



# Cambridge International AS & A Level

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**PHYSICAL EDUCATION**

**9396/12**

Paper 1

**October/November 2023**

MARK SCHEME

Maximum Mark: 90

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**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 2023 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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This document consists of **15** 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 descriptors 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(a)	5 marks for:  1 extension; 2 (anterior) deltoid / pectoralis major; 3 concentric; 4 extension; 5 triceps brachii;	<b>5</b>
1(b)	4 marks for any 4 of:  (elbow has / is:) 1 hinge (joint); 2 <b>only</b> movements are flexion / extension; 3 joint capsule provides strength / stability; 4 ligaments stabilise joint; 5 muscles / tendons stabilise joint; 6 end of humerus fits closely onto ulna / olecranon (process);	<b>4</b>
1(c)(i)	2 marks for:  1 (antagonists) <b>relax</b> to allow agonist to work <b>OR</b> oppose the movement at a joint; 2 (fixators) help to control movement <b>OR</b> stabilise <b>origin</b> / stabilise (non-moving) <b>joints</b> <b>OR</b> prevent unwanted movement <b>OR</b> assist <b>agonist</b> / working muscle during movement;	<b>2</b>
1(c)(ii)	2 marks for:  1 (antagonist) triceps brachii / deltoid; 2 (fixators) deltoid / teres minor / wrist flexors;  Accept other suitable examples.	<b>2</b>

Question	Answer	Marks
1(d)	<p>1 mark for:</p> <p>(prior to exercise)</p> <p>1 adrenaline released <b>to increase</b> heart rate;</p> <p>5 marks for 5 of:</p> <p>(during exercise sub-max. 4 marks)</p> <p>2 <b>increased</b> sympathetic impulses;</p> <p>3 drop in pH / increased CO<sub>2</sub> / increased acidity <b>detected by</b> chemoreceptors;</p> <p>4 movements <b>detected by</b> mechanoreceptors / proprioceptors;</p> <p>5 <b>impulses to</b> medulla / cardiac (control) centre;</p> <p>6 (sympathetic) impulses to sinoatrial node <b>to increase</b> heart rate;</p> <p>7 <b>decreased</b> parasympathetic / vagus stimulation;</p> <p>8 blood pressure changes <b>detected by</b> baroreceptors;</p> <p>(after exercise sub-max. 3 marks)</p> <p>9 <b>reduced</b> sympathetic impulses;</p> <p>10 <b>increased</b> stimulation of parasympathetic / vagus system;</p> <p>11 release of acetylcholine;</p> <p>Credit adrenaline only once, either prior to, or during exercise. Accept points 2 to 10 or reverse arguments either during or after exercise. Credit each point only once.</p>	6
1(e)	<p>4 marks for any 4 of:</p> <p>1 blood velocity is highest in <b>arteries / aorta</b>;</p> <p>2 due to heart contractions / pumping action of heart / cardiac output;</p> <p>3 total cross-sectional area of vessels is relatively small;</p> <p>4 blood velocity <b>reduces</b> as blood passes through arterioles and capillaries / further away from heart;</p> <p>5 (velocity reduces) because of increasing total cross-sectional area of blood vessels;</p> <p>6 (velocity reduces) because of increasing peripheral resistance of blood vessels;</p> <p>7 (velocity reduces) which allows the exchange of gases / nutrients / waste products;</p> <p>8 blood velocity <b>increases</b> in venules / veins;</p> <p>9 because total cross-sectional area decreases;</p> <p>10 venous return mechanisms affect blood velocity;</p>	4

Question	Answer	Marks
1(f)	<p>4 marks for 4 of:</p> <p>Max. two marks for structures. Max. two marks for relevant descriptions, for example:</p> <ol style="list-style-type: none"> <li>1 large cross-sectional area;</li> <li>2 allows large volumes of gases to pass through;</li> <li>3 muscular wall / smooth muscle;</li> <li>4 dilates / opens bronchi <b>OR</b> allows large volumes of gases to pass through;</li> <li>5 ciliated epithelial cells / goblet cells / mucus secreting cells;</li> <li>6 remove dust / particles / pathogens from bronchi;</li> <li>7 rings of cartilage;</li> <li>8 maintain passage / prevent collapse of bronchi <b>OR</b> keep bronchi open;</li> </ol>	<b>4</b>
1(g)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> <li>1 diffusion involves movement of gases from high to low concentrations / partial pressures <b>OR</b> gases move down a diffusion gradient;</li> <li>2 <math>pO_2</math> in blood capillary (100) is greater than muscle fibre <math>pO_2</math> (40);</li> <li>3 ... oxygen diffuses into muscle fibre <b>OR</b> oxygen diffuses out of the blood capillary;</li> <li>4 muscle fibre <math>pCO_2</math> (46) is greater than capillary <math>pCO_2</math> (40);</li> <li>5 ... carbon dioxide diffuses into blood capillary <b>OR</b> carbon dioxide diffuses out of the muscle fibre;</li> </ol> <p>Accept reverse arguments for points 2 and 4.</p>	<b>3</b>

Question	Answer	Marks
2(a)(i)	1 mark for:  1 innate / enduring / underlying;	1
2(a)(ii)	2 marks for:  1 (gross motor ability), e.g. strength / speed / stamina / power / flexibility; 2 (psychomotor ability), e.g. balance / hand–eye coordination / reaction time / aiming;  Accept other suitable examples.	2
2(b)	4 marks for any 4 of:  If no practical example max. 3 marks.  1 (suitable) <b>motor ability</b> identified, e.g. strength / speed <b>OR</b> stated that abilities are innate / genetic; 2 needed as foundation / basis to build skill learning / building block <b>OR</b> you need coordination before learning a catch in cricket; 3 performer develops a named <b>fundamental motor skill</b> , e.g. running / catching / throwing / kicking; 4 (fundamental motor skill) needs practice / repetition / reinforcement / feedback to help skill learning; 5 (fundamental motor skill) gets refined / adapted / more complex through teaching / coaching; 6 (example of a fundamental motor skill being developed to a sport-specific skill), e.g. kicking ball to passing in football / throwing a ball to a shot in netball;	4
2(c)(i)	2 marks for any 2 of:  1 Gestaltist approach / insight leaning; 2 skill is treated holistically / wholeness; 3 learner develops an understanding of the requirements of skill <b>OR</b> learner has a eureka moment; 4 learner has an awareness of the link between subroutines <b>OR</b> learner recognises the link between the stimulus and the response <b>OR</b> learner draws together many variables / subroutines; 5 takes into consideration aspects of the environment / display / perception before deciding appropriate response;	2



Question	Answer	Marks
2(c)(ii)	<p>2 marks for any 2 of:</p> <ol style="list-style-type: none"> <li>1 (the skill being learned) can be modified / adjusted;</li> <li>2 encourages problem-solving / discovery / finding out <b>OR</b> encourages independent learning;</li> <li>3 increases motivation;</li> <li>4 may speed up <b>learning</b>;</li> <li>5 helps develop <b>schema</b>;</li> </ol> <p>Accept other suitable benefits.</p>	<b>2</b>
2(d)(i)	<p>1 mark for:</p> <ol style="list-style-type: none"> <li>1 attention <b>AND</b> retention <b>AND</b> motor reproduction <b>AND</b> motivation;</li> </ol>	<b>1</b>
2(d)(ii)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> <li>1 make sure the learner is paying attention / concentrating;</li> <li>2 highlight cues / key areas of the skill;</li> <li>3 make demonstration attractive to learner <b>OR</b> use a role model / significant other / peer to demonstrate;</li> <li>4 accurate / perfect performance of the skill;</li> <li>5 demonstrate slowly;</li> <li>6 repeat the demonstration;</li> <li>7 break the skill down into parts;</li> <li>8 show the demonstration from different angles;</li> <li>9 include <b>verbal guidance</b>;</li> <li>10 encourage creation of mental image <b>OR</b> allow time for mental rehearsal;</li> <li>11 make demonstration meaningful / relevant / realistic / succinct;</li> <li>12 immediate practice;</li> <li>13 make sure the learner is motivated to copy the demonstration;</li> <li>14 make sure the learner is capable of performing the demonstration;</li> </ol>	<b>3</b>

Question	Answer	Marks
2(e)	<p>4 marks for any 4 of:</p> <p>Max. 3 marks if no practical example is used.</p> <ol style="list-style-type: none"> <li>1 is a generalised series of movements;</li> <li>2 is a series of <b>subroutines</b>;</li> <li>3 suitable example of movements / subroutines;</li> <li>4 is a set of neural commands / nerve impulses to muscles;</li> <li>5 is completed in the correct order;</li> <li>6 is brought about by making one decision <b>OR</b> first movement initiates (whole) motor programme <b>OR</b> initiated by memory trace;</li> <li>7 is established by rehearsal / practice / training;</li> <li>8 is grooved / autonomous / well-learned / easily recalled;</li> <li>9 is <b>stored</b> in long-term memory;</li> <li>10 is <b>run</b> from short-term memory;</li> </ol>	<b>4</b>
2(f)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 involves short-term sensory store (STSS) <b>AND</b> short-term memory (STM) <b>AND</b> long-term memory (LTM);</li> <li>2 selective attention occurs / important information is filtered in / irrelevant information is filtered out;</li> <li>3 (STSS) receives information from the display / environment <b>OR</b> STSS sends information to STM;</li> <li>4 STM is working memory <b>OR</b> organises / chunks / encodes information;</li> <li>5 STM <b>runs</b> motor programmes;</li> <li>6 <b>STM</b> sends information to <b>LTM</b>;</li> <li>7 LTM <b>stores</b> information / motor programmes;</li> <li>8 <b>LTM</b> decodes information (to STM);</li> <li>9 memory includes the DCR process;</li> <li>10 the memory process affects perception <b>OR</b> the memory process helps to judge what needs to be done;</li> </ol>	<b>4</b>
2(g)	<p>3 marks for:</p> <ol style="list-style-type: none"> <li>1 (extrinsic) derived from outside source <b>AND</b> suitable example, e.g. comment on technique by coach;</li> <li>2 (knowledge of performance) information about technique / movement <b>AND</b> suitable example, e.g. coach suggests how to improve performance;</li> <li>3 (negative) information on errors in performance <b>AND</b> suitable example, e.g. criticism from coach / seeing that you have missed a goal;</li> </ol>	<b>3</b>

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Question	Answer	Marks
2(h)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 as arousal increases, performance increases;</li> <li>2 <math>\text{performance} = \text{habit} \times \text{drive}</math>;</li> <li>3 linear relationship <b>OR</b> directly proportional relationship <b>OR</b> straight-line relationship <b>OR</b> drawing of relevant graph with both axes correctly labelled;</li> <li>4 increase in arousal leads to increased likelihood of <b>dominant response</b> occurring;</li> <li>5 if <b>dominant response</b> is well learned (expert performer) it will lead to improved performance;</li> <li>6 if <b>dominant response</b> not well learned (novice performer) it will lead to poor performance (because of high arousal);</li> <li>7 theory of improved performance with increased drive is not realistic because performer cannot keep improving;</li> <li>8 drive theory may explain high levels of performance of gross motor skills;</li> </ol>	<b>4</b>

Question	Answer	Marks
3(a)(i)	<p>4 marks for 4 of:</p> <p>(individual sub-max. 3 marks):</p> <ol style="list-style-type: none"> <li>1 improve physical health <b>OR</b> improve physical fitness;</li> <li>2 improve mental health <b>OR</b> stress relief <b>OR</b> to relax <b>OR</b> as catharsis <b>OR</b> increase self-esteem <b>OR</b> escape reality;</li> <li>3 improve social health / friendships / social skills;</li> <li>4 for enjoyment;</li> <li>5 to be creative;</li> <li>6 may improve employability / prepare individual for work;</li> <li>7 as a hobby to keep occupied / out of trouble;</li> <li>8 learn new interpersonal skills;</li> <li>9 as a basis for self-realisation <b>OR</b> as a basis for self-fulfilment;</li> <li>10 leisure time is increasing;</li> </ol> <p>(society sub-max. 3 marks):</p> <ol style="list-style-type: none"> <li>11 society's attitude to leisure has changed <b>OR</b> there is belief that there is a right to leisure;</li> <li>12 purposefulness of leisure <b>OR</b> increased status of leisure;</li> <li>13 leisure can be source of employment;</li> <li>14 for social control;</li> <li>15 active leisure helps reduce strain on health service;</li> <li>16 healthier workforce <b>OR</b> people can work for longer;</li> <li>17 inclusiveness / integration of community / socialisation / reduce social exclusion;</li> <li>18 leisure may be an economic product / provide financial gains for economy;</li> </ol>	<b>4</b>
3(a)(ii)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> <li>1 provide (a range of) activities for children to try <b>OR</b> stimulate children's initial interest <b>OR</b> help children to find an activity to enjoy;</li> <li>2 give children a <b>foundation</b> in sport / skills / techniques / rules / fair play / safety;</li> <li>3 children gain the <b>confidence</b> to have a go / join in activity;</li> <li>4 provide links with clubs / other agencies;</li> <li>5 teach children the benefits of active lifestyle <b>OR</b> teach about the link between exercise and health;</li> </ol> <p>Accept other suitable suggestions.</p>	<b>3</b>

Question	Answer	Marks
3(b)(i)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> <li>1 spontaneous;</li> <li>2 for everyone / anyone;</li> <li>3 non-serious;</li> <li>4 fun / enjoyment;</li> <li>5 intrinsic value;</li> <li>6 non-productive <b>OR</b> result not important;</li> <li>7 childlike activity;</li> <li>8 freedom of choice / free will / voluntary;</li> <li>9 free time;</li> <li>10 limited moral obligation / commitment;</li> <li>11 play anywhere / choice of space / venue;</li> <li>12 no pre-determined rules <b>OR</b> few / modified / made-up rules;</li> <li>13 negotiated involvement / ending;</li> <li>14 self-officiated;</li> <li>15 low level of organisation;</li> <li>16 freedom from authority;</li> </ol>	<b>3</b>
3(b)(ii)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> <li>1 (activity) increases health / fitness;</li> <li>2 learn decision-making / problem-solving skills;</li> <li>3 learn to share / negotiate <b>OR</b> learn social interaction / work with others / learn to fit in;</li> <li>4 learn leadership / response to leadership;</li> <li>5 learn <b>physical</b> skills;</li> <li>6 encourages confidence;</li> <li>7 allows children to learn the rules of life / <b>life</b> skills <b>OR</b> practise real-life situations;</li> <li>8 freedom from authority;</li> <li>9 learn to make moral decisions <b>OR</b> learn to be fair;</li> <li>10 increasing mastery over reality / opportunity to pretend / fantasy / creativity;</li> </ol>	<b>3</b>

Question	Answer	Marks
3(c)	<p>5 marks for any 5 of:</p> <ol style="list-style-type: none"> <li>1 for national pride / prestige / feel-good factor;</li> <li>2 advertisement for the country <b>OR</b> to create a shop-window effect;</li> <li>3 to provide more / better sporting facilities <b>OR</b> to create a positive legacy;</li> <li>4 demand / expectation from population for national success;</li> <li>5 success can act as confirmation of <b>political</b> superiority <b>OR</b> for <b>political</b> popularity;</li> <li>6 to enable individuals to succeed / reach potential / goals;</li> <li>7 to encourage / increase participation <b>OR</b> to create role models;</li> <li>8 to improve health <b>OR</b> less strain on health service;</li> <li>9 for social control <b>OR</b> to reduce crime;</li> <li>10 to create employment opportunities;</li> <li>11 to increase trade / economy / tourism;</li> <li>12 to improve infrastructure, i.e. better roads / hotels / transport;</li> </ol>	5
3(d)	<p>5 marks for any 5 of:</p> <ol style="list-style-type: none"> <li>1 raise awareness through advertising / publicity / campaigns;</li> <li>2 make access to facilities affordable <b>OR</b> fund development of more clubs / more teams / more facilities;</li> <li>3 develop inner-city schemes <b>OR</b> develop schemes in deprived / rural areas;</li> <li>4 use sport personalities / role models;</li> <li>5 more coaches / coaching resources / scouts;</li> <li>6 grass-roots provision / focus on target groups / groups with lower participation;</li> <li>7 develop award schemes <b>OR</b> provide extrinsic motivation;</li> <li>8 develop / promote modified / adapted sports;</li> <li>9 improve links within schools / school–club links;</li> <li>10 change attitudes / prejudice / discrimination within sport;</li> <li>11 change structural barriers, e.g. membership restrictions;</li> </ol>	5

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Question	Answer	Marks
3(e)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 stereotyping / labelling by society / looked down on;</li> <li>2 discrimination;</li> <li>3 lack of transport;</li> <li>4 lack of motivation / poor self-image;</li> <li>5 lack of income / funding <b>OR</b> high costs of equipment;</li> <li>6 safety concerns;</li> <li>7 lack of specialist coaches;</li> <li>8 lack of specialist facilities / equipment within venue <b>OR</b> access problems;</li> <li>9 fewer competitions / clubs / teams / opportunities;</li> <li>10 lack of role models;</li> <li>11 lack of media coverage;</li> </ol> <p>Accept other appropriate suggestions.</p>	<b>4</b>
3(f)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> <li>1 drug testing / out of season / random (testing);</li> <li>2 role of WADA in coordinating antidoping rules and policies;</li> <li>3 governments / IOC have signed up to the code <b>OR</b> all countries show a unified front;</li> <li>4 fines / bans / removal of medals / prizes;</li> <li>5 name and shame;</li> <li>6 money is invested in testing programmes;</li> <li>7 education on the health risks of doping <b>OR</b> educate by publishing a list of banned drugs to all athletes;</li> <li>8 use of positive / clean role models;</li> <li>9 use of biological passports / whereabouts system;</li> </ol>	<b>3</b>