Mark Scheme (Final)

Summer 2018

Pearson Edexcel GCSE

In Physical Education Short Course (3PE0)

Paper 01 Theory

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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 C – Short bone** ***A*** *is not correct because it is used as a lever* ***B*** *is not correct because it is used for protection or muscle attachment* ***D*** *is not correct because it is used for protection or muscle attachment*	**(1)**

Question number	Answer A01– 1 mark	Mark
1 (b)	**The only correct answer is D – Hinge** ***A*** *is not correct because the knee is a hinge joint* ***B*** *is not correct because the knee is a hinge joint* ***C*** *is not correct because the knee is a hinge joint*	**(1)**

Question number	Answer A01 – 1 mark	Mark
1 (c)	**The only correct answer is A – Join bone to bone** ***B*** *is not correct because this is a tendon* ***C*** *is not correct because ligaments join bone to bone they do not attach to tendons* ***D*** *is not correct ligaments join bone to bone they do not attach to muscle*	**(1)**

Question number	Answer A01 – 1 mark	Mark
1 (d)	**The only correct answer is C – Aorta** ***A*** *is not correct because this vessel returns blood to the heart* ***B*** *is not correct because this vessel takes blood to the lungs* ***D*** *is not correct because this vessel returns blood to the heart*	**(1)**

Question number	Answer A01 – 1 mark	Mark
1 (e)	**The only correct answer is B – Alveoli** ***A*** *is not correct because this transports gases rather than exchanges them* ***C*** *is not correct because this transports gases rather than exchanges them* ***D*** *is not correct because it is a muscle responsible for the mechanics of breathing not gas exchange*	**(1)**

Question number	Answer A02 – 1 mark	Mark
1 (f)	**The only correct answer is C - Lifting the body weight onto the toes from standing during calf raises** ***A*** *is not correct because this is a third class lever system* ***B*** *is not correct because this is a first class lever system* ***D*** *is not correct because this is a third class lever system*	**(1)**

Question number	Answer A02 – 1 mark	Mark
1 (g)	**The only correct answer is A – Marathon runner** ***B*** *is not correct because they would need protein rather than additional carbohydrate* ***C*** *is not correct because they are a power athlete* ***D*** *is not correct because they are not an endurance athlete*	**(1)**

Question number	Answer AO1 - 3 marks	Mark
2 (a)	One mark for each correctly identified muscle. NB muscles must be stated in this order. Accept other appropriate responses.	**(3)**

	(a) Muscle
A	Biceps (1)
B	Hamstrings (1)
C	Gastrocnemius (1)

Question number	Answer AO1 - 3 marks	Mark
2 (b)	One mark for each correctly stated role. NB must be stated in this order. Accept other appropriate responses.	**(3)**

	(b) Role of the muscle
A	Flexes the arm at the elbow (1)
B	Flexes the leg at the knee (1)
C	Plantar flexion at the ankle (1)

Question number	Answer AO2 - 2 marks; AO3 - 2 marks; AO3 - 2 marks	Mark
3	**Elbow (max 3 marks)** For example: • In the picture there is extension <u>at the elbow</u> (1) this is possible because the triceps have contracted (1) however, this is only possible because of the antagonistic muscle action of the biceps which relax (1). • Triceps contract/act as agonist (1), biceps relax/act as antagonist (1) causing <u>extension at elbow</u> (1) **Hip (max 3 marks)** For example: • In the picture there is <u>flexion at the hip</u> (1) this is possible because the hip flexors contract (1) however, this is only possible because of the antagonistic action of the gluteus maximus which relaxes (1). • Hip flexors contract/act as agonist (1), gluteus maximus/gluteals relax/act as antagonist (1) causing <u>flexion at hip</u> (1) Accept other appropriate responses. For each joint: 1 mark for joint action occurring at named joint 1 mark for action of agonist 1 mark for action of antagonist	**(6)**

Question number	Answer AO2 - 2 marks; AO3 - 2 marks; AO3 - 2 marks	Mark
4	**Slow twitch (max 3)** • The steeplechase athletes require slow twitch/type I muscle fibres when running (1) as this fibre type is: resistant to fatigue/has a high aerobic capacity/needed when running for a sustained period of time (1) allowing the athlete to complete the 3000m without (the muscles) fatiguing/needing to slow down (due to fatigue) (1). **Fast twitch (max 3)** • When jumping during the race the steeplechase athletes require fast twitch/type II(x) muscle fibres (1) as this fibre type can contract powerfully (1) giving them the height needed to clear the hurdle/allowing them to jump the hurdle without clipping it/clear the hurdle quickly/not lose time clearing the hurdle (1). Accept other appropriate responses. 1 mark for correct link between the muscle fibre type and part of race (AO2) 1 mark for analysis to determine relevant characteristic of fibre type (AO3) 1 mark for impact of this on completing the stated action (AO3)	**(6)**

Question number	Answer AO1 - 1 mark; AO2 - 1 mark	Mark
5 (a)	1 mark for the role of platelets to prevent blood loss and 1 mark for this being important to allow the boxer them to continue in the match or equivalent example from appropriate sport. For example: • Platelets clot the blood/stem blood flow/form a scab (1) • so the boxer can continue (with the bout/training) (1) Accept other appropriate responses.	**(2)**

Question number	Answer AO1 – 2 marks	Mark
5 (b)	1 mark for each correctly stated different function of plasma. For example: • Transport (system) (e.g. nutrients to cells; waste, e.g. urea) (1) • Maintains blood pressure/blood volume (1) • Regulates body temperature (1) Accept other appropriate responses.	**(2)**

Question number	Answer AO1 – 1 mark	Mark
5 (c)	1 mark for stating internal diameter/lumen reduces in size. For example: • Narrowing/decreasing/constriction of the (internal) diameter/lumen • Narrowing of the blood vessel/arteries/arterioles (1) Accept other appropriate responses.	**(1)**

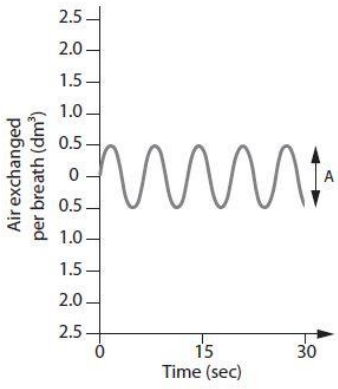
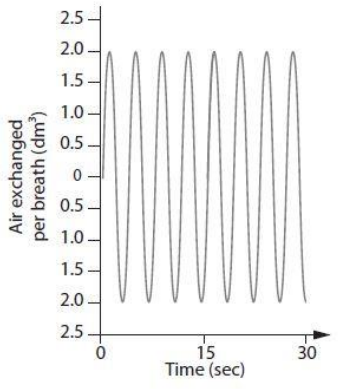
Question number	Answer AO1 – 1 mark; AO2 – 1 mark	Mark
5 (d)	1 mark for the role of protein (AO1) and 1 mark for why this is important to a boxer (AO2). For example: • Protein is used for repair (of muscle tissue) (1) so micro-tears/<u>muscle</u> injury/<u>muscle</u> damage can be repaired (1) • Protein is used in the growth (of muscle tissue (1) so the boxer can increase strength/ power/greater force when punching opponent (1) Accept other appropriate responses.	**(2)**

Question number	Answer AO1 – 1 mark; AO2 – 1 mark	Mark
5 (e)	1 mark for the role of water (AO1) and 1 mark for why this is important to boxing (AO2). **One** mark for the role of water: • Water is needed to prevent dehydration/ remain hydrated/replenish fluids (1) And **one** mark for link with boxing: • As during the boxing match they will lose a lot of water through sweat/sweating a lot (1) • So the boxer can continue to fight without loss of concentration/becoming dizzy (1) Accept other appropriate responses.	**(2)**

Question number	Answer AO3 - 2 marks	Mark
6 (a)	1 mark for analysis of data in Figure 5 and 6 in relation to oxygen levels and 1 mark in relation to carbon dioxide levels. **Oxygen – one mark for any ONE of the following:** For example: • More oxygen inhaled (than exhaled) • Oxygen levels decrease when exhaling by 5% • Breathes in 21% of oxygen but breathes out 16% **Carbon dioxide – one mark for any ONE of the following:** For example: • More carbon dioxide is exhaled (than inhaled) • Carbon dioxide levels increase when exhaling from 0.04% to 4% (1) • Breathes out 4% of CO_2 but breathes in 0.04% Accept other appropriate responses.	**(2)**

Question number	Answer AO1 - 2 marks; AO2 - 2 marks	Mark
6 (b)	For each change in composition of exhaled air: 1 mark for the reason for the change in composition of the runner's exhaled air and 1 mark for appropriate expansion. For example: • Oxygen is used/needed/required (1) in <u>aerobic</u> respiration/to release energy (1) • CO_2 is a waste product/is produced (1) during <u>aerobic</u> respiration/during exercise/by the <u>working muscles (during exercise)</u> (1) Accept other appropriate responses.	**(4)**

Question number	Answer AO3 – 1 mark	Mark
6 (c)(i)	1 mark for the correct identification of tidal volume. • Tidal volume (1) • Tidal (1)	**(1)**

Question number	Answer AO2 – 2 marks; AO3 – 2 marks	Mark
6 (c)(ii)	 **Figure 7 - At rest**  **Figure 8 - During exercise** For each reason: 1 mark for stating relevant change in breathing and 1 mark for linking to feature in Figure 8. For example: • Shows an increased breathing rate (1) as lines on graph/waves are getting closer together (1) • Shows increased depth of breathing/tidal volume (1) by: the lines becoming much deeper on the graph/increase from 0.5 dm^3 to 2.0 dm^3 (1) Accept other appropriate responses.	**(4)**

Question number	Answer AO3 – 2 marks	Mark
7 (a)	Maximum 2 marks for linking components stated in equations in Table 2 to appropriate type of respiration. For example: **Marking point 1:** • Because statement A includes oxygen/because statement B does not mention oxygen (1) **OR** • Because oxygen is required in aerobic energy production/not required in anaerobic respiration (1) **Marking point 2:** • Because the by-product of anaerobic respiration is lactic acid/lactic acid is not produced during aerobic respiration (1) • Because the by-product of aerobic respiration is carbon dioxide/water (1) Accept other appropriate responses.	**(2)**

Question number	Answer AO2 – 4 marks; AO3 – 2 marks	Mark
7 (b)	For example, (max 3 marks per example): • Transporting oxygen (1) so the cyclist can: work aerobically/remove lactic acid/produce energy (1) so they will not need to reduce their pace or rest/delay fatigue (1). • Remove/transport carbon dioxide/transporting lactic acid (to liver) (1) produced during exercise (1) otherwise if too much accumulates the cyclist will begin to fatigue and therefore would need to slow down and recover (1). • Transporting nutrients (1) to be used to generate energy (1) to fuel the muscles for their activity allowing the cyclist to continue to cycle the long distance at the required pace (1). Accept other appropriate responses. **For each function:** 1 mark for selecting function appropriate to question context (1) 1 mark for linking function to event (1) 1 mark for justifying how this enables the cyclist to perform well (1).	**(6)**

Question number	Answer AO1 – 3 marks	Mark
8 (a)	1 mark for each correct identification of a component of a lever system. Up to a maximum of 3 marks. **NB Accept in any order:** • Fulcrum/Pivot (1) • Load/resistance (1) • Effort/force (1)	**(3)**

Question number	Answer AO1 – 2 marks	Mark
8 (b)	1 mark for identifying the mechanical disadvantage and 1 mark for explaining why this disadvantage occurs. • Cannot lift as heavy loads with the same amount of effort as other levers (1) due to the position of the effort and load from the fulcrum (1) • Large effort has to be applied to move a (relatively) small load (1) because the load arm is longer than the effort arm/ the load is further from the fulcrum than the effort (1) Accept other appropriate responses.	**(2)**

Question number	Answer AO2 – 2 marks	Mark
9 (a)		**(2)**

Movement pattern	(a) Plane	(b) Axis
Tucked somersault	Sagittal (1)	Frontal (1)

Question number	Answer AO2 – 2 marks	Mark
9 (b)		**(2)**

Movement pattern	(a) Plane	(b) Axis
Full twist	Transverse (1)	Vertical (1)

Question number	Answer AO1 - 4 marks; AO2 - 2 marks	Mark
10	For each explanation: 1 mark for stating how optimum weight is affected (AO1), 1 mark for stating why this affects optimum weight and 1 mark for example of sports performers with different optimum weights (AO2). **Height**: • The taller a person is the greater their (optimum) weight (1) because their skeleton is larger (1), for example a basketball player will have a higher optimum weight (than a jockey) (1) **Muscle girth**: • The more muscular a person, the greater their (optimum) weight (1) because their muscle weighs more than fat/is heavier than other tissue (1), for example a boxer will have a higher optimum weight (1) Accept other appropriate responses.	**(6)**

Question number	Answer AO1 - 2 marks; AO2 - 1 mark	Mark
11	1 mark for stating why smoking is a poor lifestyle choice (in relation to fitness) (AO1), 1 mark for stating why smoking affects fitness (AO1) and 1 mark for application to endurance athletes (AO2). For example: Reason (one mark) • Smoking reduces oxygen <u>delivery</u> (to muscles) (1) Because (one mark) • it reduces gas exchange OR • reduces oxygen uptake OR • carbon monoxide has greater affinity with hemoglobin Application (one mark) • therefore, a long-distance runner would not be able to maintain their pace/ cannot supply oxygen for aerobic respiration/becomes fatigued/needs to slow down (1) Accept other appropriate responses.	**(3)**

Question number	Indicative content (A01 – 3 marks; A02 - 3 marks; A03 - 3 marks	Mark
12	Reward acceptable answers. Responses may include, but are not limited to, the following: Knowledge and understanding of lifestyle choices (A01) • Factual statement about the ratio of macronutrients within a balanced diet, e.g. the correct ratio of each nutrient should be eaten within a balanced diet /carbohydrates should have the greatest proportion • Understanding of meaning of a sedentary lifestyle, e.g. participation in limited, if any, activity **or** statement re recommended activity levels, e.g. 5-18-year old, an hour moderate activity daily • Factual statement about rest/sleep/work balance, e.g. need enough time away from work to allow recovery each day/GRA 8 hours of sleep/equal balance between rest, work, sleep. Application of knowledge, linking lifestyle choices to any aspect of health (physical, social, emotional) and well-being (A02) • Jacob should eat the correct ratio of each macronutrient to have a balanced diet, (AO1) currently Jacob is eating <u>too much</u> fat which he needs to reduce (AO2) • The government recommends that (5-18-year-olds) exercise for a minimum of one hour every day. (AO1) However, Jacob is leading a sedentary lifestyle, this means he is not getting enough exercise. (AO2) • We need enough time away from work to rest and recover from the day so we can function the next day, (AO1) however Jacob is not giving himself enough time to recover as most of his time is spent working. (AO2) Evaluation of topic – making reasoned judgments about the possible impact of the lifestyle choices on health and well-being (A03) • Jacob should eat the correct ratio of each macronutrient to have a balanced diet, (AO1) currently Jacob is eating <u>too much</u> fat which he needs to reduce (AO2) otherwise he will be at greater risk of developing coronary heart disease/obesity/type II diabetes (A03) • The government recommends that (5-18-year-olds) exercise for a minimum of one hour every day. (AO1) However, Jacob is leading a sedentary lifestyle, this means he is not getting enough exercise. (AO2) This will have a negative impact on his health and well-being due to an increased risk of depression (AO3) • We need enough time away from work to rest and recover from the day so we can function the next day, (AO1) however Jacob is not giving himself enough time to recover as most of his time is spent working. (AO2) This could have a negative impact as a lack of sleep will make him irritable and less able to interact well with others. (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).