Cambridge Assessment International Education

# Cambridge International AS & A Level

**PHYSICAL EDUCATION** **9396/32**

Paper 3 **October/November 2023**

MARK SCHEME

Maximum Mark: 90

**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.





**[Turn over**

**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.

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|---|
| GENERIC MARKING PRINCIPLE 5:<br><br>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:<br><br>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<br><br>For questions that require ***n*** responses (e.g. State **two** reasons …):<br><br>• The response should be read as continuous prose, even when numbered answer spaces are provided.<br>• Any response marked *ignore* in the mark scheme should not count towards ***n***.<br>• Incorrect responses should not be awarded credit but will still count towards ***n***.<br>• 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.<br>• 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) | 6 marks for 6 of:<br><br>(aerobic glycolysis sub-max. 4 marks)<br>1 glycogen is converted / broken down to glucose;<br>2 glucose is broken down into pyruvic acid / pyruvate;<br>3 in the sarcoplasm;<br>4 (yield) (net) 2 ATP (per molecule of glucose);<br>5 (enzyme) glycogen phosphorylase / GP / GPP / phosphofructokinase / PFK;<br>6 (as oxygen is sufficient) no lactic acid is formed;<br>7 (pyruvate) goes through link reaction **OR** catalysed by coenzyme A;<br>8 (pyruvate) becomes acetyl coenzyme A / acetyl CoA;<br><br>(electron transport chain sub-max. 4 marks)<br>9 hydrogen atoms;<br>10 (hydrogen atoms) are carried by hydrogen carriers / hydrogen acceptors;<br>11 e.g. by NAD (NADH) / FAD ($FADH_2$);<br>12 in the cristae of the mitochondria;<br>13 hydrogen is split into a proton / $H^+$ **AND** an electron / $H^-$ / hydride;<br>14 (yield) 30–38 ATP / large amounts of ATP;<br>15 (hydrogen) combines with oxygen to produce $H_2O$; | **6** |
| 1(b) | 4 marks for any 4 of:<br><br>1 slow component;<br>2 removal of lactic acid;<br>3 conversion (of lactic acid) to pyruvate **OR** to $H_2O$ **AND** $CO_2$;<br>4 conversion (of lactic acid) to glycogen / glucose / protein / sweat / urine;<br>5 (removal of lactic acid) takes 30 minutes to 2 hours;<br>6 elevated circulatory / respiratory rate **OR** uses aerobic system;<br>7 uses 5–8 litres of oxygen;<br>8 replenishment of glycogen stores;<br>9 (glycogen restoration) takes up to 48 hours; | **4** |

| Question | Answer | Marks |
|---|---|---|
| 1(c) | 3 marks for any 3 of:<br><br>1 level of fitness;<br>2 oxygen availability;<br>3 chemical / food fuel availability;<br>4 enzyme availability / enzyme control;<br>5 OBLA / lactic acid; | **3** |
| 1(d) | 4 marks for any 4 of:<br><br>1 **reduces** risk of injury / DOMS;<br>2 increases flexibility / elasticity of muscle / connective tissue;<br>3 increases heart rate / stroke volume / cardiac output;<br>4 increases breathing rate / tidal volume / minute ventilation;<br>5 increases / redirects flow of blood / oxygen to (working) **muscles**;<br>6 activates vascular shunt **OR** dilates blood vessels to (working) muscles;<br>7 improves rate of dissociation of oxygen from haemoglobin / to myoglobin;<br>8 increases enzyme activity;<br>9 increases speed of nerve impulses **OR** improves reaction time **OR** faster muscle contractions;<br>10 **reduces** EPOC / oxygen debt;<br>11 facilitates release of **more** synovial fluid into joints; | **4** |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(e)</td><td>4 marks for any 4 of:<br><br>
<table>
<tr><th></th><th>continuous running</th><th>fartlek training</th></tr>
<tr><td>1</td><td>constant speed / pace OR jogging</td><td>varied speeds / pace OR jogging AND sprinting;</td></tr>
<tr><td>2</td><td>(usually) level ground</td><td>different gradients;</td></tr>
<tr><td>3</td><td>(usually) consistent surface</td><td>different terrains;</td></tr>
<tr><td>4</td><td>constant intensity</td><td>varied intensities;</td></tr>
<tr><td>5</td><td>heart rate constant / 60–80% of max. heart rate</td><td>heart rate varies more than continuous running;</td></tr>
<tr><td>6</td><td>trains aerobic system only OR aerobic benefits only</td><td>trains aerobic AND anaerobic systems OR aerobic AND anaerobic benefits;</td></tr>
</table></td><td>4</td></tr>
<tr><td>1(f)</td><td>2 marks for:<br><br>1 (static example), e.g. holding splits in gymnastics;<br>2 (dynamic example), e.g. overhead kick in football;<br><br>Accept any suitable sporting examples for each.</td><td>2</td></tr>
</table>

| Question | Answer | Marks |
|---|---|---|
| 1(g) | 1 mark for:<br><br>1 (name) Illinois agility test;<br><br>3 marks for 3 of:<br><br>2 (set up) **10 metres** × **5 metres** space;<br>3 (set up) diagram showing positions of cones / cones **3.3 metres** apart;<br>4 (protocol) performer lies face down / in press-up position (with head level with the start line);<br>5 (protocol) performer **sprints** around cones **OR** runs **as fast as possible** around cones;<br>6 (measure) performance is timed / best of 3 attempts recorded;<br>7 (evaluation) result is compared to normative data;<br><br>Accept other suitable tests. | **4** |
| 1(h)(i) | 2 marks for any 2 of:<br><br>1 increase in **bone** density / bone strength;<br>2 increase in metabolism **OR** reduces body fat **OR** weight loss;<br>3 able to train / perform at higher intensity;<br>4 faster recovery (after training) **OR** faster tissue repair;<br><br>Accept other descriptions of positive physiological effects. | **2** |

| Question | Answer | Marks |
|---|---|---|
| 1(h)(ii) | 1 mark for 1 of:<br><br>1 abnormal growth of bone / muscle / vital organs / hands / feet / face / acromegaly;<br>2 carpal tunnel syndrome / nerve / muscle / joint pain;<br>3 high blood pressure / high cholesterol / heart disease;<br>4 risk of cancers;<br>5 diabetes;<br>6 liver damage;<br>7 reduced production of natural human growth hormone;<br>8 decrease in size of pituitary gland;<br>9 enlarged breasts in men;<br><br>Accept other relevant negative effect on long-term health. | **1** |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)</td><td>3 marks for any 3 of:<br><br>
<table>
<tr><th></th><th>extroversion</th><th>introversion</th></tr>
<tr><td>1</td><td>sociable / outgoing / talkative</td><td>solitary / reserved / quiet;</td></tr>
<tr><td>2</td><td>active / optimistic</td><td>passive / pessimistic;</td></tr>
<tr><td>3</td><td>tend to perform better with high arousal</td><td>tend to perform better with low arousal;</td></tr>
<tr><td>4</td><td>prefer team activities</td><td>prefer individual activities;</td></tr>
<tr><td>5</td><td>tend to prefer gross skills</td><td>tend to prefer fine skills;</td></tr>
<tr><td>6</td><td colspan="2">extroverts cope better in competitive situations;</td></tr>
<tr><td>7</td><td colspan="2">extroverts cope better with distractions;</td></tr>
<tr><td>8</td><td colspan="2">extroverts cope with pain more easily;</td></tr>
<tr><td>9</td><td colspan="2">extroverts tend to be more energised by a crowd;</td></tr>
</table>
<br>Accept reverse arguments for points 6 to 9.</td><td>3</td></tr>
<tr><td>2(b)(i)</td><td>4 marks for any 4 of:<br><br>1 negative / unpleasant experience of the activity;<br>2 family / friends / peers / race / culture have a negative attitude to physical activity OR socialisation against an activity;<br>3 role models with a negative attitude;<br>4 (description of a constraint due to) age / gender / size;<br>5 perceived low ability / low self-confidence / negative self-concept / learned helplessness;<br>6 fear of failure / high naf / low nach;<br>7 fear of the danger of the activity;<br>8 previous criticism of ability;<br><br>Accept other suitable negative influences.</td><td>4</td></tr>
</table>

| Question | Answer | Marks |
|---|---|---|
| 2(b)(ii) | 4 marks for any 4 of:<br><br>1 create conflict between components;<br>2 change one element of the **triadic model**;<br>3 **change** cognitive component **OR** show that fitness training is good for you / can improve health / sport performance **OR** reduce the importance of the cognition;<br>4 **change** affective / emotional component **OR** make fitness training fun / enjoyable;<br>5 **change** behavioural component **OR** ensure success is experienced **OR** punish negative attitude to fitness work **OR** insist on / reward positive attitude to training;<br>6 natural response is to reduce conflict between components / need for consonance; | **4** |
| 2(c) | 3 marks for any 3 of:<br><br>1 leader has the support of the group **OR** the group values the qualities of the leader;<br>2 leader knows the strengths / weaknesses of individuals / the group;<br>3 leader understands the personality / needs of each member of the group;<br>4 leader shares the aims / goals of the group;<br>5 leader understands the history / ethos / norms of the team / club;<br>6 group may be more motivated;<br>7 decision making may be quicker;<br>8 better group cohesion;<br>9 raises aspirations of group members who may want to become leader in the future; | **3** |

| Question | Answer | Marks |
|---|---|---|
| 2(d) | 4 marks for any 4 of:<br><br>1 goal must be **specific** (to the performer / sport / event / position / fitness component) **AND** e.g. basketball player wants to improve leg power to jump higher / rebound better;<br>2 goal must be **measurable AND** e.g. weightlifter wants to increase their bench press 1 RM to 100 kilograms;<br>3 goal must be **agreed** (between performer and coach) **OR accepted** (by the performer) **AND** e.g. footballer agrees to take at least 5 shots per match;<br>4 goal must be **achievable** / **attainable AND** e.g. sprinter with PB of 11.5 seconds aims to reduce this by 0.2 seconds;<br>5 goal must be **time-phased** / **time-bound AND** e.g. rugby player aims to score 5 tries in the first six weeks of the season;<br>6 goal must be **exciting** / **enjoyable** (to maintain motivation) **AND** e.g. aim to achieve qualifying time for national swimming championships;<br>7 goal must be **recorded AND** e.g. performer keeps a log to monitor progress / show commitment to the goal **OR reviewed AND** e.g. performer / coach reviews the progress made towards the goal; | **4** |
| 2(e)(i) | 5 marks for 5 of:<br><br>(causes sub-max. 3 marks)<br>1 presence of an audience;<br>2 anxiety / **increased** arousal (experienced by a performer);<br>3 a perception / perceived fear;<br>4 (that) people / audience are **judging** the performance;<br>5 dependent on who is in the audience **OR** it is not just the presence of an audience (that affects);<br>6 proximity of audience (to performer);<br><br>(effects sub-max. 3 marks)<br>7 social inhibition / overarousal / impairs performance;<br>8 social facilitation / enhances performance;<br>9 increased likelihood of dominant response;<br>10 highly skilled / extrovert / need to achieve / autonomous performers may perform better;<br>11 novices / beginners / introvert / need to avoid failure / cognitive performers may perform worse; | **5** |

| Question | Answer | Marks |
|---|---|---|
| 2(e)(ii) | 2 marks for any 2 of:<br><br>1 selective attention / focus (on relevant cues);<br>2 mental rehearsal;<br>3 imagery / visualisation;<br>4 positive self-talk;<br>5 thought stopping;<br>6 rational / positive thinking; | **2** |
| 2(f) | 5 marks for any 5 of:<br><br>Max. 3 marks if no examples from a team game used. Max. 4 marks if only one example from a team game used.<br><br>1 win-at-all-costs attitude, e.g. tripping an opponent in football to stop them scoring;<br>2 nature of game / contact sport / (aggressive) cues present, e.g. in football shoulder charging is allowed;<br>3 frustration / poor performance / losing, e.g. footballer keeps getting tackled;<br>4 poor refereeing decisions / fouls by opponent not penalised, e.g. defender in football makes a reckless tackle;<br>5 previous experience / scores to settle from past encounter, e.g. last time we played them at football there was a brawl;<br>6 verbal / physical abuse from opponent / gamesmanship / retaliation, e.g. opponent makes personal comments to a footballer;<br>7 hostile crowd / proximity of crowd, e.g. football crowd mocking a player;<br>8 rivalry / local derby, e.g. Liverpool v Manchester United;<br>9 very high arousal levels / overarousal, e.g. psyched up by team mates before rugby match;<br>10 importance of event, e.g. top two teams in football league;<br>11 pressure from significant others / copying role models / social learning, e.g. coach encourages / reinforces aggression / assertiveness from players in football;<br>12 emotional / off-the-pitch issues, e.g. footballer's close family member is ill;<br>13 instinct / innate / genetic / trait, e.g. footballer has a predisposition to be aggressive;<br>14 use of drugs, e.g. use of steroids increases aggression in a rugby player; | **5** |

| Question | Answer | Marks |
|---|---|---|
| 3(a)(i) | 2 marks for:<br><br>1 1988;<br>2 Seoul; | **2** |
| 3(a)(ii) | 4 marks for any 4 of:<br><br>1 WADA / world anti-doping agency **set up** by IOC **OR** International Testing Agency (ITA) **set up** by IOC;<br>2 drug testing;<br>3 (IOC) provide (some) funding for WADA / ITA;<br>4 produce anti-doping code / anti-doping rules;<br>5 educate on the dangers of doping / doping control process;<br>6 ensure compliance of anti-doping code by every country;<br>7 apply sanctions / punishments against offenders / countries;<br>8 support / protect 'clean' athletes;<br>9 develop partnerships with (international) sports governing bodies / National Anti-doping Organisations (NADOs) / law enforcement agencies;<br>10 monitor new technologies;<br>11 produce needle policy;<br>12 reanalysis programme **OR** ensure that tests from previous Olympics are reviewed;<br>13 liaise with CAS / Court of Arbitration for Sport;<br>14 medical and scientific commission; | **4** |
| 3(b) | 4 marks for any 4 of:<br><br>1 black power salute / (clenched) fist;<br>2 protest against racial discrimination / supporting human rights;<br>3 on victory podium **OR** during medal ceremony **OR** during national anthem;<br>4 after 200-metre sprint final;<br>5 wore **black** glove;<br>6 also took off shoes (before mounting podium);<br>7 wore **black** socks **OR** badges (supporting human rights) **OR** Smith wore **black** scarf;<br>8 supported by Peter Norman / other athlete on podium; | **4** |

| Question | Answer | Marks |
|---|---|---|
| 3(c) | 4 marks for any 4 of:<br><br>1 protest against New Zealand / IOC;<br>2 protest against apartheid in South Africa;<br>3 (boycott) led by Tanzania;<br>4 New Zealand rugby team toured South Africa;<br>5 African nations wanted New Zealand to be banned from Olympic Games;<br>6 IOC allowed New Zealand to participate **OR** refused to ban New Zealand; | **4** |
| 3(d) | 3 marks for any 3 of:<br><br>1 central / lottery / governmental funding;<br>2 sponsorship / endorsements;<br>3 appearance money / media work;<br>4 prize money;<br>5 grants;<br>6 scholarships;<br>7 bursaries;<br>8 parental support;<br>9 part-time employment / self-funded;<br>10 employed by military / state;<br>11 professional contracts;<br><br>Accept other suitable examples. | **3** |

| Question | Answer | Marks |
|---|---|---|
| 3(e) | 7 marks for 7 of:<br><br>(benefits sub-max. 5 marks)<br>1 increase in tourism;<br>2 improved transport infrastructure;<br>3 employment opportunities;<br>4 availability of sporting facilities after Olympic Games;<br>5 use of Olympic Village as new housing;<br>6 urban regeneration;<br>7 profits from TV networks;<br>8 revenue from facilities as training sites;<br>9 national pride / feel-good factor;<br>10 shop-window effect / promotion of country;<br>11 positive legacy / increase in participation;<br><br>(potential problems sub-max. 5 marks)<br>12 high financial costs / debt / spiral of extravagance;<br>13 travel restrictions / increased security checks;<br>14 traffic congestion;<br>15 increased taxes;<br>16 increased pollution;<br>17 relocation of population;<br>18 white elephants **OR** stadia not used after Games;<br>19 increased risk of diseases (entering country);<br>20 increased chance of terrorism / crime;<br>21 money taken from other areas (e.g. health / education);<br>22 negative media profile (if things go wrong);<br><br>Accept other suitable descriptions of benefits or potential problems. | **7** |

| Question | Answer | Marks |
|---|---|---|
| 3(f) | 3 marks for any 3 of:<br><br>1 Olympic Games were for amateurs only **OR** strict amateur code enforced;<br>2 influence / beliefs of Pierre de Coubertin / IOC;<br>3 gentleman amateur was (traditionally) a social class / upper class distinction **OR** belief that working class had no concept of Olympic values / fair play / sportsmanship;<br>4 upper class had the **time** to compete at Olympic Games;<br>5 upper class able to afford **costs** involved in travelling to / living expenses at Olympic Games;<br>6 belief that working class had an unfair advantage (due to greater fitness from physical occupation);<br><br>Accept reverse arguments for point 4 and 5, e.g. working class did not have the time to compete. | **3** |
| 3(g) | 3 marks for any 3 of:<br><br>1 remove national uniforms / track suits;<br>2 remove national flags **OR** use Olympic flag;<br>3 remove national anthems **OR** use Olympic anthem;<br>4 remove / discourage use of medal counts / tables;<br>5 athletes compete as individuals, (not as part of national team);<br><br>Accept other valid suggestions. | **3** |