

Cambridge International AS Level

SPORT & PHYSICAL EDUCATION**8386/12**

Paper 1 Theory

October/November 2024

MARK SCHEME

Maximum Mark: 70

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **11** printed pages.

PUBLISHED**Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Science-Specific Marking Principles

1 Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.

2 The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.

3 Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).

4 The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.

5 'List rule' guidance

For questions that require *n* responses (e.g. State **two** reasons ...):

- The response should be read as continuous prose, even when numbered answer spaces are provided.
- Any response marked *ignore* in the mark scheme should not count towards *n*.
- Incorrect responses should not be awarded credit but will still count towards *n*.
- Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response.
- Non-contradictory responses after the first *n* responses may be ignored even if they include incorrect science.

6 Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

7 Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

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Question	Answer	Marks
1(a)(i)	1 (type of synovial joint) hinge; 2 (articulating bones) femur AND tibia; 3 (type of movement) extension; 4 (main agonist) rectus femoris;	4
1(a)(ii)	concentric;	1
1(a)(iii)	(antagonist) biceps femoris;	1
1(a)(iv)	relax to allow agonist to work OR relax to allow movement; Accept other appropriate descriptions.	1
1(b)	6 marks for any 6 of: 1 a series of subroutines / linked movements; 2 performed in the correct order; 3 a set of nerve impulses to the (working) muscles; 4 (any 2 of in correct order) run up / approach / take off / flight / landing; 5 description of run up, e.g. sprinting; 6 description of take off, e.g. on / behind take-off board OR one-footed jump; 7 description of flight technique; 8 description of landing technique; 9 long jumper initiates the motor programme with one decision; 10 motor programme is created / modified through practising long jump; 11 motor programme for long jump is stored in the long-term memory; 12 motor programme for long jump is run from the short-term memory;	6
1(c)	1 (gross) because long jump involves contraction of large muscle groups in the legs (to run and jump); 2 (closed) because the environment of the run up, take-off board and pit does not change OR the run up, take-off board and pit is predictable; 3 (low organisation) because long jump can be split into subroutines of run up, take off, flight and landing easily; 4 (discrete) because long jump has a clear beginning, e.g. start of run up and end, e.g. landing;	4

Question	Answer	Marks																
1(d)	<p>6 marks for 6 of:</p> <p>3 marks for different examples of the use of technology. 3 marks for relevant descriptions of how the examples help to improve performance in track-and-field athletics.</p> <table border="1" data-bbox="338 384 1935 1010"> <thead> <tr> <th data-bbox="338 384 1137 450">example of use of technology</th> <th data-bbox="1137 384 1935 450">description of how it improves performance</th> </tr> </thead> <tbody> <tr> <td data-bbox="338 450 1137 550">1 (equipment) e.g. starting blocks / carbon fibre poles / force plates;</td> <td data-bbox="1137 450 1935 550">2 greater force can be applied / greater acceleration (at start of a sprint);</td> </tr> <tr> <td data-bbox="338 550 1137 616">3 (clothing) e.g. compression wear;</td> <td data-bbox="1137 550 1935 616">4 reduces wind resistance / air resistance;</td> </tr> <tr> <td data-bbox="338 616 1137 681">5 (footwear) e.g. running shoes / use of spikes;</td> <td data-bbox="1137 616 1935 681">6 improves grip / friction on track / run up;</td> </tr> <tr> <td data-bbox="338 681 1137 746">7 (surface) e.g. artificial / plastic tracks / run ups;</td> <td data-bbox="1137 681 1935 746">8 improves grip / friction on surface / ground;</td> </tr> <tr> <td data-bbox="338 746 1137 844">9 (facilities) e.g. indoor athletics track / indoor pits / wind tunnels;</td> <td data-bbox="1137 746 1935 844">10 allows for all-year round training OR prevents bad weather impacting on training / performance;</td> </tr> <tr> <td data-bbox="338 844 1137 909">11 use of cameras;</td> <td data-bbox="1137 844 1935 909">12 motion / gait analysis to improve technique;</td> </tr> <tr> <td data-bbox="338 909 1137 1010">13 use of software / limb kinematics;</td> <td data-bbox="1137 909 1935 1010">14 allows for biomechanical analysis to improve technique OR track runner's speed / distance;</td> </tr> </tbody> </table> <p>Accept alternative examples of the use of technology with relevant descriptions.</p>	example of use of technology	description of how it improves performance	1 (equipment) e.g. starting blocks / carbon fibre poles / force plates;	2 greater force can be applied / greater acceleration (at start of a sprint);	3 (clothing) e.g. compression wear;	4 reduces wind resistance / air resistance;	5 (footwear) e.g. running shoes / use of spikes;	6 improves grip / friction on track / run up;	7 (surface) e.g. artificial / plastic tracks / run ups;	8 improves grip / friction on surface / ground;	9 (facilities) e.g. indoor athletics track / indoor pits / wind tunnels;	10 allows for all-year round training OR prevents bad weather impacting on training / performance;	11 use of cameras;	12 motion / gait analysis to improve technique;	13 use of software / limb kinematics;	14 allows for biomechanical analysis to improve technique OR track runner's speed / distance;	6
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1(e)(i)	<p>1 (displacement) the shortest straight-line route from start to finish / between A and B; 2 (distance) the length of the path / route taken from start to finish OR the total movement of an object without any regard to direction; 3 (velocity) the rate of change of displacement; 4 (momentum) the product of mass and velocity OR a quantity of motion of an object;</p> <p>Accept other appropriate descriptions.</p>	4																

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Question	Answer	Marks
1(e)(ii)	1 (working) acceleration = (final velocity – initial velocity) ÷ time OR (+)9.6 ÷ 3; 2 (answer) = (+)3.2; 3 (units) metres per second per second;	3

Question	Answer	Marks
2(a)	5 marks for any 5 of: 1 role of specialist schools OR schools that specialise in one (or more) sports; 2 role of clubs with qualified coaches OR clubs with high-quality facilities OR clubs that compete at a high level; 3 role of academies linked to professional sports clubs; 4 role of selection procedures OR talent identification; 5 role of college / university system (linked to facilities / coaching / competition); 6 role of scholarships; 7 role of governing bodies; 8 role of regional / national squads;	5
2(b)	8 marks for any 8 of: 1 pressure to win / do well; 2 increase fitness OR improve any named fitness component; 3 increase muscle mass / increase haemocrit OR other anatomical change: 4 reduce weight / body fat; 5 speed up recovery (after training / injury); 6 increase intensity of training; 7 reduce the effects of fatigue; 8 increase concentration; 9 participate despite injury OR to mask pain; 10 hide the presence of other prohibited drugs; 11 belief that others are using prohibited drugs; Accept other suitable suggestions.	8

Question	Answer	Marks
3(a)	5 marks for any 5 of: 1 heart rate increases to between 95 and 120 ; 2 heart rate reaches its highest point within first 5 minutes of swim (by time = 10 minutes); 3 heart rate plateaus until reaching time = 20 minutes ; 4 heart rate declines (steeply) from time = 20 minutes; 5 heart rate decline becomes more gradual (after steep decline); 6 heart rate ends between 30 and 70 (at time = 30 minutes);	5
3(b)	5 marks for any 5 of: 1 (autonomic nervous system) determines firing rate of sinoatrial node; 2 cardiac control centre receives information from (sensory) nerves / receptors; 3 role of one named receptor, e.g. chemoreceptors detect increase in acidity; 4 sympathetic nervous system; 5 accelerator / cardiac nerve; 6 ... release of noradrenaline; 7 ... stimulates the sinoatrial node / increases heart rate; 8 parasympathetic nervous system; 9 ... allows heart rate to increase; 10 ... via (reduced stimulation of) the vagus nerve; 11 ... reduced release of acetylcholine;	5

Question	Answer	Marks
4(a)	1 mass of body / mass of discus thrower; 2 distribution of mass from the axis of rotation;	2

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Question	Answer	Marks
4(b)	1 (factor) speed of release; 2 (explanation) the greater the force applied, the greater the change in momentum / acceleration / speed so the greater the horizontal displacement; 3 (factor) angle of release; 4 (explanation) (slightly less than) 45 degrees is the optimal angle to maximise horizontal displacement; 5 (factor) height of release; 6 (explanation) the higher the height of release the longer the flight time so the greater the horizontal displacement OR release height is above landing height so optimal angle of release is less than 45 degrees; Accept other appropriate factors and relevant explanations.	6

Question	Answer	Marks
5	3 marks for any 3 of: 1 diaphragm contracts / flattens to cause inspiration ; 2 ... increasing the volume of the thoracic cavity / chest cavity / lungs AND reducing the pressure inside the thoracic cavity / chest cavity / lungs; 3 diaphragm relaxes / domes to cause expiration ; 4 ... reducing the volume of the thoracic cavity / chest cavity / lungs AND increasing the pressure inside the thoracic cavity / chest cavity / lungs;	3

Question	Answer		Marks																					
6	<p>6 marks for 6 of:</p> <p>(cognitive) sub-max. 2 marks</p> <table border="1" data-bbox="338 352 1339 716"> <tr> <td data-bbox="338 352 394 451">1</td> <td data-bbox="394 352 633 451">extrinsic feedback</td> <td data-bbox="633 352 1339 451">more beneficial / more effective;</td> </tr> <tr> <td data-bbox="338 451 394 550">2</td> <td data-bbox="394 451 633 550">extrinsic feedback</td> <td data-bbox="633 451 1339 550">reinforces correct actions / detects / corrects errors / motivates;</td> </tr> <tr> <td data-bbox="338 550 394 716">3</td> <td data-bbox="394 550 633 716">intrinsic feedback</td> <td data-bbox="633 550 1339 716">ineffective / unreliable because novice does not have kinaesthetic awareness / cannot judge if technique was correct / cannot interpret intrinsic feedback;</td> </tr> </table> <p>(associative) sub-max. 2 marks</p> <table border="1" data-bbox="338 820 1339 1182"> <tr> <td data-bbox="338 820 394 887">4</td> <td data-bbox="394 820 633 887">both</td> <td data-bbox="633 820 1339 887">can be used effectively;</td> </tr> <tr> <td data-bbox="338 887 394 986">5</td> <td data-bbox="394 887 633 986">extrinsic feedback</td> <td data-bbox="633 887 1339 986">used to build motor programmes / corrects errors / motivate;</td> </tr> <tr> <td data-bbox="338 986 394 1085">6</td> <td data-bbox="394 986 633 1085">extrinsic feedback</td> <td data-bbox="633 986 1339 1085">but, if inaccurate, performance / motivation may drop;</td> </tr> <tr> <td data-bbox="338 1085 394 1182">7</td> <td data-bbox="394 1085 633 1182">intrinsic feedback</td> <td data-bbox="633 1085 1339 1182">useful because it develops kinaesthetic awareness OR reduces reliance on extrinsic feedback;</td> </tr> </table>		1	extrinsic feedback	more beneficial / more effective;	2	extrinsic feedback	reinforces correct actions / detects / corrects errors / motivates;	3	intrinsic feedback	ineffective / unreliable because novice does not have kinaesthetic awareness / cannot judge if technique was correct / cannot interpret intrinsic feedback;	4	both	can be used effectively;	5	extrinsic feedback	used to build motor programmes / corrects errors / motivate;	6	extrinsic feedback	but, if inaccurate, performance / motivation may drop;	7	intrinsic feedback	useful because it develops kinaesthetic awareness OR reduces reliance on extrinsic feedback;	6
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Question	Answer		Marks	
6	(autonomous) sub-max. 2 marks			
	8	intrinsic feedback		more beneficial / more effective;
	9	intrinsic feedback		likely to be interpreted correctly / lead to improved performance;
	10	intrinsic feedback		readily available / continuous OR performer does not have to rely on others / can correct own errors;
	11	extrinsic feedback		can still be useful to correct minor errors / motivate performer;
Accept other appropriate evaluations and reverse arguments.				