



Cambridge International AS & A Level

PHYSICAL EDUCATION

9396/31

Paper 3

May/June 2021

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 May/June 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This document consists of **14** 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)	<p>3 marks for:</p> <table border="1" data-bbox="331 284 1485 612"> <thead> <tr> <th></th> <th>ATP / PC system</th> <th>aerobic system</th> </tr> </thead> <tbody> <tr> <td>1 site of reaction</td> <td>sarcoplasm</td> <td>sarcoplasm AND mitochondria;</td> </tr> <tr> <td>2 enzyme</td> <td>creatine kinase</td> <td>glycogen phosphorylase / GP(P) / phosphofructokinase / PFK / (lipoprotein) lipase;</td> </tr> <tr> <td>3 energy yield</td> <td>(net) 1 ATP (per PC) / 1:1</td> <td>32–39 ATP (per glucose molecule);</td> </tr> </tbody> </table>		ATP / PC system	aerobic system	1 site of reaction	sarcoplasm	sarcoplasm AND mitochondria;	2 enzyme	creatine kinase	glycogen phosphorylase / GP(P) / phosphofructokinase / PFK / (lipoprotein) lipase;	3 energy yield	(net) 1 ATP (per PC) / 1:1	32–39 ATP (per glucose molecule);	3
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1(b)	<p>4 marks for any 4 of:</p> <p>Max. 3 marks if no sporting example used.</p> <ol style="list-style-type: none"> 1 splitting the (training) year into blocks of time OR blocks of training with specific goals and time-frames; 2 macrocycle is 1–4 years / long-term plan, e.g. swimmer aiming for personal best at Olympic Games; 3 mesocycle is 1–4 months / medium-term plan, e.g. swimmer focuses training on increasing their speed; 4 microcycle is 1–4 weeks / short-term plan, e.g. swimmer focuses on improving tumble turn; 5 microcycles consist of several different training sessions / may focus on different elements / weekly training programme; 6 pre-season AND season AND post- / off-season; 7 preparatory phase AND competitive phase AND transition phase; 8 double periodisation for 2 peaks within a season; 	4												
1(c)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> 1 continuous (running); 2 repetition running; 3 fartlek; 4 interval; 5 HIIT; 6 circuit; 7 altitude; 	3												

Question	Answer	Marks															
1(d)	5 marks for any 5 of: 1 all muscle fibre types are used together for maximum strength; 2 for lower intensity slow twitch are recruited first; 3 slow twitch / fast oxidative / FOG fibres are used for (strength) endurance; 4 fast glycolytic / FTG fibres are used for explosive / elastic strength; 5 fast twitch fibres have high stores of phosphocreatine / PC (so can produce more force); 6 fast twitch fibres are larger in size (so can produce more force); 7 fast twitch fibres have many fibres per motor neurone / unit; 8 summation of force / recruitment;	5															
1(e)(i)	2 marks for: 1 (static) range of movement about a joint (without reference to speed of movement); 2 (dynamic) range of movement about a joint with reference to (speed of) movement / muscle contractions OR resistance of a joint to movement;	2															
1(e)(ii)	4 marks for any 4 of: <table border="1" data-bbox="331 855 1592 1401"> <tbody> <tr> <td data-bbox="331 855 663 954">1 (equipment)</td> <td data-bbox="663 855 1126 954">sit and reach box / ruler AND bench;</td> <td data-bbox="1126 855 1592 954">goniometer;</td> </tr> <tr> <td data-bbox="331 954 663 1086">2 (description)</td> <td data-bbox="663 954 1126 1086">sit on floor, legs straight, feet against box / bench;</td> <td data-bbox="1126 954 1592 1086">fulcrum / pivot / head of goniometer is placed at joint (axis of rotation);</td> </tr> <tr> <td data-bbox="331 1086 663 1185">3 (description)</td> <td data-bbox="663 1086 1126 1185">reach forward as far as possible (with arms straight);</td> <td data-bbox="1126 1086 1592 1185">arms of goniometer align with bones / limbs;</td> </tr> <tr> <td data-bbox="331 1185 663 1284">4 (score / result of test)</td> <td data-bbox="663 1185 1126 1284">hold position (for 2 seconds) and record score / distance reached;</td> <td data-bbox="1126 1185 1592 1284">record angle in degrees shown (on goniometer);</td> </tr> <tr> <td data-bbox="331 1284 663 1401">5 (evaluation)</td> <td data-bbox="663 1284 1126 1401">compare score to (normative) tables / data;</td> <td data-bbox="1126 1284 1592 1401">compare angle to (normative) tables / data;</td> </tr> </tbody> </table>	1 (equipment)	sit and reach box / ruler AND bench;	goniometer;	2 (description)	sit on floor, legs straight, feet against box / bench;	fulcrum / pivot / head of goniometer is placed at joint (axis of rotation);	3 (description)	reach forward as far as possible (with arms straight);	arms of goniometer align with bones / limbs;	4 (score / result of test)	hold position (for 2 seconds) and record score / distance reached;	record angle in degrees shown (on goniometer);	5 (evaluation)	compare score to (normative) tables / data;	compare angle to (normative) tables / data;	4
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Question	Answer	Marks
1(f)(i)	4 marks for any 4 of: 1 stimulant / has a stimulating effect on the CNS / reduce reaction time / increase alertness; 2 reduces the sensation of fatigue / perception of work effort / pain; 3 improves concentration / focus / technical skill; 4 glycogen sparing; 5 enhances fat utilisation in the body OR increases levels of free fatty acids; 6 delays exhaustion OR prolongs aerobic energy production; 7 speeds up glycogen replenishment after exercise; 8 diuretic effect OR causes dehydration; 9 insomnia / anxiety / gastrointestinal problems;	4
1(f)(ii)	5 marks for any 5 of: 1 increased PC stores; 2 delays exhaustion of ATP / PC system OR enables ATP / PC system to work for longer; 3 allows performer to train at higher intensities OR allows training to increase strength / power / speed; 4 increased weight gain; 5 water retention; 6 stomach cramps / diarrhoea; 7 muscle cramps; 8 potential long-term kidney / liver damage; 9 reduces natural creatine production; 10 possible link to testicular cancer;	5

Question	Answer	Marks
2(a)	3 marks for any 3 of: 1 personality is innate / inherited / genetic / from parents / what you are born with; 2 behaviour is predictable; 3 personality / behaviour is stable / constant / enduring; 4 personality is predetermined / not learned / generalised; 5 personality can be measured / tested; 6 (influence of) Cattell / Eysenck / Freud;	3

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Question	Answer	Marks
2(b)	<p>3 marks for any 3 of:</p> <p>Max. 2 marks if no practical example used.</p> <ol style="list-style-type: none"> 1 cognitive / knowing the benefits of exercise means that athlete trains regularly; 2 affective / emotions / feelings about exercise so enjoys training; 3 behavioural / action / actual approach to exercise so goes training regularly; 4 attitude will be positive if components of attitude / triadic model are all good; 5 consonance OR no dissonance (when all components correlate); <p>Allow the use of other practical examples.</p>	3
2(c)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> 1 shows task persistence / does not give up easily; 2 takes risks; 3 likes challenges / 50:50 situations / welcomes competition; 4 takes responsibility for their actions; 5 complete tasks quickly / goal-orientated; 6 welcomes feedback / enjoys evaluation; 7 is not afraid of failure; 8 has high standards; 9 is confident / high self-efficacy / optimistic; 10 attributes success internally / correct use of attribution; 	4
2(d)(i)	<p>2 marks for any 2 of:</p> <ol style="list-style-type: none"> 1 good relationships between leader and group; 2 clear task structure; 3 leader has strong position of power / authority; 4 group has high ability; 5 high motivation; 	2

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Question	Answer	Marks
2(d)(ii)	1 mark for: 1 task-oriented / autocratic;	1
2(e)	3 marks for any 3 of: 1 anxiety / stress management OR control arousal; 2 increase motivation / drive to achieve success; 3 increase confidence / self-efficacy / mastery orientation; 4 increase effort / persistence / determination; 5 increase focus / attention on important aspects of task; 6 prevents learned helplessness;	3
2(f)	4 marks for any 4 of: Max. 2 marks if no sporting examples used; max. 3 marks if only one sporting example used. 1 (fear of) failure / losing / performing badly / lack of training / planning / unsure of role in group, e.g. messing up a gymnastic routine; 2 (fear of) injury, e.g. getting hurt by a strong opponent in rugby; 3 (fear of) letting others / team mates down, e.g. dropping baton in relay race; 4 importance of event, e.g. football world cup final; 5 evaluation / presence of an audience, e.g. county cricket selector is watching you; 6 quality of opposition, e.g. playing tennis player who has beaten you every time; 7 poor officiating, e.g. netball umpire previously gave decisions against you; 8 unfamiliar environment / kit / equipment, e.g. never having played basketball at a particular sports hall before; 9 misunderstand effects of arousal, e.g. footballer thinks sweating before match has negative effect on performance; 10 personality / trait (anxiety);	4

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Question	Answer	Marks
2(g)	4 marks for any 4 of: 1 frustration (always) leads to / causes aggression; 2 when goals are blocked, frustration increases; 3 the drive to achieve goal increases OR becomes an aggressive drive; 4 release of aggression reduces frustration; 5 catharsis (is the release of aggression); 6 (catharsis) produces a feeling of well-being; 7 punishment of aggression leads to more frustration; 8 links to drive theory / instinct theory;	4
2(h)(i)	1 mark for: 1 the negative effect of an audience OR the negative effect of presence of others;	1
2(h)(ii)	5 marks for any 5 of: 1 train in front of an audience OR train with distractions; 2 reduce importance of the event; 3 improve selective attention / focus / concentration; 4 ensure skills / tactics / individual roles are well learned; 5 use stress / anxiety management techniques OR an example of these, e.g. mental rehearsal / goal setting; 6 encourage team mates to be supportive OR use verbal encouragement OR give positive feedback; 7 increase self-efficacy of performer; 8 performance accomplishments OR give success; 9 use attributions correctly; 10 avoid social comparison with others;	5

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Question	Answer	Marks
3(a)(i)	3 marks for any 3 of: 1 promote understanding / education about different countries; 2 experience a range of sports from around world; 3 celebrate the culture of host nation / cultural aspects of host in opening / closing / medal ceremony; 4 promote tolerance / respect for others; 5 promote inclusion / equality / sport for all; 6 punish examples of intolerance / discrimination; 7 demonstration sports;	3
3(a)(ii)	2 marks for any 2 of: 1 colour; 2 race; 3 creed / religion; 4 political belief; 5 gender / sexual orientation; 6 disability; 7 age;	2
3(b)(i)	4 marks for any 4 of: 1 every 4 years; 2 oath; 3 opening ceremony; 4 Olympiad; 5 Olympic flame; 6 symbols of victory for winners; 7 festival nature / sporting AND cultural event; 8 eligibility standards / specialist training; 9 values / ethics / ideals of fair play / peace; 10 (evidence of) cheating / rule-breaking; 11 supreme challenge; 12 athletes as role models / cult figures; 13 large stadium / many spectators;	4

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3(b)(ii)	3 marks for any 3 of: <table border="1" data-bbox="333 284 1352 906" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>ancient</th> <th>modern</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5 days</td> <td>over 2 weeks;</td> </tr> <tr> <td>2</td> <td>male participants only</td> <td>males AND females take part OR females allowed;</td> </tr> <tr> <td>3</td> <td>naked</td> <td>clothed;</td> </tr> <tr> <td>4</td> <td>wreaths</td> <td>medals;</td> </tr> <tr> <td>5</td> <td>... for winners only</td> <td>... for 1st, 2nd AND 3rd;</td> </tr> <tr> <td>6</td> <td>religious festival</td> <td>secular / not religious;</td> </tr> <tr> <td>7</td> <td>always at same venue / Olympia</td> <td>different cities / countries as hosts;</td> </tr> <tr> <td>8</td> <td>Greeks only</td> <td>athletes from all over world;</td> </tr> </tbody> </table> <p>Both ancient and modern equivalent must be included.</p>			ancient	modern	1	5 days	over 2 weeks;	2	male participants only	males AND females take part OR females allowed;	3	naked	clothed;	4	wreaths	medals;	5	... for winners only	... for 1st, 2nd AND 3rd;	6	religious festival	secular / not religious;	7	always at same venue / Olympia	different cities / countries as hosts;	8	Greeks only	athletes from all over world;	3
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3(c)	3 marks for any 3 of: <ol style="list-style-type: none"> 1 athletes as pawns for their governments; 2 master race / Aryan supremacy / nationalism; 3 political statements / black power salute; 4 athletes as targets for terrorists; 5 boycotts; 		3																											

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Question	Answer	Marks
3(d)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> 1 (sale of) TV rights; 2 sponsorship / marketing / licensing programmes; 3 donations from private corporations; 4 government subsidies; 5 lottery funding; 6 taxation / increased taxes (at local or national level); 7 ticket sales; 8 sales of merchandise; 9 IOC gives grants / loans; 10 revenue from (operating facilities as) training sites; 11 use of foreign exchange reserves; 	4
3(e)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> 1 role / influence of Pierre de Coubertin; 2 amateurism as a noble concept OR upper class / amateurs showed correct values of Olympism OR belief that lower classes had no concept of fair-play ideals; 3 IOC failed to act against broken-time payments / shamateurs / sponsorships / trust funds / scholarships; 4 role of Avery Brundage in ignoring growth of shamateurism; 5 need for best athletes to take part in Olympics; 6 term 'amateurism' removed from Olympic charter (in 1974); 	3
3(f)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> 1 use of prohibited / illegal drugs; 2 cheating; 3 gamesmanship; 4 bribery of judges / referees; 5 age / gender falsification; 6 modifying equipment; 7 losing a group game (to gain a more favourable draw later) / tanking / competition manipulation; 8 to achieve financial gain; 9 pressure from peers / coach / media; 10 misleading information / lack of knowledge; 	4

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Question	Answer	Marks
3(g)	4 marks for any 4 of: (both) 1 to promote personal achievement; 2 to emphasise participation OR not consistent with 'taking part more important than winning'; (medal counts) 3 to remove politics from Olympics; 4 to prevent use to enhance national prestige / promote political ideology; 5 not fair to smaller / poorer countries; (Olympic Motto) 6 may encourage elitism / win-at-all-costs ethic; 7 not applicable to all sports; 8 to emphasise fair play;	4