Cambridge Assessment International Education

# Cambridge International AS & A Level

**PHYSICAL EDUCATION** **9396/33**

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 | <u>'List rule' guidance</u><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) | 4 marks for any 4 of:<br><br>1 electron transport / transfer chain;<br>2 (hydrogen atoms) are carried by hydrogen carriers / hydrogen acceptors;<br>3 e.g. by NAD (NADH) / FAD ($FADH_2$);<br>4 in the cristae of the mitochondria;<br>5 (hydrogen atoms are split) into a proton / H+ **AND** an electron;<br>6 (net yield) 30–38 ATP / large amounts of ATP;<br>7 (hydrogen) combines with oxygen to produce $H_2O$ / water; | **4** |
| 1(b) | 3 marks for any 3 of:<br><br>1 sufficient oxygen means aerobic system used **OR** insufficient oxygen means anaerobic systems used;<br>2 presence of phosphocreatine / PC means ATP-PC system can be used;<br>3 presence of glycogen / glucose means lactic acid system / aerobic system can be used;<br>4 depletion of phosphocreatine / PC means lactic acid system is used;<br>5 presence of ADP triggers ATP-PC system;<br>6 presence of calcium triggers lactic acid system;<br>7 presence of lactic acid means aerobic system is used;<br>8 presence of fats increases use of aerobic system; | **3** |
| 1(c) | 6 marks for:<br>(progression)<br>1 (increase in workload) to maintain improvements / adaptations;<br>2 (example) increase weight from 50 kg to 55 kg **OR** increase number of repetitions / sets;<br>(moderation)<br>3 (intensity / overload must be monitored) to avoid overtraining / overuse injuries / chronic fatigue / burnout / risk of illness;<br>4 (example) include rest days in programme **OR** target different muscle groups each session;<br>(variance)<br>5 (different training methods / exercises must be included) to avoid boredom / injury / plateau;<br>6 e.g. change weight-training / circuit-training exercises; | **6** |

| Question | Answer | Marks |
|---|---|---|
| 1(d)(i) | 4 marks for:<br><br>(elastic strength)<br>1 (definition) the ability to produce (maximal) force **quickly OR** the ability to absorb, store and release energy **OR** the ability to produce powerful / fast contractions;<br>2 (example) e.g. throwing a javelin **OR** sprinting;<br><br>(static strength)<br>3 (definition) the ability to **apply force** without movement occurring **OR** the ability to **hold** a body part still where the muscle does not change in length **OR** the ability to **hold** isometric contractions;<br>4 (example) e.g. holding a crucifix position in gymnastics **OR** rugby scrum; | **4** |
| 1(d)(ii) | 2 marks for any 2 of:<br><br>1 muscle fibre type;<br>2 cross-sectional area of muscle;<br>3 hormones / testosterone / drugs;<br>4 genetics;<br>5 limb length / point of tendon insertion;<br>6 lifestyle / occupation / injury;<br><br>Accept other appropriate factors. | **2** |
| 1(e) | 3 marks for:<br><br>1 (frequency) at least two times per week;<br>2 (intensity) 50–75% of max HR / 40–60% of $VO_2$ max;<br>3 (time) at least 20 minutes per session; | **3** |

| Question | Answer | Marks |
|---|---|---|
| 1(f) | 5 marks for any 5 of:<br><br>(process 1)<br>1 reduce **glycogen** levels (7 days before race);<br>2 achieved by increased endurance training / training at high intensity;<br>3 (and 3 days of) low carbohydrate diet / diet high in proteins and fats;<br>4 (3 / 4 days before race) tapering / reduction in training levels;<br>5 and high carbohydrate diet / e.g. pasta;<br>6 trained / elite athletes may rest for several days before eating high carbohydrate diet;<br>7 increased water consumption helps the process;<br><br>(process 2 – acceptable points in context, but this is not a week-long programme)<br>8 one day before, complete (3 minutes of) high-intensity exercise;<br>9 … this opens a **carbohydrate window**;<br>10 immediately / within 20 minutes intake a high-carbohydrate meal;<br>11 carbohydrate window only lasts 2 hours **OR** carbohydrates must be eaten within 2 hours of exercise;<br><br>Answers may include elements of both processes but descriptions must be in appropriate context. | **5** |
| 1(g) | 3 marks for any 3 of:<br><br>1 liver damage;<br>2 kidney damage;<br>3 cancers;<br>4 heart failure / CHD;<br>5 blood clots / strokes / embolism;<br>6 hypertension / high cholesterol;<br>7 hormonal changes, e.g. acne;<br>8 abdominal / stomach pain;<br><br>Accept other appropriate examples. | **3** |

<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>type A</th><th>type B</th></tr>
<tr><td>1</td><td>extremely competitive</td><td>less competitive;</td></tr>
<tr><td>2</td><td>high levels of alertness / focused / highly stressed</td><td>low levels of stress / anxiety OR more relaxed;</td></tr>
<tr><td>3</td><td>works at a fast pace / efficient</td><td>works at a slow pace OR less keen to get work done quickly;</td></tr>
<tr><td>4</td><td>perfectionist tendencies / task persistence OR highly motivated</td><td>less of a perfectionist OR gives up easily OR less motivated;</td></tr>
<tr><td>5</td><td>more aggressive / quick to become angry / intolerant</td><td>less aggressive / slow to become angry / tolerant;</td></tr>
<tr><td>6</td><td>needs to be in control</td><td>delegates easily;</td></tr>
</table></td><td>3</td></tr>
<tr><td>2(b)</td><td>4 marks for any 4 of:<br><br>1 a negative effect on group productivity / decrease in group performance (as group size increases);<br>2 a <u>faulty process</u>;<br>3 (as group size increases) individual effort decreases;<br>4 (attributed originally) due to poor coordination / coordination loss OR due to poor cooperation / lack of cohesion;<br>5 (more recently found to be) due to lack of motivation / social loafing;</td><td>4</td></tr>
</table>

| Question | Answer | Marks |
|---|---|---|
| 2(c) | 3 marks for any 3 of:<br><br>1 leader does not understand the situation;<br>2 leader does not understand team members;<br>3 leader has been **imposed** on the group **OR** group may have **had no say** on choice of leader;<br>4 may cause conflict / personality clash with members;<br>5 motivation of individuals / group may be lower **OR** members may be upset to have been overlooked / rejected (as leaders);<br>6 leader may want to change style of play / tactics;<br>7 leader may not understand ethos / culture / history of team;<br>8 may delay (effective) decision making;<br>9 leadership style may not match preferred style of the group;<br><br>Accept other suitable suggestions. | **3** |
| 2(d) | 6 marks for 6 of:<br><br>Max. 5 marks if no example used.<br><br>1 (objective sport) **situation** may be general, e.g. playing rugby **OR** specific, e.g. kicking a penalty in rugby;<br>2 performer approaches the situation with a degree of trait sports confidence **AND** a level of competitiveness orientation;<br>3 competitiveness orientation refers to how the performer perceives success **OR** how they evaluate the kick at goal;<br>4 competitiveness orientation affects confidence;<br>5 judgements may be based on technique, e.g. it was a difficult kick but I struck it well;<br>6 judgements may be based on outcome, e.g. the kick was successful;<br>7 **trait** sports confidence is the innate level of confidence a performer has to, e.g. kicking a penalty;<br>8 competitiveness orientation **AND** trait sports confidence combine to give state sports confidence;<br>9 the level of confidence affects the performer's behaviour / attitude to kicking the goal, e.g. does the kicker want to have a go or not;<br>10 the level of confidence may affect the performance of the kick;<br>11 the subjective outcomes / satisfaction or disappointment will affect confidence in the next kick;<br>12 the greater the confidence the greater the likelihood of success;<br>13 the more successful you are the greater your confidence will be;<br><br>Accept other suitable examples. | **6** |

| Question | Answer | Marks |
|---|---|---|
| 2(e) | 1 mark for:<br><br>(what is meant by social facilitation)<br>1 presence of an audience has a **positive effect** on performance;<br><br>4 marks for any 4 of:<br><br>(descriptions of causes of social facilitation)<br>2 **increase** in arousal (to optimal level);<br>3 increase in / high motivation **OR** high need to achieve;<br>4 increased probability of (correct) dominant response occurring;<br>5 tasks are well-learned / simple / gross tasks **OR** performer is an expert / highly skilled;<br>6 supportive audience / cheering / clapping / home field advantage;<br>7 presence of significant others / family / friends / role models / scouts / coaches / selectors;<br>8 high self-confidence / self-belief;<br>9 incentive value of success is high; | **5** |
| 2(f)(i) | 4 marks for 4 of:<br><br>1 aggression is a function of the environment / environmental influences;<br>2 (observing and) copying / imitating aggressive behaviour of others / vicarious processes;<br>3 others must be role models / significant others;<br>4 aggression is only learned if it is (positively) reinforced;<br>5 learning / copying more likely if model is same gender / age / ability;<br>6 learning / copying more likely if viewed live **OR** learning / copying less likely if seen remotely;<br>7 some aggressive behaviour seems to be innate / inherited / genetic **OR** aggression is shown despite a lack of aggressive role models;<br>8 some people observe aggressive behaviour being reinforced and choose not to be aggressive **OR** humans have the capability of free will / choice;<br>9 if performers can learn aggressive tendencies they can also learn non-aggressive tendencies; | **4** |

| Question | Answer | Marks |
|---|---|---|
| 2(f)(ii) | 5 marks for any 5 of:<br><br>1 reward / positively reinforce non-aggressive play;<br>2 promote non-aggressive role models;<br>3 teach performers the implications of aggression / teach rational thinking / teach anger management techniques;<br>4 teach performer to walk away / avoid aggressive situations;<br>5 remove performer from situation / change position on pitch / substitute;<br>6 lower arousal levels;<br>7 improve performer's selective attention / ability to block out aggressive cues;<br>8 teach somatic relaxation techniques / deep breathing;<br>9 teach cognitive relaxation techniques / imagery / mental rehearsal / count to 10 / positive self-talk;<br>10 reduce the importance of the event / outcome;<br>11 set process / performance goals;<br>12 give position of responsibility; | **5** |

| Question | Answer | Marks |
|---|---|---|
| 3(a) | 4 marks for any 4 of:<br><br>1 promote appreciation of cultural diversity;<br>2 athletes from all over the world meeting / competing / mixing / living together (in Olympic village);<br>3 different cities around the world host Games;<br>4 experience a range of sports from around world / different cultures;<br>5 celebrate the culture of host nation **OR** cultural aspects of host in opening / closing ceremony;<br>6 promote tolerance / respect for others;<br>7 promote inclusion / sport for all;<br>8 punish examples of intolerance / discrimination; | **4** |

| Question | Answer | Marks |
|---|---|---|
| 3(b) | 3 marks for:<br><br>For example:<br>1 Germany;<br>2 1936 Berlin Games;<br>3 to show the strength of Nazism / Third Reich / superiority of Aryan race / master-race ethic / nationalism / produced propaganda / film of Games;<br>**OR**<br>4 Soviet Union;<br>5 1980 Moscow Games;<br>6 promote communism / socialism / encourage national pride / show the strength of Soviet sport / nationalism;<br>**OR**<br>7 USA;<br>8 1984 Los Angeles Games / 1996 Atlanta Games;<br>9 promote capitalism / commercialism / values of freedom / 'American Dream' / 'rags-to-riches' / nationalism;<br>**OR**<br>10 (People's Republic of) China;<br>11 2008 Beijing Games;<br>12 promote communism / encourage national pride / show the strength of Chinese sport / economy / nationalism; | **3** |
| 3(c) | 5 marks for any 5 of:<br><br>1 talent-identification programmes / scouting systems;<br>2 pathways to excellence **OR** structured / tiered competitions;<br>3 grants / bursaries / scholarships for promising / potential medallists;<br>4 specialist / high-quality equipment / technology;<br>5 specialist / national / international coaches / elite coaching schemes;<br>6 centres of excellence / academies;<br>7 science support / biomechanics / performance analysis;<br>8 medical support / physiotherapy / rehabilitation;<br>9 other science-related support, e.g. strength and conditioning / nutritional / psychological support;<br><br>Accept other suitable examples. | **5** |

| Question | Answer | Marks |
|---|---|---|
| 3(d) | 4 marks for any 4 of:<br><br>1 ticket sales;<br>2 sale of merchandise;<br>3 increased tourism during / after the Games;<br>4 boost to hospitality trade / hotels / restaurants;<br>5 employment opportunities;<br>6 **revenue** from TV / media networks **OR sale** of broadcasting rights;<br>7 money from increased tax revenues;<br><br>Accept other suitable suggestions. | **4** |
| 3(e)(i) | 3 marks for any 3 of:<br><br>1 loss of income (from having to miss work to train / compete);<br>2 training expenses (for coaching / medical support / science support);<br>3 entry fees (to facilities / competitions);<br>4 living / subsistence expenses (for food / accommodation);<br>5 cost of travel / transport;<br>6 cost of kit / equipment; | **3** |
| 3(e)(ii) | 4 marks for any 4 of:<br><br>1 high income;<br>2 sponsorships / endorsements;<br>3 public appearances / opportunities for work;<br>4 media attention / fame / become a role model;<br>5 honour of representing country<br>6 competing at the highest level in sport / achieving goal / winning a medal;<br>7 socialising with other elite athletes;<br>8 once-in-a-lifetime experience / opportunity to travel; | **4** |

| Question | Answer | Marks |
|---|---|---|
| 3(f)(i) | 4 marks for any 4 of:<br><br>1 (men's) 100-metre sprint;<br>2 **Ben Johnson** won race;<br>3 tested positive **AND** stripped of gold medal;<br>4 gold medal given to Carl Lewis / second place finisher;<br>5 positive tests allegedly covered up **OR** Lewis / Christie / Williams / Mitchell all allegedly had used drugs;<br>6 (it is possible that) Calvin Smith should have received the gold medal **OR** Calvin Smith / fourth place finisher never tested positive;<br>7 **widespread** drug use / **many** positive tests;<br>8 damage to credibility of sport / Olympics; | **4** |
| 3(f)(ii) | 3 marks for any 3 of:<br><br>1 (cheating), e.g. taking a short cut in the marathon;<br>2 (gamesmanship), e.g. slowing the game down to run the clock down in basketball;<br>3 bribery of judges / referees **OR** e.g. allegations of boxing scorers favouring host boxers;<br>4 age / gender falsification **OR** e.g. allegations of under-age gymnasts;<br>5 modifying equipment **OR** e.g. adapting fencing equipment to record false hits;<br>6 losing a group game (to gain a more favourable draw later) in badminton;<br>7 not accepting officials' decisions **OR** e.g. sit-down protest of fencer / boxer;<br><br>Accept other suitable examples, including examples of a win-at-all-costs ethic. | **3** |