CAMBRIDGE
International Education

Cambridge IGCSE™

PHYSICAL EDUCATION **0413/13**

Paper 1 Theory **October/November 2024**

MARK SCHEME

Maximum Mark: 100

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.

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.

Question	Answer	Marks
1	2 marks for: intrinsic; extrinsic;	**2**

Question	Answer	Marks
2	Physical activity must be appropriate. 1 mark for each type of guidance. 1 mark for each relevant description for these, for example in swimming: visual; coach may demonstrate the breaststroke (to enable the skill to be seen) / coach may display posters of elite swimmers performing a turn / coach may show a video of the back crawl (to be able to analyse performance of the back crawl and determine areas to improve) / coach may use flags above a lane to help know when to turn; verbal; coach may give instructions to the swimmer about how to perform a leg kick / coach may remind the swimmer of the pace to swim at beforehand / a coach may use questioning to assess the level of understanding of breathing technique / a coach may provide accurate descriptions of a turn; manual; a coach may adjust the physical position of a swimmer, e.g. move the swimmer's legs in breaststroke kick / a coach may help a swimmer to develop a feeling of their position in the water, e.g. by supporting the swimmer's hips; mechanical; a coach may use a float to help isolate breathing / kicking / arm technique; Accept other examples of each type of guidance.	**6**

Question	Answer	Marks
3(a)	2 marks for: (sportsmanship) upholding the spirit of the game by being honest / playing by the rules / showing respect for your opponents / playing fairly / being gracious when winning or losing; (gamesmanship) seeking to gain an advantage in any way you can that is not against the rules / pushing the rules to the limit to gain an advantage;	**2**
3(b)	1 mark for each appropriate different example in an appropriate physical activity. Examples must be different for credit, for example in football: 2 marks from: a player walking slowly off the pitch when being substituted / taking the longest route to leave the pitch / player taking prolonged medical treatment for a minor injury / a player taking the ball into the corner of the pitch without it being necessary / a player not returning the ball to the opposition; making comments to an opponent to undermine their confidence; a goalkeeper waving their arms to distract a penalty taker; Accept other appropriate examples.	**2**

Question	Answer	Marks
4(a)	1 mark for naming each component of fitness (max. 4 marks). 1 mark for each explanation of the benefit (max. 4 marks), for example: muscular endurance; the race requires the mountain biker to cover considerable distances and be able to contract the muscles in their legs for long periods of time; strength; the mountain biker will need to exert additional force when there is a sharp incline / needs to maintain or increase speed; reaction time; the mountain biker must be able to respond to other bikers breaking away from the group so they do not get left behind / manoeuvre around rocks / obstacles which may suddenly appear on the route; balance; being able to maintain a good position on the bike when going around sharp bends at speed / able to avoid other cyclists or obstacles; agility; the mountain biker needs to be able to change position whilst riding, has to stand up on the bike / move body position to aid when cornering / going over obstacles; coordination; being able to use hands to steer the bike while looking where going / change gears at the same time as looking where going / see terrain change and adjust body position accordingly; flexibility; be able to get into a low, crouched position on the bike to reduce air resistance / get into a more streamlined position to go faster; power; able to go up hills faster / able to push the pedals harder to go faster; speed; to have good sprint finishes to beat opponent / to move legs quickly to increase pace;	**8**

Question	Answer	Marks
4(b)	1 mark for each real risk. 1 mark for each different appropriate strategy to reduce each identified risk, for example: 3 from: falling off bike; do not ride beyond your skill level / do not go too fast when taking blind corners / go slower / wear a helmet / gloves / other protective equipment; collision with other riders; do not go too fast when taking blind corners / do not ride too close to the rider in front / be aware of other riders / regulate number of riders on course at any one time; collision with surface / trail hazards; get acquainted with the trail beforehand / do not push beyond your skill level / be able to manoeuvre bike quickly / always wear mountain biking gear / wear helmet; equipment failure; check bike before riding, e.g. tyres / brakes; dehydration / hypothermia; wear appropriate clothing for weather conditions / drink water; Accept other appropriate risks and strategies.	**6**

Question	Answer	Marks
5(a)	1 mark for each nutrient. 1 mark for each different function, for example: carbohydrates; provides a source of energy; protein; growth / repair / source of energy; fats; provides a source of energy / provides insulation; water; transport nutrients to cells / assists in removing waste from the body / helps maintain body temperature / prevents dehydration / improves cognitive functions / improves blood viscosity; Accept other relevant functions and nutrients.	**6**
5(b)	1 mark for each explanation, for example: males generally need more energy than females **because** they often have an overall larger body (both height and weight) / greater muscle mass; teenagers need more energy than children **because** they have bigger bodies / may be more active; active lifestyle needs more energy than sedentary lifestyle **because** performing physical activity / exercise requires more energy; Accept other appropriate explanations for other differences in energy need.	**3**

Question	Answer	Marks
6(a)	1 mark for naming the test. 1 mark for each part of a description of the test (3 marks max.). Multi-Stage Fitness Test; 3 marks from: performer must run in time with the bleeps on a CD / eq.; 20–metre / measured shuttles are performed; time between bleeps reduces as test progresses / bleeps get closer together / the subject must run faster; subject runs until they can no longer keep up with the bleeps; the level achieved and the number of shuttles performed within the level are recorded; scores are compared to standardised normative data; **OR** 12–Minute Cooper Run Test; 3 marks from: subject runs / walks as far as possible; test duration is 12 minutes; a measured course is used, e.g. with cones placed at regular intervals to help identify the exact distance covered / measured laps; calculate the distance covered; the distance covered is compared to standardised normative data; Accept other standardised tests.	**4**

Question	Answer	Marks
6(b)(i)	1 mark for each advantage. 2 marks from: reflects the nature of the event the performer is training for; can develop pacing; easy to measure overload / record improvements made; burns fat to maintain a low body weight; does not require high level of coach input; training can be done without others; does not require much / any equipment; can be done anywhere; limited cost / cheap; Accept other appropriate suggestions.	**2**
6(b)(ii)	1 mark for each disadvantage. 2 marks from: does not develop speed / anaerobic fitness for sprint finish; needs high levels of motivation to keep going / can be boring; time consuming; can cause overuse injuries; difficult in hilly areas;	**2**
6(c)(i)	1 mark for: the volume of oxygen that can be consumed / used while exercising at a maximum capacity; Accept other appropriate wording.	**1**
6(c)(ii)	2 marks for any 2 of: age; gender; genetics; lifestyle; Accept other appropriate factors.	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>7(a)</td><td>2 marks for:

(X) ball and socket;
(Y) hinge;</td><td>2</td></tr>
<tr><td>7(b)(i)</td><td>1 mark for:
extension;</td><td>1</td></tr>
<tr><td>7(b)(ii)</td><td>1 mark for identifying the agonist. 1 mark for identifying the antagonist. 2 marks for describing how they cause the movement.

agonist is quadriceps;
antagonist is hamstrings;

quadriceps OR agonist contracts / shortens;
hamstrings OR antagonist relaxes / lengthens;</td><td>4</td></tr>
<tr><td>7(c)</td><td>3 marks from:

<table>
<tr><th>fast-twitch muscle fibre</th><th></th><th>slow-twitch muscle fibre</th></tr>
<tr><td>contracts quickly</td><td>AND</td><td>contracts slowly;</td></tr>
<tr><td>produces large force</td><td>AND</td><td>produces little force;</td></tr>
<tr><td>low fatigue tolerance / tire quickly / short period of time</td><td>AND</td><td>high fatigue tolerance / do not tire quickly / long period of time;</td></tr>
<tr><td>good for strength / power / speed</td><td>AND</td><td>good for endurance;</td></tr>
<tr><td>white in colour</td><td>AND</td><td>red in colour;</td></tr>
<tr><td>anaerobic</td><td>AND</td><td>aerobic;</td></tr>
</table>

Accept other appropriate differences.</td><td>3</td></tr>
</table>

Question	Answer	Marks
7(d)(i)	1 mark for: third (class lever);	**1**
7(d)(ii)	1 mark for labelling the correct position of the middle component of the lever. 2 marks if all three components are in the correct position and labelled. Must match candidate's **(d)(i)** response for credit. For example, for a third-class lever: _____ – effort – _____; fulcrum – _____ – resistance **OR** resistance – _____ – fulcrum;	**2**

Question	Answer	Marks
8(a)	1 mark for explaining the effect of each factor. Physical activities must be appropriate and different. For example: (age and maturity) rugby may have age restrictions preventing young performers from participating so skill levels will be low; the earlier someone starts playing rugby the more opportunity they have to learn rugby skills so skill levels may be higher compared to others of a similar age; older performers may have more experience of when to apply rugby skills for the best result so have a higher skill level; young children have not developed coordination / balance needed to play rugby so skill level is low; elderly people's coordination may decrease so skill level in rugby is lower; (culture) cricket may have greater exposure in the country / more opportunities in certain countries so have a higher profile which leads to higher skill level; some countries excel in cricket so greater opportunities to play cricket leading to higher skill level; the culture within families to play cricket often means children are influenced to play cricket, leading to higher skill level; some sports like cricket are traditional due to climate and geography so people expect to take part, so skill levels are higher; some women's participation in cricket in some countries may be restricted so their skill level may be lower; (arousal conditions) underarousal / overarousal in netball may result in a lack of focus which results in low skill levels; optimal arousal leads to being focused and results in high skill levels in netball; a netball performer who prefers low arousal activities may perform fine motor skills at a higher level, e.g. a goal shooter; a performer who prefers high arousal activities may perform gross motor skills at a higher level, e.g. a centre; (facilities) having a swimming pool available and accessible would influence the time spent swimming / this would include the costs of facilities, e.g. a swimmer may not be able to develop swimming skills without regular access to a pool so skill level will be lower;	**4**

Question	Answer	Marks
8(b)	1 mark for appropriate continuum. 1 mark for each justification of placement, for example: (serving in tennis) 2 marks for: basic and complex; complex – need to coordinate ball toss and racket swing; **OR** fine and gross; gross – uses large muscle groups to perform the serve; **OR** open and closed; closed – service movement is repeated the same every time; (dribbling in hockey) 2 marks for: basic and complex; complex – need to coordinate stick and ball; **OR** fine and gross; fine – use small muscle groups in hands to control stick; **OR** open and closed; open – direction of movement will depend on position of opponents; (tackling in rugby) 2 marks for: basic and complex; complex – player needs to coordinate arms and legs to make the tackle; **OR** fine and gross; gross – uses large muscle groups in legs to drive opponent back; **OR** open and closed; open – player needs to adjust the tackle depending on the movement of the opponent; Accept other appropriate continua. Accept other placements if appropriately justified.	**6**

Question	Answer	Marks
9(a)	3 marks from: breathing rate increases; sweating; body temperature increases / muscles become warmer; heat control / blood vessels closer to the skin enlarge to release heat / vasodilation; red skin; fatigue / feeling tired; suffering from nausea / feeling light-headed; adrenaline is produced / released into the blood; more carbon dioxide is produced / removed; lactic acid is produced; increase in stroke volume; increase in cardiac output; increase in tidal volume; increase in minute volume; increased blood flow to muscles / oxygen supply to muscles; increased blood pressure;	**3**
9(b)	3 marks for: oxygen; high; lactic;	**3**
9(c)	2 marks from: take in additional oxygen; maintain high breathing rate; remove lactic acid; pay back oxygen debt; return body to its resting state;	**2**

Question	Answer	Marks
10(a)	1 mark for each in either order: physical; social;	**2**
10(b)	1 mark for each description, for example: lifts self-esteem / confidence / feeling good; control emotions; exercise can build resilience; improves moods / the release of endorphins which can make a person feel happier; lowers risk of depression; reduced stress / able to cope with stress / anxiety / distracts helping to reduce anger / worry / fear; feel motivated;	**3**

Question	Answer	Marks
11	1 mark for each personality type (max. 2 marks). 1 mark for a relevant named physical activity with an appropriate justification (max. 2 marks). introvert; examples could include activities such as: long-distance running / swimming / gymnastics / table tennis like being on their own / perform better with low arousal levels / involved in activities requiring high concentration / excel at activities requiring fine motor skills / dislike contact sports / low tolerance to pain; extrovert; examples could include activities such as: rugby / hockey / basketball / netball / football prefer team sports / enjoys company of others / require low levels of concentration / displays high levels of energy / have higher levels of arousal / uses gross movements / likely to have more physical contact / high tolerance to pain;	**4**

Question	Answer	Marks
12	1 mark for each type of sponsorship. 1 mark for each explanation of benefit, for example: financial support; may pay the wages of the organisers of the event / reduces costs so increases profit; clothing / footwear / equipment; companies can provide the necessary equipment needed, e.g. provide the footballs for all matches in the World Cup / clothing for officials / volunteers; provision of specialist facilities; enables the organisers to run a high-quality event, e.g. state of the art athletics track for the Olympic Games helps attracts top-level performers / use of line-judge technology at tennis tournaments means decisions more accurate; Accept other appropriate benefits and alternative wording.	**6**

Question	Answer	Marks
13	1 mark for each named blood vessel (max. 2 marks). 1 mark for description of a structural difference (max. 2 marks). 2 marks for: pulmonary artery; vena cava; structural differences, 2 marks from: (wall thickness) arteries thick walls **AND** veins thin walls; (lumen size) arteries narrow lumen **AND** veins wide lumen; (presence of valves) arteries have no valves **AND** veins have valves; Allow relevant comparative points.	**4**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>14</td><td>1 mark for each reason. Reasons must be relevant and different for credit.
<table>
<tr><td></td><td></td></tr>
<tr><td>stop the performer from playing</td><td>reduces risk of further injury / prevent injury from getting worse;</td></tr>
<tr><td>apply ice to the injury</td><td>reduces pain / numbs the area / reduces swelling / reduces blood flow to the injured area;</td></tr>
<tr><td>wrap a bandage around the injury</td><td>reduces swelling / reduces pain / slows blood flow to the injured area / immobilise area / give support;</td></tr>
<tr><td>raise the injury above the level of the heart</td><td>reduce blood flow to injured area / reduces swelling / pain / blood flow must go against gravity;</td></tr>
</table></td><td>4</td></tr>
</table>