Mark Scheme (Results)

Summer 2019

Pearson Edexcel GCSE
In Physical Education (1PE0)
Paper 01 Fitness and Body Systems

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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 A01 – 1 mark	Mark
1 (a)	**The only correct answer is B – Muscle B** ***A*** *is not correct because it is the quadriceps* ***C*** *is not correct because it is the tibialis anterior* ***D*** *is not correct because it is the hamstrings*	**(1)**

Question Number	Answer A01 – 1 mark	Mark
1 (b)	**The only correct answer is C - Flexion of the leg at the knee** ***A*** *is not correct because this is caused by the gluteus maximus* ***B*** *is not correct because this is caused by the quadriceps* ***D*** *is not correct because this is caused by the gastrocnemius*	**(1)**

Question Number	Answer A01 – 1 mark	Mark
1 (c)	**The only correct answer is A – Muscle A** ***B*** *is not correct because it works with the hip flexors* ***C*** *is not correct because it works with the gastrocnemius* ***D*** *is not correct because it cannot work antagonistically on its own*	**(1)**

Question Number	Answer A01 – 1 mark	Mark
1 (d)	**The only correct answer is C – Pulmonary vein** ***A*** *is not correct because it takes oxygenated blood away from the heart* ***B*** *is not correct because it takes deoxygenated blood away from the heart* ***D*** *is not correct because it takes deoxygenated blood to the heart*	**(1)**

Question Number	Answer A01 – 1 mark	Mark
1 (e)	**The only correct answer is B – Platelets** ***A*** *is not correct because its function is transport* ***C*** *is not correct because they carry oxygen* ***D*** *is not correct because they fight infection*	**(1)**

Question Number	Answer A03 – 1 mark	Mark
1 (f)	**The only correct answer is B – High – low** ***A*** *is not correct because would be low oxygen after gas exchange at the muscles* ***C*** *is not correct because would be high oxygen before gas exchange at the muscles* ***D*** *is not correct because would be high oxygen before gas exchange at the muscles*	**(1)**

Question Number	Answer A01 – 1 mark	Mark
1 (g)	**The only correct answer is A – Bronchioles** ***B*** *is not correct because it is outside of the lungs* ***C*** *is not correct because it is outside of the lungs* ***D*** *is not correct because it is outside of the lungs*	**(1)**

Question Number	Answer A03 – 1 mark	Mark
1 (h)	**The only correct answer is B – Student B (150 – 160 bpm)** ***A*** *is not correct because formulae is (220-16) = 204 * 60% = 123 at lower threshold and 204 * 80% = 163 at upper threshold, therefore A does not elevate HR high enough to reach threshold.* ***C*** *is not correct because their heart rate is above the maximum threshold for the aerobic training zone* ***D*** *is not correct because their heart rate is too low to be in aerobic training zone*	**(1)**

Question number	Answer AO2 - 1 mark; AO3 -2 marks	Mark
2 (a)	For example: • The gymnast needs extension to occur at the elbow to achieve the position (1) this is possible because the biceps relax/lengthen (1) allowing the triceps to contract so the gymnast can extend their arms (1). • The antagonistic pair are the biceps and triceps/the muscles working together are the biceps and triceps (1) the antagonist relaxes (1) which allows the agonist to contract (1) Accept other appropriate responses. 1 mark for extension **<u>or</u>** identification of the antagonistic pair (AO2). 1 mark for analysis of agonist/tricep action (AO3). 1 mark for evaluation of antagonist/bicep role (AO3).	**(3)**

Question Number	Answer AO1 - 1 mark	Mark
2 (b)	1 mark for the correct classification of the bones of the wrist. • Short • Short bones DNA Small bones	**(1)**

Question Number	Answer AO1 - 2 marks; AO2 - 4 marks	Mark
2 (c) (i)&(ii)	 (Source: © Kjpargeter/Shutterstock) For example: • The skeleton provides **joints** (1) different joints allow different ranges of movement/a wide range of movement is needed to achieve this position (1) eg, the **hip** allows the gymnast to bend/move the legs upwards/ the knee straightens the leg/ the ankle allows them to point their toes (1) • The bones provide points for **muscle attachment/levers** (1) so that when the muscle **contracts** they **pull the bone**/cause the **bone** to move (1) for example the gastrocnemius causes the gymnast to plantar flex/point their toes. Other eg's The hip flexor contracts to allow this position/the quadriceps contract to straighten the knee (1) • It provides **support** (1) which means the legs/lower body can be be raised/removed from the ground (1) as the gymnast takes her **weight** on to her hands (1) Accept other appropriate responses. 1 mark for each function – joints/muscle attachment/acts a lever (AO1) 1 mark for each expansion explaining how this allows gymnast to move into this position. (AO2) 1 mark for each applied example. (AO2)	**(6)**

Question number	Answer AO2 - 1 mark; AO3 – 2 marks	Mark
3 (a)	For example: Activity characteristic/what they need to do to achieve movement Fibre characteristic • Fast twitch/IIx (1) • to provide the required **force/power** for the movement/because the action is explosive/powerful/quick/a high intensity movement (1) • as this fibre type can **contract** powerfully/**contracts** quickly/**contracts** forcibly/**contracts** the quickest of the muscle fibre types. (1) Accept other appropriate responses. 1 mark for identification of fibre type (AO2). 1 mark for analysis of action, eg explosive/powerful/high intensity (AO3). 1 mark for justification of characteristic that makes fast twitch most suitable (AO3).	**(3)**

Qu Num	Answer AO1 – 4 marks	Mark
3 (b)	1 mark for each correct statement within the linked description. For example: • Blood flow is increased to active areas/blood is redistributed to **muscles**/away from inactive areas (1) • Increased by vasodilation/ widening of the **internal** diameter/widening of the **lumen** of the blood vessel (1) • and reduced blood flow to inactive areas (1) • reduced by vasoconstriction/ narrowing of the **internal** diameter/narrowing the **lumen** of the blood vessel. (1) Accept other appropriate responses. 1 mark for increased blood flow **to** active areas/ eg muscles 1 mark for vasodilation or correct description 1 mark for reduced blood flow **to** inactive areas / eg digestive system 1 mark for vasoconstriction or correct description	**(4)**

Question Number	Answer AO2 - 2 marks; AO3 - 1 mark	Mark
3 (c)	For example: • Necessary to transport oxygen to muscles/the muscles require **oxygen/more oxygen** (1) so the player can continue to work aerobically/prevent anaerobic respiration/can break down lactic acid/remove lactate/prevent lactate accumulation (1) so they are able to work at a higher intensity for longer/delay fatigue (1) • Necessary to transport nutrients/oxygen/ the muscles require **nutrients/oxygen** (1) for energy during the game (1) so they are less likely to fatigue/so they can maintain performance (1) • The muscles require **removal of CO_2** (1) this is necessary as more CO_2 is produced during exercise (1) so the player's muscles are less likely to become fatigued/so they can maintain the quality of performance (1) • Redistribute blood to blood vessels near the surface of skin/**reduce temperature** (1) as heat is generated by muscles during the activity (1) so prevents over-heating/ dehydration (1) Accept other appropriate responses. 1 mark for reason why vascular shunting is necessary during activity. (AO2) 1 mark for applied expansion (AO2) 1 mark for impact of this (AO3)	**(3)**

<table>
<tr><th>Question number</th><th>Answer
AO1 – 3 marks; AO2 – 3 marks</th><th>Mark</th></tr>
<tr><td>4</td><td>For example:

<table>
<tr><th>(a) Short-term effect of exercise</th><th>(b) Importance to the performer exercising</th></tr>
<tr><td>Increased heart rate/stroke volume/ cardiac output
Increased blood flow
Redistribution of blood flow

Increased blood pressure
(1)</td><td>Oxygen/nutrient delivery/transport
More oxygen transported around body
Increased gas exchange at muscles

(1)</td></tr>
<tr><td>Increased temperature

Muscle fatigue
Lactate accumulation
CO_2 increase
Oxygen deficit
(1)</td><td>Muscle elasticity/Increased range of movement at joint/less prone to muscle tear/pulled muscle/ muscle injury

Reduced ability to perform

(1)</td></tr>
<tr><td>Increased depth
Increase in tidal volume
Increased rate of breathing
Increase in minute ventilation
(1)</td><td>Increased oxygen intake/to lungs
Improved gas exchange at the lungs
Quicker removal of CO_2

(1)</td></tr>
</table>

Accept other appropriate responses.

1 mark for each identification of a short-term effect of exercise on named system (AO1)
1 mark for each linked application to the performer exercising (AO2)</td><td>(6)</td></tr>
</table>

Question Number	Answer AO3 - 1 mark	Mark
5 (a)	1 mark for the correct class of lever. • Second class (1)	**(1)**

Question Number	Answer AO2 – 1 mark	Mark
5 (b)	1 mark for appropriate sporting example of lever system operating at the ankle. For example: • Blocking a shot/pass in netball/volleyball • Transference of weight to front foot to smash the shuttle • Sprinter/Swimmer leaving the blocks/at starting blocks • High jump at take-off Accept other appropriate responses.	**(1)**

Question Number	Answer AO1 – 1 mark	Mark
5 (c)	1 mark for correct statement of meaning of mechanical advantage. For example: • Allows a **load** to be moved with relatively **small** muscular **effort**. (1) Accept other appropriate responses.	**(1)**

Question number	Answer AO1 – 2 marks; AO2 – 2 marks	Mark
6 (a)	One mark for correct answer Axes	**(1)**
6 (b)	One mark for correct answer Frontal	**(1)**
6 (c)	One mark for correct answer Frontal axis (1)	**(1)**
6 (d)	One mark for each correct answer Vertical axis (1)	**(1)**

Question Number	Answer AO1 – 2 marks	Mark
7 (a) (i)&(ii)	1 mark for correct statement of meaning of health and fitness. **Health** For example: • Emotional, physical and social well-being and not just the absence of disease. (1) **Fitness** For example: • The ability to meet the demands of the environment. (1) Accept other appropriate responses.	**(2)**

Question number	Answer AO1 - 2 marks; AO2 – 2 marks	Mark
7 (b) (i)&(ii)	**Health** For example: • Exercise can cause a drop in resting blood pressure (1) which will improve **physical** health/reduce the risk of stroke/CHD (1) • Exercise means you can forget about what is worrying you (1) so improves your **emotional** health/reduces stress/makes you less anxious (1) • Exercise often involves teamwork (1) so can improve your **social** health (1) • Exercise can reduce depression (1) **by** giving you the opportunity to make new friends (1) **Fitness** For example: • aerobic fitness can increase (1) if a person attends an aerobics class / does continuous training/ **aerobic** training (1) • exercise can cause muscle hypertrophy/increase strength (1) through weight training (1) Accept other appropriate responses. 1 mark for 'how' health is affected (AO1) 1 mark for linked example of the aspect of health increased/decreased or named relevant health issue (AO2) 1 mark for example of aspect of fitness increased/decreased or named relevant training adaptation (AO2) 1 mark for 'how' stated fitness aspect is affected (AO1)	**(4)**

Question number	Answer AO1 - 2 marks; AO3 – 1 mark	Mark
8	**NB** Question is about use of tests to monitor a training programme – NOT baseline testing For example: • Compare with previous results/see progress (1) to check training is working (1) to see if the programme needs changing/targets need revising (1) • To see if they are improving (1) so that the individual knows they are training hard enough/not training too hard (1) otherwise the fitness benefits that were expected will not occur. (1) • To check for progress (1) if they are meeting targets/making progress this is motivating (1) therefore they are more likely to keep training (1) Accept other appropriate responses. 1 mark for stating **why** we use fitness testing to monitor training, (AO1) 1 mark for appropriate linked expansion of **value** of this (AO1) 1 mark for **impact** of this (AO3)	**(3)**

<table>
<tr><th>Question number</th><th>Answer
AO1 - 2 marks; AO2 - 2 marks</th><th>Mark</th></tr>
<tr><td>9 (a)
9 (b)</td><td>For example:

<table>
<tr><th>Component of fitness</th><th>(a) Fitness test to measure the component of fitness</th><th>(b) Sport or physical activity in which an excellent rating would be an advantage</th></tr>
<tr><td>CV fitness</td><td>Cooper 12-minute run
Cooper 12-minute swim
12-minute Cooper run
12-minute Cooper swim
Harvard step test
(1)</td><td>Marathon running
X-country
Long distance cycling
Tennis match
(1)</td></tr>
<tr><td>Speed</td><td>30m sprint
35m sprint
(1)</td><td>Football
100m sprint
(1)</td></tr>
</table>

DNA same sport twice

Accept other appropriate responses.

1 mark for identification of fitness test for given component of fitness (AO1)
1 mark for each example clearly applied to component of fitness (AO2).</td><td>(4)</td></tr>
</table>

Question number	Answer AO3 - 1 mark	Mark
9 (c)	1 mark for correct identification of component of fitness requiring focus in training. • Muscular endurance	**(1)**

Question number	Answer AO1 - 1 mark; AO2 – 1 mark; AO3 – 1 mark	Mark
9 (d)	For example: • She could attend a spin class/ Aerobics classes (1) as this works/increases her aerobic fitness (1) With increased aerobic fitness she will have a lower heart rate after the Harvard step test / as she will be working continuously for over 20 minutes/it is continuous training (1). Accept other appropriate responses. 1 mark for appropriate choice of fitness class (AO2) 1 mark for cardiovascular fitness (AO1) 1 mark for justification of this choice of class (AO3)	**(3)**

Question number	Answer AO3 - 1 mark	Mark
10 (a)	1 mark for correct identification of training method • Fartlek training	**(1)**

Question number	Answer AO3 - 1 mark	Mark
10 (b)	1 mark for correct identification of component of fitness • Cardiovascular fitness	**(1)**

Question number	Answer AO2 – 2 marks; AO3 – 2 marks	Mark
10 (c) (i)&(ii)	An outline of one week of her training is shown in **Table 5**. **Table 5** For example: • Specificity/Type (1) as she is training over different terrains/varying the intensity of her run/working on her CV fitness to match what she needs in cross-country (1) • Thresholds of training/Intensity (1) because she works within her aerobic training zone on Tuesday/works at 60 – 80% MHR (1) Accept other appropriate responses. 1 mark for principle of training (AO3) - (max 2) 1 mark for applied justification of principle of training to Table 5 (AO2) (max 2)	**(4)**

Day of week	Activity	Length of session
Sunday	Run at varying intensities through woodland	60 minutes
Monday	Rest	
Tuesday	Laps around the park varying her pace, running at 60% – 80% of her maximum heart rate	75 minutes
Wednesday	Rest	
Thursday	Run at varying intensities along the beach	60 minutes
Friday	Rest	
Saturday	X-country race	

Question number	Answer AO2 - 1 mark	Mark
10 (d)	An outline of one week of her training is shown in **Table 5**. **Table 5** 1 mark for appropriate applied example For example: • By increasing the length of her Sunday run from 60 minutes to 65 minutes (1) • By running an extra lap around the park on Tuesday (1) • By running up sand dunes rather than along the beach (1) • Take out one of the rest days (1) Accept other appropriate responses.	**(1)**

Day of week	Activity	Length of session
Sunday	Run at varying intensities through woodland	60 minutes
Monday	Rest	
Tuesday	Laps around the park varying her pace, running at 60% – 80% of her maximum heart rate	75 minutes
Wednesday	Rest	
Thursday	Run at varying intensities along the beach	60 minutes
Friday	Rest	
Saturday	X-country race	

Question number	Answer AO2 - 1 mark	Mark
11 (a)	1 mark for correct interpretation of image • Plyometric • Plyometrics • Plyometric training	**(1)**

Question number	Answer AO1 - 1 mark	Mark
11 (b) (i)	**Advantage of plyometric training** For example: • Can be used to develop power/strength quickly (1) • Requires minimal/no equipment (1) Accept other appropriate responses.	**(1)**

Question number	Answer AO1 - 1 mark	Mark
11 (b) (ii)	**Disadvantage of plyometric training** For example: • Can cause injury (1) • Higher risk of injury (1) Accept other appropriate responses.	**(1)**

<table>
<tr><th>Question number</th><th>Answer
AO1 - 2 marks; AO2 - 2 marks</th><th>Mark</th></tr>
<tr><td>12 (a)
12 (b)</td><td>For example:

<table>
<tr><th>Performance-enhancing drug (PED)</th><th>(a) Positive effect of the PED</th><th>(b) Sport where effect of PED would be an advantage</th></tr>
<tr><td>Anabolic steroids</td><td>Allow performers to train <u>harder for longer</u> (1)
Increase power/strength (1)
Hypertrophy
Increased muscle mass/muscle growth
Speed up recovery time (1)</td><td>Sprinting (1)
Weightlifting (1)
Boxing (1)</td></tr>
<tr><td>Beta blockers</td><td>Reduce anxiety (1)
Reduce muscle tremor/ shaking (1)
Reduce heart rate (1)</td><td>Archery (1)
Diving (1)</td></tr>
</table>

Accept other appropriate responses.

1 mark for each statement of positive effect of PED (AO1)
1 mark for each example of sport/physical activity where effect would be an advantage (AO2).</td><td>(4)</td></tr>
</table>

Qu. Num	Indicative content (A01 – 3 marks; A02 - 3 marks for application; A03 - 3 marks for evaluation)	
13	Reward acceptable answers. Responses may include, but are not limited to, the following: **Knowledge and understanding of the respiratory system (A01).** Factual statements about the role/mechanisms associated with the respiratory system in relation to: **For example:** • RS breathes in oxygen /supplies oxygen/moves O_2 into the body • RS breathes out/removes carbon dioxide/moves CO_2 out of the body • During (aerobic) exercise the amount of carbon dioxide increases • Alveoli the site for gas exchange in the lungs • **More** oxygen is needed in exercise/**more** oxygen is needed for the working muscles • Oxygen provides energy in aerobic exercise • Lactic acid will form/accumulate if there is not enough oxygen • Oxygen breaks down lactic acid/oxygen prevents build-up of lactic acid • If there is insufficient oxygen, oxygen deficit/oxygen debt can occur **Application of knowledge, linking the respiratory system to sport**. (AO2) **For example:** • **Serve** - the player will not use oxygen/the service action is explosive/anaerobic (AO2) • **Rally** - the players breathing rate will increase/the player's depth of breathing will increase/ tidal volume will be high (AO2) • **Rally** - the player needs **more** oxygen for **increased** energy production/ more oxygen for aerobic respiration (AO2) • **Resting** - the players breathing rate/breathing depth will be maintained/ higher than at rest (AO2) • **Resting** - the respiratory system repays the oxygen debt (AO2) **Evaluation of topic** – making reasoned judgments about the importance of the respiratory system throughout the varying intensities of the match. (A03) **For example:** • **Serve -** Oxygen is used to provide energy aerobically (AO1), when serving, the player will not use oxygen/the service action is explosive/anaerobic (AO2) therefore at the time of serving the importance of the respiratory system is minimal as he doesn't need to take in oxygen (AO3) • **Rally -** The lungs take oxygen into the body (AO1) so there is more oxygen available for the tennis player to increase energy production oxygen (AO2) this is important because it makes sure he has the energy to maintain the long rallies/delays fatigue helping him maintain quality of play (AO3) • **Rest –** Lactic acid will form if not enough oxygen (AO1) the elevated breathing rate allows the player to remove lactate that has developed during the long rallies (AO2). This is important otherwise their muscles will fatigue more quickly making them too tired to play well (AO3) Each AO carries a maximum of three marks.	**(9)**

Level	Mark	Descriptor
	0	No rewardable material
1	1-3	• Demonstrates isolated elements of knowledge and understanding, with limited technical language used (AO1). • Limited attempt to apply knowledge to question context (AO2). • Generic assertions may be presented (AO3 - evaluation).
2	4-6	• Demonstrates mostly accurate knowledge and understanding, including appropriate use of technical language in places (AO1). • Applied knowledge to question context (AO2). • Attempts at drawing conclusions, with some support from relevant evidence (AO3 – evaluation).
3	7-9	• Demonstrates accurate knowledge and understanding throughout, including appropriate use of technical language (AO1). • Applied detailed knowledge to question context throughout (AO2). • Reaches valid and well-reasoned conclusions supported by relevant evidence (AO3 – evaluation).

Qu Num	Indicative content (A01 – 3 marks; A02 - 3 marks for application; A03 - 3 marks for evaluation)	
14	Reward acceptable answers. Responses may include, but are not limited to, the following: **Knowledge and understanding of adaptations due to training (A01).** • bone density will increase with resistance/weight bearing training • decreased resting heart rate will be from aerobic/continuous training • muscle hypertrophy will result from weight training **Application of knowledge, linking the training effect to shot put. (A02)** • increased bone density means the bones in Dan's **wrist** will become **stronger**, (AO2) • increased bone density means Dan is less likely to miss training due to injury/reduced risk of reversibility/loss of training due to injury (AO2) • decreased resting heart rate means that Dan is increasing his cardiovascular fitness (AO2) • decreased resting heart rate means that Dan would decrease the time he needs to **recover**/return to resting heart rate **quicker** (AO2) • muscle hypertrophy means Dan will be able to apply more force to the shot (AO2) • muscle hypertrophy means greater muscle mass **therefore** Dan will have more strength/power to throw the shot (AO2) **Evaluation of topic** – making reasoned judgments about the importance of these adaptations on shot put performance. **(A03)** • bone density will increase with resistance/weight bearing training (AO1) this means the bones in Dan's bones **wrist** will become **stronger** (AO2) this means that he can practice the technique of shot put many times in a session giving him the practice he needs to improve his technique (AO3) • decreased resting heart rate will be from aerobic/continuous training (AO1) this means that Dan is increasing his cardiovascular fitness (AO2). Whilst this may be helpful to Dan to improve his general fitness this will have limited impact on his shot put performance as he needs explosive strength/it is an anaerobic event/it is a short term event (AO3) • muscle hypertrophy will result from weight training (AO1) this means Dan will be able to apply more force when throwing the shot (AO2) therefore this type of training is critical to make sure Dan has the required muscular force/strength/power to get the shot a long enough distance to perform well (AO3) Students who only show achievement against A01 will not be able to gain marks beyond level 1.	**(9)**

Level	Mark	Descriptor
	0	No rewardable material
1	1-3	• Demonstrates isolated elements of knowledge and understanding, with limited technical language used (AO1). • Limited attempt to apply knowledge to question context (AO2). • Generic assertions may be presented (AO3 - evaluation).
2	4-6	• Demonstrates mostly accurate knowledge and understanding, including appropriate use of technical language in places (AO1). • Applied knowledge to question context (AO2). • Attempts at drawing conclusions, with some support from relevant evidence (AO3 – evaluation).
3	7-9	• Demonstrates accurate knowledge and understanding throughout, including appropriate use of technical language (AO1). • Applied detailed knowledge to question context throughout (AO2). • Reaches valid and well-reasoned conclusions supported by relevant evidence (AO3 – evaluation).