Mark Scheme (Results)

Summer 2024

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 AO1 – 1 mark	Additional Guidance	Mark
Q01 (a)	Cervical.	Must have correct spelling.	**(1)**

Question Number	Answer AO1 – 1 mark	Additional Guidance	Mark
Q01 (b)	Lumbar.	Must have correct spelling.	**(1)**

Question Number	Answer AO1 – 2 marks	Additional Guidance	Mark
Q02 (a)	• Radius. • Ulna. • Humerus.	One mark for each correct response. Must have correct spelling.	**(2)**

Question Number	Answer AO1 – 4 marks	Additional Guidance	Mark
Q02 (b)	• Horizontal-flexion. • Horizontal-extension. • Abduction. • Adduction. • Circumduction. • Rotation. • Flexion. • Extension.	One mark for each correct response. Must have correct spelling. Elevation/Depression/Protraction/Retraction would all be credited with a mark although are not on the specification.	**(4)**

Question Number	Answer AO2 – 4 marks	Additional Guidance	Mark
Q03	• Stimulation is delivered before relaxation occurs. • The contractile peaks become stronger with each stimulation – more forces come from each increased stimulation (contract again before relaxation). • Increasing the frequency of stimulation increases force. • Muscle does not relax. • Will eventually cause max contractile strength/tetanic contraction.	One mark for each correct summary point.	**(4)**

Question Number	Answer AO2 – 4 marks	Additional Guidance	Mark
Q04	• A large amount of ATP can be re-synthesised **36-38 ATP.** • Glycogen will last longer in the aerobic system. • Alternative sources can be used such as Fat/protein can be utilised as an energy source. • Very efficient system **with** good O2 delivery. • Energy can be supplied for long periods of time/long duration/exercise for longer. • No fatiguing bi – products.	One mark for each correct summary of an advantage. High energy yield is too vague.	**(4)**

Question Number	Answer AO1 – 1 mark	Additional Guidance	Mark
Q05 (a)	100N.	Accept 100 or 100 N.	**(1)**

Question Number	Answer AO1 – 1 mark	Additional Guidance	Mark
Q05 (b)	20N.	Accept 20 or 20 N.	**(1)**

Question Number	Answer AO2 – 3 marks	Additional Guidance	Mark
Q05 (c)	• A greater surface area of a swimmer increases resistance. Shape of the swimmer - a larger frontal cross-sectional area increases resistance. • Swimming in an outside lane increases resistance due to wash from other swimmers/pool design which may impact on friction. • Swimming on the surface of the water increases resistance compared to underwater. • Type of water can affect friction e.g. it is easier to swim in sea water than river water as denser fluid has more upthrust which increases resistance. • The stroke used can affect resistance (e.g. dolphin leg action can reduce resistance)/ choice of stroke may mean one has less friction. • Clothing to reduce friction -swim suit/swim hat. • Shaving the body to reduce friction. • Swim technique to affect. streamlining e.g. body position such as raised head and dropped hips increase drag in breaststroke/ gliding more. • Velocity/Speed of the swimmer will impact on friction as the water moves over the athlete.	One mark for each correct description. Accept other appropriate responses.	**(3)**

Question Number	Answer AO2 – 3 marks	Additional Guidance	Mark
Q06	• Troponin allows calcium to bind to it/combines with tropomyosin. • Tropomyosin influences binding of actin to myosin and blocks muscle contraction/prevents actin and myosin binding/moving of tropomyosin allows the binding to happen. • Myosin binds to actin/binding sites to allow the contraction.	One mark for each correct summary of role of component. Cross Bridge formation is too vague for point 3.	**(3)**

Question Number	Answer AO2 – 6 marks	Additional Guidance	Mark
Q07	• Muscular hypertrophy. • Increased muscular stores of ATP. • Increased stores of CP/PC. • Increased blood flow in the muscles. • Increased mitochondrial density. • Increased muscle glycogen. • Increased enzymes. • Increased actin and myosin. • Increased capillaries at the muscle bed/capillarisation. • Increased myoglobin. • Increase lactate threshold.	One mark for each correct chronic adaptation. All answers must be focused on inside the muscles. Hyperplasia – formation of new muscles fibres can be credited.	**(6)**

Question Number	Answer AO2 – 4 marks	Additional Guidance	Mark
Q08	• At moderate intensity fuel comes from a mix of carbohydrates and fats. • (Up to 90 Mins) Glycogen/Carbs are a fuel/long duration/low intensity. • During long duration (2+ hours)/low intensity activity fat is the main fuel source. • High intensity uses carbohydrate only. • At maximum intensity exercise/very short duration ATP-PC can be used as a fuel. • Protein can be used for very long events. • Carbohydrate stores are limited and can run out in very long-distance events.	One mark for each correct description. All the use of the term carbs/glycogen/glucose are all acceptable rather than carbohydrate if correctly used.	**(4)**

Question Number	Answer AO1 – 5 marks	Additional Guidance	Mark
Q09	• Vascular shunting begins/blood. redirected to working muscles. • Stroke Volume increase. • Heart Rate increase. • Increase Cardiac Output. • Increase blood pressure. • Increase venous return. • Increased rate of ventilation/breathing. • Increased Tidal volume/depth of breathing. • Haemoglobin releases more O_2 (due to increased CO_2, muscle temp increase, decreased pH)/dissociation curve shifts. • Vasodilation at muscles/ vasoconstriction of blood vessels in other areas. • Increased rate of diffusion in lungs / muscles/diffusion gradient.	One mark for each correct outline.	**(5)**

Question Number	Indicative Content AO1 – 4 marks; AO3 – 4 marks	Mark
Q10	**Reward acceptable answer. Responses may include, but are not limited to the following. All answers should be linked to how an athlete uses lever system.** An examination that gives all sides of the issue and any implications, including details about lever system, that includes the following indicative AO1 content: **1st Class Levers** • In a first class lever, the fulcrum is between the effort/force and the load/resistance: E…F…L and creates a see-saw action. • First class levers are very rare in the human body with the most common example being any activity that involves nodding of the head e.g. watching the flight of a ball. The head is the load (resistance), the joint between the skull and first vertebra is the fulcrum and the effort (force) comes from the trapezius. • Another example is when throwing a ball - the triceps (effort) causing extension at the elbow (fulcrum) with the load (ball/arm). **2nd Class Levers** • In a second-class lever, the load/resistance is between the fulcrum and the effort/force: F…L…E. • Again second class levers are limited within the human body with the most used example being a calf raise where the load is the body, the fulcrum is between the toes and the ball of the foot and the effort comes from the gastrocnemius and soleus. • Examples might include taking off in high jump, jumping to shoot in basketball (effort is gastrocnemius, fulcrum ankle joint and load is body), press up (whole body). **3rd Class Levers** • In a third class lever the effort/force lies between the fulcrum and the load/resistance; F…E…L. • Third class lever systems are very common in the body with a wide range of examples e.g. a biceps curl, where the fulcrum is the elbow, the effort comes from the biceps group and the load is the weight or preparing to kick a ball, where the knee joint is the fulcrum, the effort comes from the hamstring group contracting to flex the knee and lift the load of the lower leg. **Examples of AO3 statements**	

	• Mechanical advantage of 2nd class lever (effort arm greater than load arm). • Mechanical disadvantage of 3rd class lever (load arm greater than effort arm). • Explanation of load arm and effort arm. • Reference to length of lever and moment of force (advantages for taller athletes). • Combination of levers generate more force. • Use of an implement to maximise lever e.g. an oar. • Speed and range of movement for 3rd class levers are an advantage. • Heavy loads can be moved more easily in 2nd class levers. AO3 marks will be rewarded by justification or exemplification of a point using analysis or evaluation. 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. 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.	**(8)**

Level	Mark	Descriptor
0	0	• No rewardable content
Level 1	1-2	• 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	• 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	• 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 AO1 – 4 marks; AO3 – 4 marks	Mark
Q11	**Reward acceptable answer. Responses may include, but are not limited to the following. All answers should be linked to how an athlete uses the respiratory system.** An examination that gives all sides of the issue and any implications, including details about the mechanics involved in the respiratory system, that includes the following indicative AO1 content: • Diaphragm flattens more forcefully extending the thoracic cavity. • External intercostal muscles lift ribs and sternum extending thoracic cavity. • Volume of thoracic cavity increases therefore pressure decreases within the lungs. • Pressure is greater outside the lungs so the air moves into the lungs down a pressure gradient. • Mechanical changes result in more air entering the respiratory system causing changes in lung volume. • Expiration becomes more forceful. • Expiration is from the relaxation of the inspiratory muscles. • Diaphragm relaxes and the intercostals relax to push the sternum and ribs down - this decreases the thoracic cavity and elastic recoil of lung tissue allows return to original size. • In exercise, breathing is forced and this uses additional muscles to expand the thoracic volume e.g. sternocleidomastoid, latissimus dorsi etc. Active inspiration also forces air out using internal intercostals. • Increases in partial pressure gradients at the alveoli, increasing diffusion resulting in greater gas exchange. • Process of gas exchange. • Changes to inspiratory and expiratory reserve volumes and changes to residual volumes. AO3 marks will be rewarded by justification or exemplification of a point using analysis or evaluation. 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.	

	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.	**(8)**

Level	Mark	Descriptor
0	0	• No rewardable content
Level 1	1-2	• 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	• 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	• 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 AO1 – 5 marks; AO3 – 10 marks	Mark
Q12	**Reward acceptable answer. Responses may include, but are not limit to the following.** A discussion that gives all sides of the issue and any implications, including details about the different stages of recovery, that includes the following indicative content: EPOC (Excess post exercise oxygen consumption) is used to return the body to homeostasis. The speed and rate of phosphagen replenishment linked to activities where this is relevant. **Fast Component** Linked activities would be AO3 marks: • Replenishment of blood and muscle oxygen stores. • Resynthesis of ATP and PC stores. • Restoration of myoglobin. **Slow Component** Linked activities would be AO3 marks: • Slow component is after the first 3 minutes of recovery (after the fast component). • Oxidation /Removal of lactate and hydrogen ions and conversion to glycogen. • Protein allows for repair of damaged muscle fibres. • Replenishment of energy stores. • Rehydration. • Restoration of Glycogen and carbohydrate restores energy levels. • Return of temperature to resting levels. • Elevated ventilation. **AO3 content** E.g. discussion of recovery strategies in relation to training aims and predominant energy systems (warm-up, W:R ratio, active recovery, supplementation, strategies/tactics, etc). AO3 marks will be rewarded by examining something methodically and in detail typically in order to explain and interpret it.	

	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. 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.	**(15)**

Level	Mark	Descriptor
0	0	• No rewardable content
Level 1	1-3	• 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). • 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	• 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	• 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	• Key issues are explored, 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	• Excellent knowledge and understanding 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 AO1 – 3 marks	Additional Guidance	Mark
Q13	• Sub-maximal aerobic fitness. • Maximal aerobic fitness. • Anaerobic capacity. • Anaerobic power. • Maximum/maximal speed.	One mark for each correct principle. Other acceptable answers include: Submaximal aerobic capacity (in place of submaximal aerobic fitness) These can replace maximal aerobic fitness: Maximal aerobic capacity Aerobic Power $\dot{V}O_{2max}$	**(3)**

Question Number	Answer AO1 – 3 marks	Additional Guidance	Mark
Q14	• Energy balance is making sure that calories in equals calories out. • **Adjusting** energy intake - the amount of calories consumed/eating more or less. • **Adjusting** energy Expenditure - the amount of calories used in activity, BMR and the thermal effect of food/exercising more or less. • Appropriate weight management programme/dieting. • Methods of fluid loss.	One mark for each correct outline. Dieting alone is not worthy of credit it needs to link to weight management. Exercise needs to link to weight management.	**(3)**

Question Number	Answer AO1 – 1 mark	Additional Guidance	Mark
Q15 (a)	• The amount of energy obtained from anaerobic sources (creatine phosphate breakdown and anaerobic glycolysis) in a single bout of exercise. • This is the greatest amount of energy that can be released from the anaerobic system.	One mark for correct definition.	**(1)**

Question Number	Answer AO1 – 3 marks	Additional Guidance	Mark
Q15 (b)	• Stores of PC. • Stores of muscle glycogen. • Muscle mass/body composition. • Training status/level of fitness. • Proportion of type 2 fibres. • Quantity of anaerobic enzymes. • Ability to withstand/tolerate lactate.	One mark for each correct factor.	**(3)**

Question Number	Answer AO2 – 4 marks	Additional Guidance	Mark
Q16	• Bungee running use the recoil action of the bungee cord to pull you at a faster rate than you could achieve in a sprint. • Elastic bands/resistance bands use the recoil action to achieve a faster movement by pulling you faster. • Wind assisted training use of a tail wind takes you at a faster rate. • Being towed – being pulled so movement occurs at a faster speed than normal. • Slip streaming – removal of air resistance e.g. cycling behind a car makes you travel faster. • Downhill running means you work at a faster rate than you could on the flat.	One mark for correct identification and description of each type of training. Description must make sure it is assisted rather than resisted e.g. resistance bands must be used to assist not resist. Accept other appropriate responses.	**(4)**

Question Number	Answer AO2 – 2 marks	Additional Guidance	Mark
Q17 (a)	• 7.26 x 19. • 137.94 N.	One mark for correct working out or correct response with no/incorrect units. Two marks for correct response with correct units. F=ma so. Accept 138N. Accept 137.9N.	**(2)**

Question Number	Answer AO2 – 2 marks	Additional Guidance	Mark
Q17 (b)	• 18 divided by 0.38 • 47.37 m/s	One mark for correct working out or correct response with no/incorrect units. Two marks for correct response with correct units. Accept 47 m/s. Do not accept 47.36 m/s. Do accept 47.4 m/s. Accept more decimal places if accurate. Speed is distance/time.	**(2)**

Question Number	Answer AO2 – 5 marks	Additional Guidance	Mark
Q18	• Weigh the athlete. • The athlete is given a few **practice runs up the steps** to warm up. • The athlete stands ready at the starting line 6 meters in front of the first step. • On the command "Go", the athlete **sprints** to and up the flight of steps, **taking three steps** at a time (stepping on the 3rd, 6th and 9th steps), attempting to go up the steps as fast as possible. • The time to get from the **3rd step to the 9th step is recorded** (either using a stopwatch or using switch mats placed on the 3rd and 9th steps), (starting when the foot was in first in contact with the 3rd step and stopped when the foot contacts the 9th step). • Measuring the vertical distance travelled /Step height (17.5cm step height). • Allow three trials of the test, with 2-3 minutes recovery between each trial. • Scoring: Power (Watts) is calculated from the formula below, where P = Power (Watts), M = Body mass (kg), D = Vertical distance, between steps 3 & 9 (meters), t = Time (seconds). 9.8 is the constant of gravity: P = (M x D) x 9.8 / t.	One mark for each correct protocol summary point. The timing point needs to reference specifically when the timing starts and stops (3^{rd} step to 9^{th} step). Correctly annotated diagrams are accepted.	**(5)**

Question Number	Answer AO2 – 4 marks	Additional Guidance	Mark
Q19	• Frequency - complete more training sessions in the week. • Intensity - make the workout harder by running faster or higher target HR zone. • Time - train for a longer period of time. • Type - adjust the type of training being completed e.g. interval or continuous training. Fartlek changing running conditions to make more challenging. Needs to link to how overload is increased – e.g. modifying the type of training. Or adjust the medium used e.g. swim/cycle.	One mark for each correct descriptive point. For type allow suitable methods if justified. Need to describe what they would do not just the word frequency etc Each type must link to how overload is achieved. Accept other appropriate responses.	**(4)**

Question Number	Answer AO2 – 4 marks	Additional Guidance	Mark
Q20	• Angle of release (hitting net or going beyond baseline). • Height of release – higher/lower release will affect the distance the ball travels. • Speed of release – not enough speed will mean it might not reach the net/how hard the ball is struck. • Air resistance will affect flight of the ball and slow it down. • Wind can affect the flight path by diverting it is taking. • The fluffy or worn tennis ball will affect the amount of drag/air resistance. • Gravity causes the ball to fall to the ground. • Playing at altitude will reduce air resistance which increases the flight distance. • Increased temperature decreases air resistance which increases the flight distance. • Greater humidity reduces air resistance which increases flight distance. • If the ball gets wet, it will get heavier which reduces the flight distance/a low compression ball may travel less far.	One mark for each correct description of factor.	**(4)**

Question Number	Indicative Content AO1 – 4 marks; AO3 – 4 marks	Mark
Q21	**Reward acceptable answers. Responses may include, but are not limited to the following. All answers should be linked to how an athlete may rehabilitate from a soft tissue injury.** An examination that gives all sides of the issue and any implications, including details about how and why different dietary supplements effect power athletes, that includes the following indicative AO1 content: • Relevant soft tissue injury selection. • Methods of rehab - e.g. physio, ultrasound, compression garments, RICE, POLICE, Ice Bath, taping, nutrition. • If accessible depending on the level of athlete/accessibility - cryotherapy, hyperbaric chambers, climate chambers, oxygen tents. • Resting and gradual return to gradual intensity increasing sessions. AO3 marks will be rewarded by justification or exemplification of a point using analysis or evaluation. Examples - the timing of the season, discussion about which methods might be most effective and most suited to particular injuries, cost implications of some methods, accessibility, e.g. hydrotherapy might be good for lower body parts, sporting application for example return to sport whilst not fully weight bearing. 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. 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	**(8)**

Level	Mark	Descriptor
0	0	• No rewardable content
Level 1	1-2	• 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	• 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	• 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 AO1 – 4 marks; AO3 – 4 marks	Mark
Q22	**Reward acceptable answers. Responses may include, but are not limited to the following. All answers should be linked to how an athlete may improve their maximal aerobic fitness.** An examination that gives all sides of the issue and any implications, including details about appropriate training methods. For example, justification why fartlek training would be appropriate for a team games player. AO1 content: • Fartlek training- ensuring the ratio of aerobic to anaerobic is right. • Continuous Training - linked to their activity for example on bike, rower, swim, run. • Interval Training – needs to link to aerobic at approx. max aerobic speed / sprint interval training e.g. HIIT. • Circuits with specific stations linked to Aerobic activity or stations with less rest periods. • Must be applied with specific examples. • Hypoxic training/Altitude training. Guidance - Weight training is not the most appropriate for **maximal** aerobic fitness. AO3 marks will be rewarded by justification or exemplification of a point using analysis or evaluation. 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. 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.	**(8)**

Level	Mark	Descriptor
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Level 1	1-2	• 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	• 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	• 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 AO1 – 4 marks; AO3 – 4 marks	Mark
Q23	**Reward acceptable answer. Responses may include, but are not limited to the following. All answers should be linked to how fitness testing can be affected.** An examination that gives all sides of the issue and any implications, including details about fitness testing. For example, a test done in sunny conditions that is then repeated on a rainy day. AO1 content: • Time of day. • Weather conditions. • Environment - surface/noise/presence of others. • Different assessor. • Accuracy of measuring. • Test protocol not perfectly followed. • Time since last meal. • Might be affected by motivation/emotions. • Calibration of machinery. • Footwear used. • Lab v field testing - lab more reliable. • Max v submax testing – submax generally more reliable as may not be a true maximum. AO3 marks will be rewarded by justification or exemplification of a point using analysis or evaluation. 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. 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.	**(8)**

Level	Mark	Descriptor
0	0	• No rewardable content
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		• 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	• 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	• 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 AO2 – 5 marks; AO3 – 10 marks	Mark
***Q24**	**Reward acceptable answers. Responses may include, but are not limited to the following.** An evaluation that uses analysis to make a judgement, including details about the role that technology plays in athletes preparing for their events. Answers must link to <u>preparing for an event and not during the event.</u> • Technique has been modified to take account of mechanics. • Clothing has become more streamline e.g. swimsuits/cycling helmet shape. • Wind tunnels have allowed equipment to become more streamlined. • Equipment has been changed by increased knowledge of mechanics from coaching teams. • Optimal movement patterns practiced in training to allow for reduced injury. • Training is filmed to allow for analysis of performance. • Opposition is viewed to plan for set pieces and plays. • Limb kinematics. • Force plates. • Equipment/clothing/footwear materials/design. • Recovery, e.g. cryotherapy. • Passive training, e.g. hypoxic tents. • Wearable tech, e.g. HR monitor, GPS, impact sensors (rugby), etc. • Analysis (video/statistical) of performance (own and opponents). • VR equipment. • Virtual imaging (pacing). • Use of Strava/Runna to monitor or track progress before the event. • Training for extreme conditions e.g. climate chambers/face masks. • Mouthguards that provide measurement of head impacts •	

	AO3 marks will be awarded by evaluating which are the most suitable tests. 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. 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.	**(15)**

Level	Mark	Descriptor
0	0	• No rewardable content
Level 1	1-3	• 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	• 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	• 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	• Makes strong links between theory and practice. Appropriate technical language supports a very good knowledge and understanding (AO2). • 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	• 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).