There is an increase in the volume of air resulting in a decrease in the pressure of air within the lungs</li> <li>• Pressure outside the lungs is larger compared to the inside</li> <li>• Air rushes into the lungs moving from an area of high pressure to low pressure</li> </ul>		(4)

Question Number	Answer	Additional Guidance	Mark
6	<ul style="list-style-type: none"> <li>• TV increases to get more O<sub>2</sub> in</li> <li>• IRV decreases to allow more lung "space" for TV</li> <li>• ERV decreases to allow more lung "space" for TV</li> <li>• TV increases to expire more CO<sub>2</sub></li> <li>• TV increases to ensure more effective gaseous exchange</li> <li>• RV remains the same as it prevents lungs from collapsing</li> </ul>	Maximum of 4 marks	(4)

Question Number	Answer	Additional Guidance	Mark
<b>7</b>	<ul style="list-style-type: none"> <li>• The strength/gradation of contraction depends upon the number of motor units recruited</li> <li>• A power athlete would recruit more motor units</li> <li>• Power athletes would typically recruit more units of type II muscle fibres</li> <li>• Endurance athletes would typically recruit more units of type I muscle fibres</li> <li>• Endurance athletes use a different spatial summation patterns to delay fatigue</li> </ul>		<b>(4)</b>

Question Number	Answer	Additional Guidance	Mark
<b>8a</b>	<ul style="list-style-type: none"> <li>(i) 7n backwards</li> <li>(ii) 0/forces are balanced</li> <li>(iii) 14N forward</li> </ul>		<b>(3)</b>

Question Number	Answer	Additional Guidance	Mark
<b>8b</b>	<ul style="list-style-type: none"> <li>• <b>Runner A</b> will slow down/decelerate</li> <li>• <b>Runner B</b> will maintain current speed/velocity</li> <li>• <b>Runner C</b> will speed up/accelerate</li> </ul>		<b>(3)</b>



Question Number	Answer	Mark
9	<p><b>AO2 = 4 marks, AO3 = 8 marks</b></p> <p><b>Students who only draw their answer from one area of study will not be able to gain marks beyond Level 3.</b></p> <p><b>Reward acceptable answer. Responses may include, but are not limit to the following:</b></p> <ul style="list-style-type: none"> <li>• Heart rate increases (AO2)</li> <li>• To allow more oxygenated blood to the working muscles (AO3)</li> <li>• To delay fatigue (AO3)</li> <li>• Stroke volume increase (AO2)</li> <li>• To pump more oxygenated blood per beat (AO3)</li> <li>• To speed up delivery to the working muscles (AO3)</li> <li>• To delay fatigue (AO3)</li> <li>• Cardiac output increases (AO2)</li> <li>• Again, increasing delivery of oxygen to working muscles (AO3)</li> <li>• To delay fatigue (AO3)</li> <li>• Venous return increases (AO2)</li> <li>• Leading to a higher end diastolic volume (AO3)</li> <li>• which leads to a more forceful contraction and ejection of blood (AO3)</li> <li>• Vascular shunting occurs (AO2)</li> <li>• Redistributing blood to areas with the greatest demand for oxygen away from areas with a lower demand for oxygen to allow optimum (AO2)</li> <li>• Performance of the working muscles (AO3)</li> </ul> <p>Credit only responses about the <b>cardiovascular system</b></p> <p>The indicative content is a guide to the responses candidate may give. Other valid responses which answer the question correctly can be credited as appropriate.</p> <p>The candidate's response must be read in conjunction with the level descriptor below in order to give the appropriate mark. For example, a response that is firmly in the level would receive the middle mark in the level, a response that is just into the level would receive the bottom mark in the level, a response which nearly reaches the next level would receive the top mark in the level preceding it.</p>	<b>(12)</b>

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-3	<ul style="list-style-type: none"> <li>• There are limited links between theory and practice. Limited technical language supports isolated elements of knowledge and understanding (AO2).</li> <li>• Limited analysis of the factors that underpin performance and involvement in physical activity and sport (AO3).</li> <li>• Analysis is not used to make a judgement (AO3).</li> </ul>
Level 2	4-6	<ul style="list-style-type: none"> <li>• Makes few links between theory and practice. Basic technical language supports some elements of knowledge and understanding (AO2).</li> <li>• Attempts some analysis of the factors that underpin performance and involvement in physical activity and sport (AO3).</li> <li>• Analysis may not be used to make a clear judgement (AO3).</li> </ul>
Level 3	7-9	<ul style="list-style-type: none"> <li>• Makes some links between theory and practice. Some appropriate technical language supports a good knowledge and understanding (AO2).</li> <li>• Good analysis of the factors that underpin performance and involvement in physical activity and sport (AO3).</li> <li>• Uses analysis to make a judgement but without full substantiation (AO3).</li> </ul>
Level 4	10-12	<ul style="list-style-type: none"> <li>• Makes strong links between theory and practice. Appropriate technical language supports a very good knowledge and understanding (AO2).</li> <li>• Comprehensive analysis of the factors that underpin performance and involvement in physical activity and sport (AO3).</li> <li>• Uses analysis to make a clear judgement and supports this with examples (AO3).</li> </ul>

## Section B

Question Number	Answer	Additional Guidance	Mark
<b>10a</b>	<ul style="list-style-type: none"><li>• Minimum 84 seconds (1min 24s)</li><li>• Maximum 140 seconds (2mins 20s)</li></ul>	Units must be correct	<b>(2)</b>

Question Number	Answer	Additional Guidance	Mark
<b>10b</b>	<ul style="list-style-type: none"><li>• Minimum 30 seconds</li><li>• Maximum 50 seconds</li></ul>	Units must be correct	<b>(2)</b>

Question Number	Answer	Additional Guidance	Mark
<b>11</b>	<p>Advantages:</p> <ul style="list-style-type: none"> <li>• Easy to set up as it requires minimal but specialist equipment that is easy to use</li> <li>• Reliable test as it is easy to replicate conditions</li> <li>• Very time efficient as it doesn't take long to do</li> </ul> <p>Disadvantages:</p> <ul style="list-style-type: none"> <li>• Requires very specialist/expensive equipment so might not be able to afford</li> <li>• Assistant needs to know how to calculate resistance otherwise the test becomes unreliable</li> <li>• The test is cycling based and may not be valid for many athletes</li> </ul>		<b>(4)</b>

Question Number	Answer	Additional Guidance	Mark
<b>12</b>	<ul style="list-style-type: none"> <li>• Increase glycogen stores in the muscle and liver</li> <li>• More energy available</li> <li>• with glycogen stores maximized, carbohydrates more available as energy store</li> <li>• Last longer at a higher rate before fatigue sets in</li> <li>• Maintain pace for longer</li> <li>• Marathon lasts over two hours and body only typically stores enough glycogen for 90-120 mins</li> <li>• Should help prevent runner from "hitting wall"</li> </ul>		<b>(4)</b>

Question Number	Answer	Additional Guidance	Mark
<b>13</b>	<ul style="list-style-type: none"> <li>• To increase aerobic fitness to allow athlete to maintain sustained training periods</li> <li>• To increase mobility to increase range of movement and improve technique</li> <li>• To improve technical skills to improve performance or develop consistency</li> <li>• To increase strength to allow for increased power</li> <li>• To decrease the risk of injury in competition phase and avoid missing competitions/training.</li> <li>• To allow gradual build up to peak fitness in competition phase to allow optimum performance</li> </ul>		<b>(4)</b>

Question Number	Answer	Additional Guidance	Mark
<b>14</b>	<p>Games player:</p> <ul style="list-style-type: none"> <li>• Reflects the pattern of the game</li> <li>• Regular changes in pace</li> </ul> <p>Endurance-based athlete:</p> <ul style="list-style-type: none"> <li>• Develops aerobic fitness</li> <li>• Prepares athlete for periods of acceleration in pace to catch/avoid being caught</li> <li>• Can develop anaerobic fitness which is important in the final 400m of 1500/5000/10000m</li> <li>• But difficulty in keeping detailed metrics</li> <li>• Benefit more from continuous training</li> </ul> <p>Both:</p> <ul style="list-style-type: none"> <li>• Adds variety to training/reduces tedium</li> <li>• Reduces overuse injuries by varying periods of high intensity with periods of low intensity</li> <li>• Appropriate method of training for both</li> </ul>		<b>(6)</b>

Question Number	Answer	Additional Guidance	Mark
<b>15a</b>	<p>(i) Athlete B</p> <p>(ii) Athlete C</p> <p>(iii) Athlete A</p>		<b>(3)</b>

Question Number	Answer	Mark
15b	<p><b>AO1 = 4 marks, AO3 = 4 marks</b></p> <p><b>Students who only show achievement against AO1 will not be able to gain marks beyond level 1.</b></p> <p><b>Reward acceptable answer. Responses may include, but are not limit to the following:</b></p> <p>Marathon runner:</p> <ul style="list-style-type: none"> <li>• Has/needs high level of aerobic fitness as tested by multi-stage fitness test (AO1)</li> <li>• No real change of direction so agility not as important so slightly lower score ok (AO1)</li> <li>• A high score in 1RM would not be advantageous as this would suggest extra upper body muscle mass and extra mass to carry for 26.2 mile/lower score suggests no extra upper body muscle mass and therefore more likely to be optimum weight (AO3)</li> <li>• Does not require sprint speed to complete the marathon due to the duration of the performance (AO3)</li> </ul> <p>Middleweight boxer:</p> <ul style="list-style-type: none"> <li>• Strength in arms paramount to performance so needs to score highly (AO1)</li> <li>• Agility is needed to dodge opponent so needs to score highly (AO1)</li> <li>• Speed is important (AO1) but the test is a 30m straight line sprint whereas a boxer moves quickly in multiple directions and over very short distances (AO3)</li> <li>• Aerobic fitness - 3 min rounds but can go to 12 rounds, lots of running /aerobic work completed in training (AO3)</li> </ul> <p>Football midfielder:</p> <ul style="list-style-type: none"> <li>• Speed needed to beat defender (AO1)</li> <li>• Agility needed to change direction at speed to outwit opponent (AO3)</li> <li>• Game lasts 90 mins so aerobic fitness needed (AO1)</li> <li>• Strength needed to hold off tackler (AO3)</li> </ul>	

	<p>The indicative content is a guide to the responses candidate may give. Other valid responses which answer the question correctly can be credited as appropriate.</p> <p>The candidate's response must be read in conjunction with the level descriptor below in order to give the appropriate mark. For example, a response that is firmly in the level would receive the middle mark in the level, a response that is just into the level would receive the bottom mark in the level, a response which nearly reaches the next level would receive the top mark in the level preceding it.</p>	<b>(8)</b>
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Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-2	<ul style="list-style-type: none"> <li>• Some accurate and relevant knowledge (AO1).</li> <li>• Simple or generalised statements supported by limited evidence (AO1).</li> <li>• Limited balancing of ideas against each other (AO3).</li> <li>• Limited evaluative statement (AO3).</li> </ul>
Level 2	3-5	<ul style="list-style-type: none"> <li>• A good level of accurate and relevant knowledge (AO1).</li> <li>• A line of reasoning is presented and supported by some evidence (AO1).</li> <li>• Examines a wide range of ideas, balancing ideas against each other (AO3).</li> <li>• An evaluative statement which is relevant (AO3)</li> </ul>
Level 3	6-8	<ul style="list-style-type: none"> <li>• A high level of accurate and relevant knowledge (AO1).</li> <li>• Articulates a clear viewpoint with clarity and precision which is well substantiated (AO1).</li> <li>• Critically examines a wide range of issues balancing ideas against each other (AO3).</li> <li>• Clear evaluative statement which is thorough and focussed (AO3)</li> </ul>



Question Number	Answer	Mark
*16	<p><b>AO1 = 4 marks, AO3 = 8 marks</b></p> <p><b>Students who only show achievement against AO1 will not be able to gain marks beyond level 1. Students who only draw their answer from one area of study will not be able to gain marks beyond Level 3.</b></p> <p><b>Reward acceptable answer. Responses may include, but are not limit to the following:</b></p> <ul style="list-style-type: none"> <li>• Cooling down (AO1)</li> <li>• Helps clear any lactic acid in the muscles/stops blood from pooling within the veins/reduces risk of DOMS which will help the muscles recover in time to perform at maximum efficiency (AO3)</li> <li>• Massage (AO1)</li> <li>• Increase blood flow to the muscles aiding removal of lactate after exercise through enhanced oxidation (AO3)</li> <li>• Ice baths (AO1)</li> <li>• Speeds up recovery after exercise by reducing temperature, blood flow and inflammation in tissues of the muscles (AO3)</li> <li>• 24-hour window (AO1)</li> <li>• Recovery foods (AO1)</li> <li>• Restoration of glycogen (AO1)</li> <li>• Rehydration (AO1)</li> <li>• Analysis of performance (AO1) (video/technological/tactical/physiological/psychological)</li> <li>• Goal setting (AO1)</li> <li>• Psychological skills training/revision (AO1)</li> </ul> <p>The indicative content is a guide to the responses candidate may give. Other valid responses which answer the question correctly can be credited as appropriate.</p> <p>The candidate's response must be read in conjunction with the level descriptor below in order to give the appropriate mark. For example, a response that is firmly in the level would receive the middle mark in the level, a response that is just into the level would receive the bottom mark in the level, a response which</p>	

	nearly reaches the next level would receive the top mark in the level preceding it.	<b>(12)</b>
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Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-3	<ul style="list-style-type: none"> <li>Limited understanding of the factors that underpin performance and involvement in physical activity and sport. This is communicated in a basic way with simple or generalised statements (AO1).</li> <li>Limited analysis of the factors that underpin performance and involvement in physical activity and sport (AO3).</li> <li>Analysis is not used to make a judgement (AO3).</li> </ul>
Level 2	4-6	<ul style="list-style-type: none"> <li>Attempts some understanding of the factors that underpin performance and involvement in physical activity and sport and expresses ideas with some clarity (AO1).</li> <li>Attempts some analysis of the factors that underpin performance and involvement in physical activity and sport (AO3).</li> <li>Analysis may not be used to make a clear judgement (AO3).</li> </ul>
Level 3	7-9	<ul style="list-style-type: none"> <li>Evidence of some understanding of the factors that underpin performance and involvement in physical activity and sport. Communicated in a logical writing structure (AO1).</li> <li>Good analysis of the factors that underpin performance and involvement in physical activity and sport (AO3).</li> <li>Uses analysis to make a judgement but without full substantiation (AO3).</li> </ul>
Level 4	10-12	<ul style="list-style-type: none"> <li>Comprehensive understanding of the factors that underpin performance and involvement in physical activity and sport. Communicated in a logical, clear writing structure (AO1).</li> <li>Comprehensive analysis of the factors that underpin performance and involvement in physical activity and sport (AO3).</li> <li>Uses analysis to make a clear judgement and supports this with examples (AO3).</li> </ul>