



Pearson
Edexcel

Mark Scheme (Results)

Summer 2022

Pearson Edexcel Advanced Level
In Physical Education (9PE0)
Paper 01: 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 |
|-----------------|--|---------------------|------------|
| Q01i | The volume of blood pumped out of the heart (left ventricle) during one contraction of the heart | | (1) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|---|-----------------------------------|------------|
| Q01ii | Volume of blood pumped by the heart in one minute | Accept stroke volume x heart rate | (1) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|--|-----------------------|------------|
| Q02 | <ul style="list-style-type: none"> • Venous return is blood being returned to the heart through veins, venules and vena cava so stroke volume is dependent on the amount of venous return • If there is more venous return (Starling's Law) this means that stroke volume will be greater (or less means it will be smaller) • Cardiac output = SV x HR therefore, a larger SV = a greater cardiac output (or vice versa a smaller SV = smaller cardiac output) • Blood returning to the heart stretches the ventricle, increasing end diastolic volume (EDV) • Greater filling of the ventricle will increase contractile force • An increase in ventricular contractile force will increase SV | Points must be linked | (4) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|---|---|------------|
| Q03 | <ul style="list-style-type: none"> • Cardiac hypertrophy (bigger) • Increased SV • Heart does not have to pump as often to get the same cardiac output • Increased size of ventricle/chamber size • Stronger heart muscle/more forceful contraction • Increased capillarisation | <p>No mark for the definition of Bradycardia resting HR being less than 60 beats per min.</p> <p>No marks awarded for training undertaken as it is the effect on the body needed.</p> | (4) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|---|---------------------|------------|
| Q04 | <ul style="list-style-type: none"> • Plantar Flexion • Dorsi Flexion • Eversion • Inversion | Any three from... | (3) |

| Question Number | Answer | Additional Guidance | Mark | | | | | | | | | | | | |
|--------------------|--|---|----------------------------|-------------------|-------------------|--|---|------------------|--|---|------------------|--|--|--|------------|
| Q05 | <table border="1"> <thead> <tr> <th data-bbox="277 333 493 414">Muscle Contraction</th> <th data-bbox="493 333 759 414">Summary of the Contraction</th> <th data-bbox="759 333 1099 414">Practical Example</th> </tr> </thead> <tbody> <tr> <td data-bbox="277 414 493 815">Concentric</td> <td data-bbox="493 414 759 815">Contractions involving the muscle shortening while contracting</td> <td data-bbox="759 414 1099 815">Any suitably applied example: e.g. the bicep (brachii) during the upward phase of a bicep curl, or in the tricep (brachii) during the upward phase of a push-up.</td> </tr> <tr> <td data-bbox="277 815 493 1216">Eccentric</td> <td data-bbox="493 815 759 1216">Contractions involving the muscle lengthening while contracting (remember a muscle is not always relaxing while lengthening)</td> <td data-bbox="759 815 1099 1216">Any suitably applied example: e.g. downward phase of biceps curl for biceps (brachii) muscle</td> </tr> <tr> <td data-bbox="277 1216 493 1496">Isometric</td> <td data-bbox="493 1216 759 1496">The muscle stays the same length while contracting</td> <td data-bbox="759 1216 1099 1496">Any suitably applied example: e.g. when holding a weight in a static position - but muscle must be named.</td> </tr> </tbody> </table> | Muscle Contraction | Summary of the Contraction | Practical Example | Concentric | Contractions involving the muscle shortening while contracting | Any suitably applied example: e.g. the bicep (brachii) during the upward phase of a bicep curl, or in the tricep (brachii) during the upward phase of a push-up. | Eccentric | Contractions involving the muscle lengthening while contracting (remember a muscle is not always relaxing while lengthening) | Any suitably applied example: e.g. downward phase of biceps curl for biceps (brachii) muscle | Isometric | The muscle stays the same length while contracting | Any suitably applied example: e.g. when holding a weight in a static position - but muscle must be named. | <p>Named examples of muscles should be used and should link to a movement.</p> <p>The example can score without the accurate definition.</p> <p>Must say under tension or contracting /active action</p> | (6) |
| Muscle Contraction | Summary of the Contraction | Practical Example | | | | | | | | | | | | | |
| Concentric | Contractions involving the muscle shortening while contracting | Any suitably applied example: e.g. the bicep (brachii) during the upward phase of a bicep curl, or in the tricep (brachii) during the upward phase of a push-up. | | | | | | | | | | | | | |
| Eccentric | Contractions involving the muscle lengthening while contracting (remember a muscle is not always relaxing while lengthening) | Any suitably applied example: e.g. downward phase of biceps curl for biceps (brachii) muscle | | | | | | | | | | | | | |
| Isometric | The muscle stays the same length while contracting | Any suitably applied example: e.g. when holding a weight in a static position - but muscle must be named. | | | | | | | | | | | | | |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|--|---------------------|------------|
| Q06 | <ul style="list-style-type: none"> • Axon conducts nerve impulses/transmits the information • Dendrites receive information (from other neurones)/conduct impulse to cell body • Cell body transmits the signal, controls function of the cell • Axon terminal - information is passed to the next cell here (e.g. another neuron or muscle) • Myelin sheath - protects it from external influences that could affect transmission/insulates and facilitates faster transmission • Node of Ranvier - it's the gap in the myelin sheath that allows faster transmission of nerve impulse. | | (4) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|---|---|------------|
| Q07 | <ul style="list-style-type: none"> • Regular exercise • Reducing times you are sedentary (e.g. standing desk) • Healthy diet • Low alcohol consumption • Not smoking • Achieving an appropriate amount of sleep • Reducing stress • Not taking (recreational) drugs | <p>Brief outline as per mark scheme is enough – e.g. healthy diet mark awarded. Multiple dietary things are still only one mark e.g. reduce fat, reduce salt, reduce sugar, reduce caffeine - one mark for diet</p> | (4) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|---|--|------------|
| Q08 | <ul style="list-style-type: none">• Excitation - the muscle is stimulated with an electrical charge (action potential)• Contraction - the action of actin and myosin moving /sliding past each other/cross bridges bind/power stroke• Recharge - ATP is re-synthesised• Relaxing - when stimulation of the nerve stops, actin and myosin unbind. | The name of the stage will need to be given alongside the description to score a mark. | (4) |

| Question Number | Indicative Content | Mark |
|-----------------|--|------------|
| Q09 | <p>AO1 = 4 marks, AO3 = 4 marks</p> <p>Students who only show achievement against AO1 will not be able to gain marks beyond level 1.</p> <p>AO3 marks will be rewarded by examining something methodically and in detail typically in order to explain and interpret it.</p> <p>Reward acceptable answer. Responses may include, but are not limit to the following:</p> <ul style="list-style-type: none"> • Muscle hypertrophy • Increased strength of ligaments/tendons/connective tissues • Increased ATP/PC/Glycogen stores • Adaptation to neural pathways • Adaptation to muscle and connective tissue • Increased number and size of myofibrils • Adaptations to metabolic function • Happens to a greater extent to 11X than in type 1 <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> | (8) |

| Level | Mark | Descriptor |
|---------|------|---|
| | 0 | <ul style="list-style-type: none"> • No rewardable material |
| Level 1 | 1-2 | <ul style="list-style-type: none"> • Some accurate and relevant knowledge (AO1). • Simple or generalised statements supported by limited evidence (AO1). • Limited balancing of ideas against each other (AO3). • Limited evaluative statement (AO3). |
| Level 2 | 3-5 | <ul style="list-style-type: none"> • A good level of accurate and relevant knowledge (AO1). |

| | | |
|---------|-----|--|
| | | <ul style="list-style-type: none"> • A line of reasoning is presented and supported by some evidence (AO1). • Examines a wide range of ideas, balancing ideas against each other (AO3). • An evaluative statement which is relevant (AO3) |
| Level 3 | 6-8 | <ul style="list-style-type: none"> • A high level of accurate and relevant knowledge (AO1). • Articulates a clear viewpoint with clarity and precision which is well substantiated (AO1). • Critically examines a wide range of issues balancing ideas against each other (AO3). • Clear evaluative statement which is thorough and focussed (AO3) |

| Question Number | Indicative Content | Mark |
|-----------------|---|------------|
| Q10 | <p>AO1 = 4 marks, AO3 = 4 marks</p> <p>Students who only show achievement against AO1 will not be able to gain marks beyond level 1.</p> <p>AO3 marks will be rewarded by examining something methodically and in detail typically in order to explain and interpret it.</p> <p>Reward acceptable answer. Responses may include, but are not limit to the following:</p> <ul style="list-style-type: none"> • Restoration of phosphagen • ADP to PC and ATP • Initial high levels of oxygen into the body - gradual reduction in cardiac output and ventilation • Restoration of myoglobin with oxygen • Start of oxidation of lactate - conversion to glycogen/glucose • Body temp starting to reduce • Re-saturation of haemoglobin • Energy for ATP and PC re-synthesis <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> | (8) |

| Level | Mark | Descriptor |
|---------|------|---|
| | 0 | <ul style="list-style-type: none"> • No rewardable material |
| Level 1 | 1-2 | <ul style="list-style-type: none"> • Some accurate and relevant knowledge (AO1). • Simple or generalised statements supported by limited evidence (AO1). • Limited balancing of ideas against each other (AO3). • Limited evaluative statement (AO3). |
| Level 2 | 3-5 | <ul style="list-style-type: none"> • A good level of accurate and relevant knowledge (AO1). |

| | | |
|---------|-----|--|
| | | <ul style="list-style-type: none"> • A line of reasoning is presented and supported by some evidence (AO1). • Examines a wide range of ideas, balancing ideas against each other (AO3). • An evaluative statement which is relevant (AO3) |
| Level 3 | 6-8 | <ul style="list-style-type: none"> • A high level of accurate and relevant knowledge (AO1). • Articulates a clear viewpoint with clarity and precision which is well substantiated (AO1). • Critically examines a wide range of issues (link to why these are important) balancing ideas against each other (AO3). • Clear evaluative statement which is thorough and focussed (AO3) |

| Question Number | Indicative Content | Mark |
|-----------------|--|------------|
| Q11 | <p>AO1 = 4 marks, AO3 = 4 marks</p> <p>Students who only show achievement against AO1 will not be able to gain marks beyond level 1.</p> <p>AO3 marks will be rewarded by examining something methodically and in detail typically in order to explain and interpret it.</p> <p>Reward acceptable answer. Responses may include, but are not limit to the following:</p> <ul style="list-style-type: none"> • Warm up effectively to reduce time in anaerobic systems • Tactics to slow tempo of the game • Well timed time outs to help restore ATP PC • Rolling subs/finishers brought on • Use of injury stoppages/half time • Use of cooling aids pre- and post-game • Active recovery/cool down • Nutritional strategies pre and post meals and drinks on pitch • Hydration strategies • Organising for rest/relaxation time post intense session/match • Gamesmanship to slow play • The role of coach in coordinating support staff, e.g. access to physiotherapy/massage • Use of tracking data to roll subs if needed <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> | (8) |

| Level | Mark | Descriptor |
|---------|------|---|
| | 0 | <ul style="list-style-type: none"> • No rewardable material |
| Level 1 | 1-2 | <ul style="list-style-type: none"> • Some accurate and relevant knowledge (AO1). |

| | | |
|---------|-----|--|
| | | <ul style="list-style-type: none"> • Simple or generalised statements supported by limited evidence (AO1). • Limited balancing of ideas against each other (AO3). • Limited evaluative statement (AO3). |
| Level 2 | 3-5 | <ul style="list-style-type: none"> • A good level of accurate and relevant knowledge (AO1). • A line of reasoning is presented and supported by some evidence (AO1). • Examines a wide range of ideas, balancing ideas against each other (AO3). • An evaluative statement which is relevant (AO3) |
| Level 3 | 6-8 | <ul style="list-style-type: none"> • A high level of accurate and relevant knowledge (AO1). • Articulates a clear viewpoint with clarity and precision which is well substantiated (AO1). • Critically examines a wide range of issues balancing ideas against each other (AO3). • Clear evaluative statement which is thorough and focussed (AO3) |

| Question Number | Indicative Content | Mark |
|-----------------|---|------|
| Q12 | <p>AO1 = 5 marks, AO3 = 10 marks</p> <p>Students who only show achievement against AO1 will not be able to gain marks beyond Level 1.</p> <p>Students who only draw their answer from one area of study will not be able to gain marks beyond Level 4.</p> <p>AO3 marks will be rewarded by justification or exemplification of a point using analysis or evaluation.</p> <p>Reward acceptable answer. Responses may include, but are not limit to the following:</p> <p>CV system:</p> <ul style="list-style-type: none"> • Cardiovascular system consists of the heart, blood vessels and blood - blood contains oxygen and other nutrients and delivers them around the body and removes waste products • Oxygenated blood, which is pumped through the body via the arteries, supplies the body's tissues with oxygen • This oxygenated blood first needs to go to the capillaries, supplying the oxygenated blood to the tissues • The capillaries also absorb excess carbon dioxide into the blood and then deliver it to the veins, which then supply the blood back to the heart. • When the heart receives blood that is low in oxygen and high in carbon dioxide, it pumps it to the lungs via the pulmonary arteries. • Now that this blood has fresh oxygen in it, it returns to the heart and the heart then pumps it throughout the body to the working muscles <p>Respiratory system</p> <ul style="list-style-type: none"> • Respiratory system allows us to breathe in oxygen and also exchange carbon dioxide and oxygen. • Respiratory system allows inhalation and exhalation, external respiration where gas exchanges between lungs and blood (in CV system) and internal respiration (blood stream and body tissues CV system). | |

| | | |
|--|--|-------------|
| | <ul style="list-style-type: none"> • Comprises of airways, the lungs and the structures that move air in and out of the lungs. • The intercostals and the diaphragm cause the lungs to expand and contract; leading to inhalation and exhalation • The lungs expand, and oxygen is transferred into the low-oxygen blood, which also then sends some of its carbon dioxide back into the lungs. (Gaseous exchange) <p>Working together:</p> <ul style="list-style-type: none"> • Gas exchange involves the two systems working together so that oxygen is delivered from the respiratory system to the CV system via gas exchange. Receptors detect whether these rates need to increase. • Oxygen delivery needs to increase or decrease depending on the demands of the activity - the respiratory system and the CV system interact achieve this. • Increased CO₂ removal of carbon dioxide is needed by the CV system if too much acidity is detected. • Redistribution of blood flow is needed which involves the systems communicating together to ensure oxygen delivery is increased to the areas that it is most needed. • The respiratory system is involved in supplying oxygen to the blood (CV system) and removing carbon dioxide so they work together to achieve this. <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> | (15) |
|--|--|-------------|

| Level | Mark | Descriptor |
|---------|------|---|
| | 0 | <ul style="list-style-type: none"> • No rewardable material |
| Level 1 | 1-3 | <ul style="list-style-type: none"> • 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). |

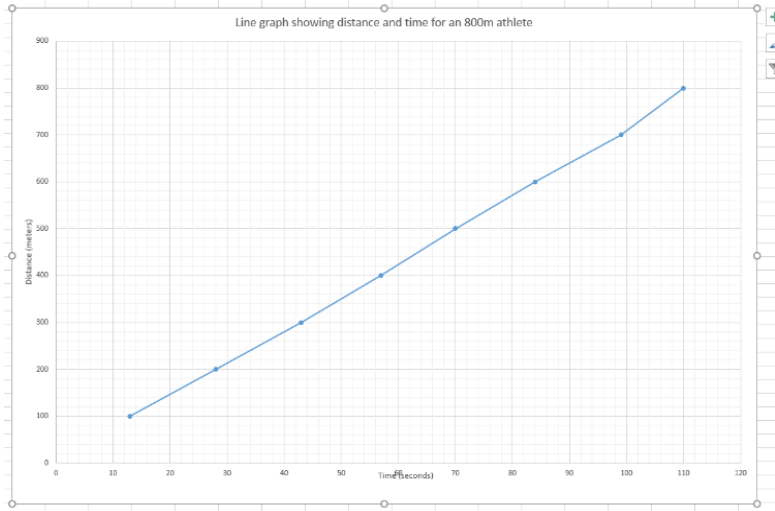
| | | |
|---------|-------|---|
| | | <ul style="list-style-type: none"> • Limited analysis of the factors that underpin performance and involvement in physical activity and sport (AO3). • Little analysis of performance due to limited application of relevant skills and techniques in physical activity and sport (AO3). • Analysis is not used to make a judgement (AO3). |
| Level 2 | 4-6 | <ul style="list-style-type: none"> • Attempts some understanding of the factors that underpin performance and involvement in physical activity and sport and organises or expresses ideas with some clarity (AO1). • Attempts some analysis of the factors that underpin performance and involvement in physical activity and sport (AO3). • Attempts to apply relevant skills and techniques in physical activity and sport to analyse performance (AO3). • Analysis may not be used to make a clear judgement (AO3). |
| Level 3 | 7-9 | <ul style="list-style-type: none"> • Evidence of some basic understanding of the factors that underpin performance and involvement in physical activity and sport and offers a logical clear writing structure (AO1). • Evidence of some analysis of the factors that underpin performance and involvement in physical activity and sport (AO3). • Some application of relevant skills and techniques in physical activity and sport to analyse performance (AO3). • A judgement may be given but with limited substantiation (AO3). |
| Level 4 | 10-12 | <ul style="list-style-type: none"> • Key issues are explored of both systems and them working together, but not all viewpoints may be addressed. The answer is generally well organised, communicated with clarity but may lack precision (AO1). • Analyses the factors that underpin performance and involvement in physical activity and sport (AO3). • Application of relevant skills and techniques in physical activity and sport to analyse performance (AO3). • Uses analysis to make a clear judgement and supports this with examples (AO3). |
| Level 5 | 13-15 | <ul style="list-style-type: none"> • Excellent knowledge and understanding of both systems and them working together of factors that underpin performance and involvement in physical activity and sport. Communicated in a coherent writing structure with clarity and precision (AO1). • Sophisticated analysis of the factors that underpin performance and involvement in physical activity and sport (AO3). • Uses analysis to make a fully informed judgement and supports this with examples (AO3). |

Section B

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|---|--|------------|
| Q13i | <ul style="list-style-type: none"> • Time taken to move a body (part or whole) through a movement over a pre-determined distance <p>OR</p> <ul style="list-style-type: none"> • Speed is distance in metres divided by time in seconds | Accept definition or formula $\text{Speed} = \text{Distance} / \text{Time}$ | (1) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|---|---|------------|
| Q13ii | <ul style="list-style-type: none"> • Speed in a particular direction <p>OR</p> <ul style="list-style-type: none"> • Velocity is displacement in metres divided by time in seconds and uses the units metres per second | Units not required Accept definition or formula $\text{Displacement} / \text{time}$ | (1) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|--|--|------------|
| Q13iii | <ul style="list-style-type: none"> • Acceleration (is the rate of change in velocity) - It is also a vector quantity (has size/magnitude and direction) <p>OR</p> <ul style="list-style-type: none"> • Acceleration is final velocity minus initial velocity divided by time taken • The formula can also be written as change in velocity divided by time taken | Units not required Accept definition or formula | (1) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|--|--|------------|
| Q14a | <ul style="list-style-type: none"> Both axes labelled correctly Points plotted correctly Curve drawn accurately  | <p>1 mark per bullet point</p> <p>Graph may be to a different scale</p> <p>For axes mark we will accept either way round but must be labelled.</p> <p>No mark for curve if line of best fit is used.</p> | (3) |

| Question Number | Answer | Additional Guidance | Mark | | | | |
|----------------------|---|----------------------|--|----------------------|---|--|------------|
| Q14b | <table border="1" style="width: 100%;"> <tr> <td style="width: 30%;">Speed at 600m</td> <td>(600/84) = 7.14m/s- average OR 100m/14s=7.14m/s using split time</td> </tr> <tr> <td>Speed at 800m</td> <td>(800/110) = 7.27m/s average OR 100m/11s =9.09m/s using split time</td> </tr> </table> | Speed at 600m | (600/84) = 7.14m/s- average OR 100m/14s=7.14m/s using split time | Speed at 800m | (800/110) = 7.27m/s average OR 100m/11s =9.09m/s using split time | <p>Correct units should be stated - Speed=distance/time No unit= no marks Accept 7.1 instead of 7.14</p> <p>Accept 7.3 instead of 7.27 or 9.1 instead of 9.09</p> <p>Award marks only for calculation and not for definition No units = no marks</p> | (2) |
| Speed at 600m | (600/84) = 7.14m/s- average OR 100m/14s=7.14m/s using split time | | | | | | |
| Speed at 800m | (800/110) = 7.27m/s average OR 100m/11s =9.09m/s using split time | | | | | | |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|--|---|------------|
| Q14c | <ul style="list-style-type: none"> • $(7.27 - 7.14) = 0.13$ • $110 - 84 = 26$ seconds • $0.13 / 26 = 0.005\text{m/s/s}$ <p>OR</p> <ul style="list-style-type: none"> • $(9.09 - 7.14) = 1.95$ • $110 - 84 = 26$ seconds • $1.95 / 26 = 0.075\text{m/s/s}$ | <p>Correct units should be stated for final answer mark.</p> <p>A fully correct answer with correct units would be max marks even if calculation is not shown.</p> <p>A correct answer with no units would be 2 marks as they must have done steps but lose final bullet point with no units.</p> <p>They may have used average or used the split time hence two possible answers. Could use rounded figs of 7.1, 7.3 or 9.1 to calculate</p> | (3) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|---|---|------------|
| Q15 | <ul style="list-style-type: none"> • Protective equipment/clothing can prevent injury • Correct technique can prevent overuse injuries. • Muscle balance can reduce risk of muscle damage. • Managing risks before activity will limit the risk of injury e.g. checking pitch/weather conditions/use of spotter • Appropriate muscle conditioning can prevent injuries. • Warming up/stretching can reduce risk of muscle pulls/tears. • Participation at appropriate level of competition (age group, weight band, gender) • Learning aids e.g. foam pit, safety mat, harness • Recovery time between training sessions • Adhering to rules/knowledge of rules of the game from NGBs • Substitutions at appropriate times for fatigued players • Use of trained officials • Using correct footwear. | Needs to say protective equipment or clothing not just correct equipment or an appropriate example. | (5) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|--|---|------------|
| Q16 | <ul style="list-style-type: none"> • Protection - injured joint should be rested • Optimal Loading - gentle motion you can start in protection phase • Ice - apply ice to manage swelling and decrease pain • Compression - to alter blood flow and limit swelling • Elevation - raise the joint to decrease blood flow | <p>Need to outline and not list the points.</p> <p>Compression mark can be given for an increase or decrease to blood flow as some evidence for both. Increase flow away from muscle or reducing to the muscle.</p> | (5) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|--|---|------------|
| Q17 | <ul style="list-style-type: none"> • Continuous running (no recovery time) • Lines 20m apart • Run in time to recorded beeps • 23 levels to the test • If you arrive before the bleep you wait for it • If you fail to reach the end of the shuttle on 2/3 intervals you are withdrawn from the test • Progressive intensity • Level and shuttle predict VO2 max/compared to national score • This is a maximal test (work to exhaustion) | <p>NO marks awarded for warming up before the test as this is not needed.</p> | (5) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|---|---------------------|------------|
| Q18a | <p>Plyometric training: a movement involving an eccentric contraction immediately before a concentric contraction</p> | | (1) |

| Question Number | Answer | Additional Guidance | Mark |
|-----------------|--|---|------------|
| Q18b | <p>Advantages:</p> <ul style="list-style-type: none"> • Little or no equipment is needed • Cheap/accessible • Good for improving strength • Good for improving power/explosiveness • Good for improving speed • Can be adapted to different muscle groups and target specific body parts/made sports specific • Can be done in short bursts of time <p>Disadvantages:</p> <ul style="list-style-type: none"> • Higher risk of injury if you do not do it correctly • Need rest days between sessions • It is high impact so can injure joints • You need good coordination to do it effectively • Can cause DOMS • Types of exercise and number of repetitions depending on age and fitness • Technical understanding needed | No more than 4 marks for either advantages or disadvantages | (6) |

| Question Number | Answer | | | Additional Guidance | Mark | | | | | | | | | |
|---------------------------------|--|---|--|------------------------------|--------------|----------------|-----------------------|---|---|---------------------------------|--|--|--|------------|
| Q19 | <table border="1"> <thead> <tr> <th data-bbox="300 331 531 412">Injury Classification</th> <th data-bbox="536 331 778 412">Cause</th> <th data-bbox="783 331 1086 412">Example</th> </tr> </thead> <tbody> <tr> <td data-bbox="300 418 531 772">Acute Injuries</td> <td data-bbox="536 418 778 772"> Develop suddenly or quickly Caused by a knock/impact/fall/trauma </td> <td data-bbox="783 418 1086 772"> Examples - fracture, dislocation, cruciate ligament injury, contusion/haematoma, sprain, strain, abrasion, concussion, credit can also be given to tendonitis </td> </tr> <tr> <td data-bbox="300 779 531 1370">Overuse/Chronic Injuries</td> <td data-bbox="536 779 778 1370"> Develop slowly/over a period of time Can be caused by incorrect technique/ repetitive strain/ increase in training/ lack of warm up/ inappropriate footwear/ hard playing surface </td> <td data-bbox="783 779 1086 1370"> Examples – shin splints, tendonitis, tennis or golfers elbow, jumpers knee, stress fractures, tendinosis </td> </tr> </tbody> </table> | | | Injury Classification | Cause | Example | Acute Injuries | Develop suddenly or quickly Caused by a knock/impact/fall/trauma | Examples - fracture, dislocation, cruciate ligament injury, contusion/haematoma, sprain, strain, abrasion, concussion, credit can also be given to tendonitis | Overuse/Chronic Injuries | Develop slowly/over a period of time Can be caused by incorrect technique/ repetitive strain/ increase in training/ lack of warm up/ inappropriate footwear/ hard playing surface | Examples – shin splints, tendonitis, tennis or golfers elbow, jumpers knee, stress fractures, tendinosis | <p>Cause and example marks can only be awarded with correct injury.</p> <p>Overuse cannot be given as a cause mark because it is the classification.</p> <p>Can score an example mark without a cause.</p> | (6) |
| Injury Classification | Cause | Example | | | | | | | | | | | | |
| Acute Injuries | Develop suddenly or quickly Caused by a knock/impact/fall/trauma | Examples - fracture, dislocation, cruciate ligament injury, contusion/haematoma, sprain, strain, abrasion, concussion, credit can also be given to tendonitis | | | | | | | | | | | | |
| Overuse/Chronic Injuries | Develop slowly/over a period of time Can be caused by incorrect technique/ repetitive strain/ increase in training/ lack of warm up/ inappropriate footwear/ hard playing surface | Examples – shin splints, tendonitis, tennis or golfers elbow, jumpers knee, stress fractures, tendinosis | | | | | | | | | | | | |

| Question Number | Indicative Content | Mark |
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| Q20 | <p>AO1 = 4 marks, AO3 = 4 marks</p> <p>Students who only show achievement against AO1 will not be able to gain marks beyond Level 1.</p> <p>AO3 marks will be rewarded by examining something methodically and in detail typically in order to explain and interpret it and explaining which are the most suitable tests.</p> <p>Reward acceptable answers. Responses may include, but are not limited to the following:</p> <p>Tests can be examined by either the measurement (direct versus indirect) or the physical demand/intensity (maximal versus submaximal):</p> <p>Gas Analysis</p> <ul style="list-style-type: none"> • Maximal • Cycle/run • Measure expired air • Calculates amount of oxygen used • Objective measure • Needs specialist equipment • Can only do one subject at a time <p>Cooper 12-minute run</p> <ul style="list-style-type: none"> • Maximal • Run as far as can in 12 mins • Distance covered compared to table • Predicted measurement • Simple/cheap/easy to administer • Can mass test multiple subjects • Self-paced <p>MSFT</p> <ul style="list-style-type: none"> • Maximal • Run in time to beeps on CD • Level achieved compared to table • Predicted measurement • Simple/cheap/easy to administer • Can mass test multiple subjects | |

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| | <ul style="list-style-type: none"> • Relies on protocols • Accuracy varies <p>Step Tests</p> <ul style="list-style-type: none"> • Submaximal • Step on off in time • Heart rate in recovery compared to table • Predicted measurement • Simple/cheap/easy to administer • Can mass test multiple subjects <p>YoYo Intermittent Recovery Test – two types</p> <ul style="list-style-type: none"> • Externally paced • YYIET - can underestimate VO2 versus treadmill test • YYIRT - relevance for games players <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> | |
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(8)

| Level | Mark | Descriptor |
|---------|------|--|
| | 0 | <ul style="list-style-type: none"> • No rewardable material |
| Level 1 | 1-2 | <ul style="list-style-type: none"> • Some accurate and relevant knowledge (AO1). • Simple or generalised statements supported by limited evidence (AO1). • Limited balancing of ideas against each other (AO3). • Limited evaluative statement (AO3). |
| Level 2 | 3-5 | <ul style="list-style-type: none"> • A good level of accurate and relevant knowledge (AO1) • A line of reasoning is presented and supported by some evidence (AO1). • Examines a wide range of ideas, balancing ideas against each other (AO3). • An evaluative statement which is relevant (AO3). |
| Level 3 | 6-8 | <ul style="list-style-type: none"> • A high level of accurate and relevant knowledge (AO1) |

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| | | <ul style="list-style-type: none">• Articulates a clear viewpoint with clarity and precision which is well substantiated (AO1).• Critically examines a wide range of issues balancing ideas against each other (AO3).• Clear evaluative statement which is thorough and focussed (AO3). |
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| Question Number | Indicative Content | Mark |
|-----------------|---|------------|
| Q21 | <p>AO1 = 4 marks, AO3 = 4 marks</p> <p>Students who only show achievement against AO1 will not be able to gain marks beyond level 1.</p> <p>AO3 marks will be rewarded by examining something methodically and in detail typically in order to explain and interpret it.</p> <p>Reward acceptable answer. Responses may include, but are not limit to the following:</p> <ul style="list-style-type: none"> • Supplements can enhance energy stores, such as creatine supplements • Supplements can enhance hydration, such as electrolytes or hypertonic/isotonic sports drinks • Supplements can enhance recovery, such as proteins which help repair of muscle. • Supplements can aid metabolic processes • Supplements can delay fatigue, such as bicarbonate loading • Potential benefits to immune system. <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> | (8) |

| Level | Mark | Descriptor |
|---------|------|--|
| | 0 | <ul style="list-style-type: none"> • No rewardable material |
| Level 1 | 1-2 | <ul style="list-style-type: none"> • Some accurate and relevant knowledge (AO1). • Simple or generalised statements supported by limited evidence (AO1). • Limited balancing of ideas against each other (AO3). |

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| | | <ul style="list-style-type: none"> Limited evaluative statement (AO3). |
| Level 2 | 3-5 | <ul style="list-style-type: none"> A good level of accurate and relevant knowledge (AO1). A line of reasoning is presented and supported by some evidence (AO1). Examines a wide range of ideas, balancing ideas against each other (AO3). An evaluative statement which is relevant (AO3). |
| Level 3 | 6-8 | <ul style="list-style-type: none"> A high level of accurate and relevant knowledge (AO1). Articulates a clear viewpoint with clarity and precision which is well substantiated (AO1). Critically examines a wide range of issues balancing ideas against each other (AO3). Clear evaluative statement which is thorough and focussed (AO3). |

| Question Number | Indicative Content | Mark |
|-----------------|--|------|
| *Q22 | <p>AO2 = 5 marks, AO3 = 10 marks</p> <p>Students who only draw their answer from one area of study will not be able to gain marks beyond Level 3.</p> <p>AO3 marks will be rewarded by justification or exemplification of a point using analysis or evaluation</p> <p>Reward acceptable answers. Responses may include, but are not limited to the following.</p> <p>An analysis that gives all sides of the issue and any implications, that includes the following indicative content:</p> <ul style="list-style-type: none"> • Analysis of periodisation -planning of the training into phases. • Training structured to peak for a big event in 2 or 4 years (may include reference to extending the peak e.g. COVID disruption to Olympic cycle and extending it to 5 years from 4). • Macro, Meso and Microcycles referenced accurately - Macrocycles -long term goals - perhaps a 4-year plan, Mesocycles are smaller phases of around 4-8 weeks where specific goals might be set. For example, mesocycles might focus on endurance or hypertrophy or strength training at specific times. Microcycles are short periods within a mesocycle - perhaps what happens day to day or week to week specifying the type of training conducted daily. • Examples from sport/athletes and time scales • Preparation Phase (general and specific) - General preparation might involve lower intensity and higher volume training but as competition nears training will be more specific to the end goal. • Competition Phase -Appropriate entries in competitions are planned to prepare the athlete for specific events. • Transition Phase - usually used to begin a mesocycle. Assessments measure progress and adaptations taken into account ready for the next phase/mesocycle. The new programme is designed and introduced, diet and nutritional strategies are also reviewed. | |

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| | <ul style="list-style-type: none"> • Allows for monitoring of the progress over time - athletes can see what lies ahead and plan for specific competition entries and peak for correct events or qualifying if needed. • Athletes will aim to reach optimum performance for the most important competition of the calendar. <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> | (15) |
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| Level | Mark | Descriptor |
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| | 0 | <ul style="list-style-type: none"> • No rewardable material |
| Level 1 | 1-3 | <ul style="list-style-type: none"> • There are limited links between theory and practice. Limited technical language supports isolated elements of knowledge and understanding (AO2). • Limited analysis of the factors that underpin performance and involvement in physical activity and sport (AO3). • Analysis is not used to make a judgement (AO3). |
| Level 2 | 4-6 | <ul style="list-style-type: none"> • Makes few links between theory and practice. Basic technical language supports some elements of knowledge and understanding (AO2). • Attempts some analysis of the factors that underpin performance and involvement in physical activity and sport (AO3). • Analysis may not be used to make a clear judgement (AO3). |
| Level 3 | 7-9 | <ul style="list-style-type: none"> • Makes some links between theory and practice. Some appropriate technical language supports a good knowledge and understanding (AO2). • Good analysis of the factors that underpin performance and involvement in physical activity and sport (AO3). • Uses analysis to make a judgement but without full substantiation (AO3). |
| Level 4 | 10-12 | <ul style="list-style-type: none"> • Makes strong links between theory and practice. Appropriate technical language supports a very good knowledge and understanding (AO2). |

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| | | <ul style="list-style-type: none"> • Comprehensive analysis of the factors that underpin performance and involvement in physical activity and sport (AO3). • Uses analysis to make a clear judgement and supports this with examples (AO3). |
| Level 5 | 13-15 | <ul style="list-style-type: none"> • Makes many insightful and significant links between theory and practice. Appropriate technical language supports a significant level of knowledge and understanding (AO2). • Sophisticated analysis of the factors that underpin performance and involvement in physical activity and sport (AO3). • Uses analysis to make a fully informed judgement and supports this with examples (AO3). |