

# Cambridge International AS & A Level

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PHYSICAL EDUCATION

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Paper 3

October/November 2020

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 2020 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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This document consists of **13** printed pages.

**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 | <p><u>'List rule' guidance</u></p> <p>For questions that require <i>n</i> responses (e.g. State <b>two</b> reasons ...):</p> <ul style="list-style-type: none"> <li>• The response should be read as continuous prose, even when numbered answer spaces are provided.</li> <li>• Any response marked <i>ignore</i> in the mark scheme should not count towards <i>n</i>.</li> <li>• Incorrect responses should not be awarded credit but will still count towards <i>n</i>.</li> <li>• Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should <b>not</b> 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.</li> <li>• Non-contradictory responses after the first <i>n</i> responses may be ignored even if they include incorrect science.</li> </ul> |

**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>1 product of one reaction is used by a second reaction;<br>2 a combination of endothermic <b>AND</b> exothermic reactions;<br>3 ATP is broken down to produce energy <b>OR</b> $\text{ATP} \rightarrow \text{ADP} + \text{P} + \text{energy}$ ;<br>4 this (point 3) is an exothermic reaction;<br>5 energy is used to resynthesise ATP <b>OR</b> $\text{energy} + \text{ADP} + \text{P} \rightarrow \text{ATP}$ ;<br>6 this (point 5) is an endothermic reaction;   | 4   |        |         |   |           |          |   |  |  |   |                                  |   |   |      |   |   |
| 1(b)     | 4 marks for any 4 of: (both points must be made for each mark)<br><table border="1" data-bbox="231 414 1209 633"> <thead> <tr> <th></th> <th>ATP/PC</th> <th>aerobic</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>anaerobic</td> <td>aerobic;</td> </tr> <tr> <td>2</td> <td>phosphocreatine / PC / creatine phosphate / CP</td> <td>glycogen / glucose / carbohydrates and fats;</td> </tr> <tr> <td>3</td> <td>(net) 1 ATP (per molecule of PC)</td> <td>(net) 36–39 ATP (per glucose molecule);</td> </tr> <tr> <td>4</td> <td>none</td> <td><math>\text{CO}_2</math> <b>AND</b> <math>\text{H}_2\text{O}</math>;</td> </tr> </tbody> </table> |   | ATP/PC | aerobic | 1 | anaerobic | aerobic; | 2 | phosphocreatine / PC / creatine phosphate / CP | glycogen / glucose / carbohydrates and fats; | 3 | (net) 1 ATP (per molecule of PC) | (net) 36–39 ATP (per glucose molecule); | 4 | none | $\text{CO}_2$ <b>AND</b> $\text{H}_2\text{O}$ ; | 4 |
|          | ATP/PC   | aerobic   |        |         |   |           |          |   |  |  |   |                                  |   |   |      |   |   |
| 1        | anaerobic  | aerobic;  |        |         |   |           |          |   |  |  |   |                                  |   |   |      |   |   |
| 2        | phosphocreatine / PC / creatine phosphate / CP   | glycogen / glucose / carbohydrates and fats;    |        |         |   |           |          |   |  |  |   |                                  |   |   |      |   |   |
| 3        | (net) 1 ATP (per molecule of PC)   | (net) 36–39 ATP (per glucose molecule);         |        |         |   |           |          |   |  |  |   |                                  |   |   |      |   |   |
| 4        | none   | $\text{CO}_2$ <b>AND</b> $\text{H}_2\text{O}$ ; |        |         |   |           |          |   |  |  |   |                                  |   |   |      |   |   |
| 1(c)     | 3 marks for any 3 of:<br>1 the relative importance / contribution of energy systems (to an activity);<br>2 dependent on intensity <b>AND</b> duration (of activity);<br>3 coach can plan training programmes suitable to <b>energy systems</b> used;<br>4 coach can apply correct <b>recovery times</b> needed based on energy systems;  | 3   |        |         |   |           |          |   |  |  |   |                                  |   |   |      |   |   |
| 1(d)(i)  | 2 marks for any 2 of:<br>1 the volume of oxygen consumed during recovery / after exercise <b>above</b> that which would normally be consumed;<br>2 occurs when the body has performed <b>anaerobic</b> work;<br>3 (partially) helps to pay off oxygen deficit;<br>4 consists of alactacid <b>AND</b> lactacid components;  | 2   |        |         |   |           |          |   |  |  |   |                                  |   |   |      |   |   |

| Question | Answer  | Marks  |   |                            |   |   |   |   |                                     |  |   |   |   |   |                                       |  |   |
|----------|---|--|---|----------------------------|---|---|---|---|-------------------------------------|--|---|---|---|---|---------------------------------------|--|---|
| 1(d)(ii) | 3 marks for any 3 of:<br>1 oxygen needed in removal of lactic acid / CO <sub>2</sub> ;<br>2 oxygen used to resynthesise / restore ATP / PC;<br>3 aerobic energy system is used for recovery process;<br>4 replenish myoglobin with oxygen <b>OR</b> restore oxy–myoglobin link;   | 3  |   |                            |   |   |   |   |                                     |  |   |   |   |   |                                       |  |   |
| 1(e)     | 4 marks for any 4 of:<br>1 training zone <b>OR</b> give correct intensity to train at;<br>2 60–80% of maximum HR;<br>3 upper / higher values more suitable for trained athletes <b>OR</b> lower values for untrained individuals;<br>4 max HR = 220 – age <b>OR</b> is calculated using a progressive / physical test;<br>5 Karvonen's principle / formula;<br>6 uses maximal heart rate reserve or max HR – resting HR;<br>7 training HR = resting HR + % (max HR – resting HR);   | 4  |   |                            |   |   |   |   |                                     |  |   |   |   |   |                                       |  |   |
| 1(f)     | 4 marks for any 4 of:<br><table border="1" data-bbox="231 571 1209 862"> <tbody> <tr> <td>1</td> <td>hand grip <b>OR</b> (hand / leg) dynamometer;</td> <td>1 repetition maximum / RM;</td> </tr> <tr> <td>2</td> <td>adjust grip <b>OR</b> set dial to zero;</td> <td>choose suitable weightlifting exercise;</td> </tr> <tr> <td>3</td> <td>squeeze handle as hard as possible;</td> <td>set achievable weight to lift 2–10 reps;</td> </tr> <tr> <td>4</td> <td>use dominant and / or non-dominant hand <b>OR</b> repeat 3 times;</td> <td>increase weight until only one rep is possible <b>OR</b> find 4–6 RM;</td> </tr> <tr> <td>5</td> <td>compare result to standardised table;</td> <td>direct objective score is given <b>OR</b> can be compared to body weight <b>OR</b> use formula to calculate;</td> </tr> </tbody> </table> | 1  | hand grip <b>OR</b> (hand / leg) dynamometer; | 1 repetition maximum / RM; | 2 | adjust grip <b>OR</b> set dial to zero; | choose suitable weightlifting exercise; | 3 | squeeze handle as hard as possible; | set achievable weight to lift 2–10 reps; | 4 | use dominant and / or non-dominant hand <b>OR</b> repeat 3 times; | increase weight until only one rep is possible <b>OR</b> find 4–6 RM; | 5 | compare result to standardised table; | direct objective score is given <b>OR</b> can be compared to body weight <b>OR</b> use formula to calculate; | 4 |
| 1        | hand grip <b>OR</b> (hand / leg) dynamometer;   | 1 repetition maximum / RM;   |   |                            |   |   |   |   |                                     |  |   |   |   |   |                                       |  |   |
| 2        | adjust grip <b>OR</b> set dial to zero;   | choose suitable weightlifting exercise;  |   |                            |   |   |   |   |                                     |  |   |   |   |   |                                       |  |   |
| 3        | squeeze handle as hard as possible;   | set achievable weight to lift 2–10 reps;   |   |                            |   |   |   |   |                                     |  |   |   |   |   |                                       |  |   |
| 4        | use dominant and / or non-dominant hand <b>OR</b> repeat 3 times;   | increase weight until only one rep is possible <b>OR</b> find 4–6 RM;  |   |                            |   |   |   |   |                                     |  |   |   |   |   |                                       |  |   |
| 5        | compare result to standardised table;   | direct objective score is given <b>OR</b> can be compared to body weight <b>OR</b> use formula to calculate; |   |                            |   |   |   |   |                                     |  |   |   |   |   |                                       |  |   |

| Question | Answer   | Marks    |
|----------|--|----------|
| 1(g)     | <p>6 marks for 6 of:</p> <p>(positives – sub-max. 3)</p> <ol style="list-style-type: none"><li>1 increased muscle mass / growth / hypertrophy / reduce fat;</li><li>2 increased strength / speed / power;</li><li>3 able to train at higher intensities;</li><li>4 faster recovery <b>OR</b> injuries heal quicker <b>OR</b> train more often;</li></ol> <p>(negatives – sub-max. 3)</p> <ol style="list-style-type: none"><li>5 irritability / aggression / mood swings / 'roid rage';</li><li>6 liver / kidney damage;</li><li>7 cancer;</li><li>8 heart failure / CHD / strokes / blood clots;</li><li>9 hormonal disturbances <b>OR</b> females acquire masculine characteristics <b>OR</b> testicular atrophy in males;</li></ol> <p><i>Accept other appropriate effects.</i></p> | <b>6</b> |

| Question | Answer   | Marks |
|----------|--|-------|
| 2(a)     | 2 marks for:<br>1 (extroversion) sociable / outgoing / talkative / optimistic;<br>2 (neuroticism) anxious / unpredictable / moody / restless;  | 2     |
| 2(b)(i)  | 3 marks for any 3 of:<br>1 competitiveness;<br>2 desire / drive for success <b>OR</b> mastery orientation <b>OR</b> shows persistence <b>OR</b> high NACH <b>OR</b> low NAF;<br>3 goal-directed behaviour;<br>4 pride in performance <b>OR</b> not afraid of evaluative situations;  | 3     |
| 2(b)(ii) | 4 marks for any 4 of:<br>1 probability of success / task difficulty <b>AND</b> incentive value of success / degree of satisfaction;<br>2 if probability of success is low, achievement motivation will be high (accept opposite);<br>3 e.g. playing team that are top of the league;<br>4 if incentive value of success is high, achievement motivation will be high (accept opposite);<br>5 e.g. the satisfaction of doing well against no. 1 ranked player;<br>6 familiarity with task / environment will increase achievement motivation;<br>7 labelled graph showing relationship between incentive value of success and task difficulty;  | 4     |
| 2(c)     | 3 marks for:<br>1 (situational) required behaviour / nature of activity, e.g. rock climbing <b>OR</b> task difficulty, e.g. a dangerous rock climb <b>OR</b> time demands, e.g. only 30 seconds in basketball time-out to get message across <b>OR</b> aims / goals of group, e.g. football team playing for social reasons / not bothered about winning;<br>2 (leader's) actual leadership style / characteristics, e.g. rugby coach is authoritarian <b>OR</b> personality / gender / age / experience of leader, e.g. rugby coach is male (and is used to autocratic approach);<br>3 (members') preferred leadership style / motivation / age / gender / experience / ability / size of group, e.g. netball team are highly motivated to win; | 3     |



| Question | Answer  | Marks |
|----------|---|-------|
| 2(d)(i)  | 5 marks for any 5 of:<br>1 optimum arousal;<br>2 calm / relaxed / low anxiety;<br>3 high levels of self-confidence / self-efficacy;<br>4 enjoyment / satisfaction;<br>5 focused / selective attention / ignoring distractions / concentration;<br>6 performance feels effortless / efficient;<br>7 feeling of being in control;<br>8 performance is automatic;  | 5     |
| 2(d)(ii) | 3 marks for any 3 of:<br>1 simple / gross tasks require high / higher arousal;<br>2 complex / fine tasks require low / lower arousal;<br>3 optimal arousal occurs at a higher level for simple tasks <b>OR</b> at a lower level for complex tasks;<br>4 high arousal will result in errors / mistakes / poor performance in complex tasks <b>OR</b> low arousal will mean poor performance in simple tasks;<br>5 inverted-U hypothesis still applies <b>OR</b> graph showing inverted-U for complex <b>AND</b> simple tasks;  | 3     |
| 2(e)     | 5 marks for any 5 of:<br>1 social facilitation;<br>2 encouragement / positive reinforcement / positive feedback / supportive;<br>3 increase effort / persistence;<br>4 increase arousal to <b>optimal</b> levels;<br>5 increase drive / motivation;<br>6 increase likelihood of dominant response;<br>7 (encourage) to take risks;<br>8 increase self-confidence;<br>9 homefield advantage phenomenon;<br>10 e.g. run faster <b>OR</b> jump higher / further <b>OR</b> throw further;<br>11 exposure may lead to sponsorship; | 5     |

| Question | Answer  | Marks |
|----------|---|-------|
| 2(f)     | 5 marks for any 5 of:<br>1 frustration causes an increase in arousal;<br>2 (increase in arousal) creates a readiness / predisposition for aggression;<br>3 stimuli / cues / triggers must be present / in environment;<br>4 (example of cues) bad tackle in football / derby games / rivalry;<br>5 performer associates the cue with being aggressive;<br>6 a development of frustration–aggression hypothesis;<br>7 includes aspects of social learning theory <b>OR</b> an interactionist theory;<br>8 implies that aggression is not innate <b>OR</b> can be controlled; | 5     |

| Question | Answer   | Marks |
|----------|--|-------|
| 3(a)     | 4 marks for any 4 of:<br>1 athletes from all over the world meeting / competing;<br>2 irrespective of colour / race / creed / political belief;<br>3 promotion of international understanding;<br>4 appreciation of cultural diversity;<br>5 supreme mental / physical challenge;<br>6 fair-play ideals;<br>7 peace / harmony / cooperation transcending political barriers;   | 4     |
| 3(b)     | 3 marks for any 3 of:<br>1 wreath awarded to winners;<br>2 death was preferable to defeat / victory or death;<br>3 win-at-all costs ethic existed <b>OR</b> opposing belief to modern Olympic ideal that challenge / taking part is more important than winning;<br>4 deaths were fairly common in some of the fighting sports;<br>5 competitors would often not concede defeat despite serious wounds;<br>6 killing an opponent was not forbidden unless rules were broken; | 3     |

| Question | Answer  | Marks |
|----------|---|-------|
| 3(c)     | 4 marks for any 4 of:<br>1 allegations of bribery of IOC delegates <b>OR</b> controversy regarding method of selection;<br>2 lack of cities / countries willing to bid for the Games;<br>3 criticism of host nation, e.g. human rights record in China;<br>4 high cost of putting initial plan together / spiral of extravagance;<br>5 economic benefits disputed <b>OR</b> inaccurate predictions of bid;<br>6 lack of political will in host country;<br>7 change of government <b>OR</b> change of public opinion in host country <b>OR</b> host may pull out after winning bid;<br>8 fear of cost overruns / white-elephant stadia;<br>9 evidence of lower than expected tourist numbers, e.g. London 2012; | 4     |
| 3(d)(i)  | 4 marks for any 4 of:<br>1 loss of income;<br>2 training expenses (for coaching / facilities / medical support / science support);<br>3 living / subsistence expenses (for food / accommodation);<br>4 travel / transport;<br>5 kit / equipment;<br>6 some athletes have no financial costs / are fully funded;   | 4     |
| 3(d)(ii) | 3 marks for any 3 of:<br>1 Olympic village;<br>2 extra housing / more hotels;<br>3 transport infrastructure;<br>4 urban regeneration (in city hosting Games);<br>5 media facilities / upgraded broadband / satellite facilities;<br>6 security facilities;<br><br><i>Accept other suitable examples of types of facilities.</i>   | 3     |

| Question | Answer   | Marks    |
|----------|--|----------|
| 3(e)     | 3 marks for any 3 of:<br>1 working class did not have time to compete at Games;<br>2 working class did not have enough money to compete at Games;<br>3 (if) working class received money for competing / loss of earnings <b>at other events</b> ;<br>4 this lost them their amateur status (so they would be banned from Olympic Games);<br>5 working class competed against professionals at other events (which was also not allowed);<br>6 named example of athlete banned / punished for losing amateur status, e.g. Jesse Owens;   | <b>3</b> |
| 3(f)     | 5 marks for any 5 of:<br>1 no women's participation in <b>1896 OR</b> only role of women was to present wreaths to winners;<br>2 limited involvement / some women's sport introduced in <b>1900</b> (tennis, golf);<br>3 low numbers of participants / less than 10% before Second World War <b>OR</b> significant increase since Second World War;<br>4 role of Alice Milliat / Women's Olympics created in response to IOC refusal to allow women's athletics in 1920s;<br>5 mixed-gender events included;<br>6 aim of IOC for all sports to have a male and female equivalent;<br>7 acceptance of women as judges / officials;<br>8 women co-opted on to IOC (in 1981);<br>9 over 20% of IOC members are women;<br>10 IOC conference on women and sport;<br>11 some countries still deny opportunities to women to participate; | <b>5</b> |

| Question | Answer   | Marks    |
|----------|--|----------|
| 3(g)     | 4 marks for any 4 of:<br><br>1 improved technology may provide unfair advantage for Paralympic athletes;<br>2 example of technology, e.g. blades;<br>3 in some sports it is not possible to include able-bodied and disabled athletes;<br>4 example of disability / event that may not be inclusive, e.g. visually impairment;<br>5 risk of injury in some sports;<br>6 the value of Paralympics would be questioned if all could compete in the Olympics <b>OR</b> standard of Paralympics would be lower;<br>7 effect on disabled people / on spectators if all events are won by able-bodied athletes;<br>8 reduced / increased inspirational / motivational effect on disabled athletes;<br>9 denial that many disabled people do have different abilities;<br>10 potential loss of many great disabled role models; | <b>4</b> |