



Cambridge International AS & A Level

PHYSICAL EDUCATION

9396/11

Paper 1

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 **16** 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.

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Question	Answer	Marks
1(a)(i)	4 marks for: 1 ball and socket; 2 femur AND pelvis / pelvic girdle; 3 extension; 4 gluteus maximus / biceps femoris;	4
1(a)(ii)	2 marks for any 2 of: 1 supraspinatus; 2 subscapularis 3 infraspinatus; 4 teres minor;	2
1(a)(iii)	1 mark for: 1 isometric;	1

Question	Answer	Marks
1(b)	<p>4 marks for 4 of:</p> <p>(structural sub-max. 2 marks)</p> <ol style="list-style-type: none"> 1 fewer fibres per motor neurone; 2 more myoglobin; 3 more mitochondria; 4 lots of capillaries; 5 more fat stores / triglycerides; 6 high glycogen stores; 7 low phosphocreatine stores; 8 low myosin ATPase activity; 9 more oxidative / glycolytic enzymes; 10 small(er) diameter; <p>(functional sub-max. 2 marks)</p> <ol style="list-style-type: none"> 11 used for endurance / stamina; 12 high aerobic capacity / low anaerobic capacity; 13 slow contractile speed / contracts slowly; 14 high fatigue resistance / fatigue slowly; 15 low strength / less forceful / less powerful (contraction); 	4
1(c)	<p>5 marks for any 5 of:</p> <ol style="list-style-type: none"> 1 decreases heart rate; 2 chemoreceptors detect increased pH / decreased acidity / CO₂ / lactic acid in blood; 3 proprioceptors / mechanoreceptors detect reduced movement; 4 baroreceptors detect decreased blood pressure; 5 messages / impulses to cardiac control centre / CCC / in the medulla; 6 parasympathetic system; 7 via vagus nerve; 	5

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Question	Answer	Marks
1(d)	<p>4 marks for 4 of:</p> <ol style="list-style-type: none"> 1 regulated / controlled by vasomotor control centre / VCC / medulla; 2 sympathetic nerve impulses; 3 action of pre-capillary sphincters / smooth muscle; 4 vasodilation / widening of arterioles / blood vessels; 5 ... leads to more blood going to working muscles; 6 vasoconstriction / narrowing of arterioles / blood vessels; 7 ... leads to less blood going to non-essential organs / e.g. gut / kidneys / inactive muscles; <p>Point 5 must link to point 4.</p> <p>Point 7 must link to point 6.</p>	4
1(e)(i)	<p>3 marks for:</p> <ol style="list-style-type: none"> 1 A – inspiratory reserve (volume); 2 C – residual volume; 3 D – vital capacity; 	3
1(e)(ii)	<p>2 marks for:</p> <ol style="list-style-type: none"> 1 B / tidal volume – increases; 2 expiratory reserve (volume) / ERV – decreases; 	2

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Question	Answer	Marks
1(f)	5 marks for any 5 of: <ol style="list-style-type: none"> 1 lower atmospheric / air pressure; 2 causes increase in frequency of breathing / ventilation rate / breathe faster; 3 partial pressure of oxygen / pO₂ in air is lower / reduced; 4 reduced / lower concentration / diffusion gradient of oxygen in alveoli / lungs / between alveoli and blood; 5 less oxygen diffuses into blood / capillaries / combines with haemoglobin / forms oxyhaemoglobin; 6 reduces / lower concentration / diffusion gradient of oxygen at muscles / less oxygen diffuses into muscle / myoglobin; 7 carbon dioxide builds up at faster rate; 8 reduced performance for endurance events; 9 body releases EPO / erythropoietin; 10 increased production of haemoglobin / red blood cells; 11 better oxygen carrying capacity; 12 advantageous on return to lower altitude level for endurance performers; 	5

Question	Answer	Marks
2(a)	4 marks for: <ol style="list-style-type: none"> 1 simple skill – one / few stimuli / limited information to process / one or few decisions to make / skill with few subroutines / limited cognitive demand / limited perceptual requirements / less feedback / limited decision making; 2 example – running / throwing / kicking / jumping / catching; 3 complex skill – many stimuli to / lots of information to process / many decisions to make / increased perceptual requirements / more feedback / skill with many subroutines; 4 example – batting or bowling in cricket / basketball dribble / tennis serve / gymnastics routine / somersault / high jump / triple jump / golf swing / open skills; 	4

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Question	Answer	Marks
2(b)(i)	5 marks for any 5 of: <ol style="list-style-type: none"> 1 associationist theory; 2 (reinforcement) aims to develop / strengthen the S/R / S–R / stimulus–response bond; 3 involves trial and error learning; 4 shaping; 5 change / modify environment to change behaviour; 6 positive reinforcement creates positive feelings / e.g. praise from coach / reward / observing target being hit; 7 negative reinforcement is the withdrawal of criticism / adverse stimulus / e.g. coach stops shouting; 8 punishment / annoyance weakens the S / R bond; 9 physical / mental preparedness strengthens S / R bond; 	5
2(b)(ii)	2 marks for any 2 of: <ol style="list-style-type: none"> 1 performers develop specific skills through repeated practice; 2 coach can control the training session / develop weak skills; 3 specific game-related practices can be developed; 4 modifying the environment helps success be achieved; 5 use of reinforcement increases motivation; 	2
2(c)	5 marks for any 5 of: <p>(open loop)</p> <ol style="list-style-type: none"> 1 used for ballistic or fast skills or movements; 2 feedback not used / no time for feedback; 3 retrieval of programmes by making one decision; 4 skills cannot be adjusted during action / skill adjusted at next attempt; <p>(links to autonomous phase)</p> <ol style="list-style-type: none"> 5 (autonomous performers) can perform with little / no conscious thought / control / movements automatic / level-one control / limited attentional demand on skill itself; 6 (autonomous performers) have increased capacity to attend to peripheral stimuli; 7 suitable example of point 6, e.g. games player can pay more attention to movement of other players; 8 memory trace already established so movements automatic; 	5

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Question	Answer	Marks
2(d)	<p>4 marks for 4 of:</p> <p>(sub-max. 2 marks for points 1 to 3)</p> <ol style="list-style-type: none"> 1 perception is making sense of / judging / interpreting information / understanding what the performer needs to do; 2 involves detection, comparison and recognition / DCR process; 3 selectively attend / concentrate / focus on relevant information / select or filter information / ignore irrelevant information / detect appropriate stimuli; 4 accurate selective attention provides appropriate stimuli / more time to perform skill; 5 the same stimuli can be perceived differently; 6 performers perform differently because of different perceptions; 7 accurate perception improves reaction time / performer reacts quicker (improve performance); 8 perception uses memory / more experiences provide more information to draw on; 9 perception uses motor programmes (from LTM) / recognises appropriate movement patterns; 10 perception uses schema to refine / inform processing (to make performance effective); <p>Accept reverse arguments that hinder performance.</p>	4
2(e)(i)	<p>1 mark for:</p> <ol style="list-style-type: none"> 1 reaction time + movement time OR information processing time + movement time OR time from start of stimulus to end of movement; 	1

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Question	Answer	Marks
2(e)(ii)	<p>5 marks for any 5 of:</p> <ol style="list-style-type: none"> 1 number of stimuli / choices / decisions to be made slows RT; 2 open / complex / externally-paced skills slow RT; 3 intensity of stimulus / more compatible / predictability of S—R bond speeds up RT; 4 psychological refractory period / single-channel hypothesis slows RT; 5 dummy / feint / fake pass slows RT; 6 distractions / ability to selectively attend / noise / spectators slow RT; 7 RT slows with age; 8 females (generally) have slower RT than males; 9 low level of fitness / health / skill / tiredness / disability / injury slows RT; 10 long neural pathways / limb length / height slows RT; 11 higher composition of fast twitch fibres speed up RT; 12 RT quicker with hands than with feet; 13 RT quicker with warm up / warmer muscle / higher body temperature; 14 high level of arousal or anxiety speeds up RT / low levels slow RT; 15 past experience / practice / presence of motor programmes speeds up RT; 16 poor environmental / windy conditions slow RT; 17 dehydration can slow RT; 18 release of adrenaline speeds up RT; 19 named drug with relevant effect; <p>Accept reverse arguments.</p>	5
2(f)	<p>4 marks for:</p> <ol style="list-style-type: none"> 1 (positive) skill helps / has beneficial effect on learning / performance of another skill AND e.g. learning of over-arm throw can help skill of tennis serve / netball pass helps basketball pass; 2 (negative) skill hinders / detrimental effect on learning / performance of another skill AND e.g. learning of wrist action in tennis forehand can hinder forehand in badminton; 3 (proactive) previously learned skill affects / helps or hinders learning / performance of new / current / future skill AND e.g. tennis player takes up badminton and previously learned smash in tennis affects learning of overhead clear in badminton; 4 (retroactive) learning of new skill affects / helps or hinders learning / performance of previously learned / past skill AND e.g. tennis player takes up badminton and the learning of badminton overhead clear affects previously learned tennis smash; 	4

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3(a)(i)	<p>2 marks for any 2 of:</p> <table border="1" data-bbox="439 284 1839 810"> <thead> <tr> <th></th> <th>outdoor recreation</th> <th>outdoor education</th> </tr> </thead> <tbody> <tr> <td>why</td> <td>1 for enjoyment / fun / health / fitness</td> <td>for learning;</td> </tr> <tr> <td>when</td> <td>2 leisure time / hobby in own time</td> <td>school time;</td> </tr> <tr> <td>choice</td> <td>3 tends to be voluntary / choice</td> <td>tends to be compulsory;</td> </tr> <tr> <td>who</td> <td>4 tends to be led by self / friends / family</td> <td>tends to be led by school / outdoor education centre / specialists;</td> </tr> <tr> <td>how</td> <td>5 low organisation / structured</td> <td>high organisation / structured;</td> </tr> <tr> <td>performance pyramid</td> <td>6 participation level on the performance pyramid</td> <td>foundation level on the performance pyramid;</td> </tr> </tbody> </table> <p>Accept other valid differences.</p>		outdoor recreation	outdoor education	why	1 for enjoyment / fun / health / fitness	for learning;	when	2 leisure time / hobby in own time	school time;	choice	3 tends to be voluntary / choice	tends to be compulsory;	who	4 tends to be led by self / friends / family	tends to be led by school / outdoor education centre / specialists;	how	5 low organisation / structured	high organisation / structured;	performance pyramid	6 participation level on the performance pyramid	foundation level on the performance pyramid;	2
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3(a)(ii)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> 1 lack of staff expertise or qualifications / staff ratios; 2 cost of transport / specialist equipment / specialist staff; 3 has perceived or real risk; 4 some teachers may be reluctant to take responsibility / lack of parental consent / complex risk assessment / health and safety / media highlighting tragedies; 5 distance from school to natural environment / specialist facilities; 6 not enough time / timetable restrictions / pressure on curriculum / exam work; 7 lack of specialist equipment / facilities; 8 may not be a compulsory part of the curriculum; 	3																					

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Question	Answer	Marks
3(a)(iii)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> 1 (physical benefits) improved physical health / fitness / physical well-being; 2 (mental / emotional benefits) self-awareness / confidence / self-esteem / self-realisation / self-actualisation / self-reliance / overcome fears / mental strength / emotional control / challenge / character building / sense of achievement / sense of freedom / improved mental health / reducing stress; 3 (social benefits) socialisation / teamwork / bonding / sharing / cooperation / communication / trust / loyalty / improved social health; 4 learn new skills, e.g. camp craft / first aid / map reading / survival techniques; 5 leadership / responsibility; 6 cognitive / thinking skills / decision-making / problem-solving / learn how to overcome challenges; 7 commitment / determination; 8 preparation for lifelong participation / for career / gain awards / qualifications; 9 adventure / risk / 'buzz' / 'thrill' / 'rush' / 'sense of risk' / adventure / excitement; 10 respect for countryside / appreciation of natural environment / learn about nature / conservation; 	3
3(b)(i)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> 1 central / lottery / governmental funding; 2 sponsorship / endorsements; 3 appearance money; 4 prize money; 5 grants / scholarships / NGB funding; 6 parental support; 7 part-time employment / self-funded; 8 professional / paid contract / salaried; 9 employed by military / state; 	3

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Question	Answer	Marks
3(b)(ii)	<p>5 marks for any 5 of:</p> <ol style="list-style-type: none"> 1 description of government policies / initiatives / schemes / relating to talent ID and talent development; 2 description of pathways in place to achieve excellence / organisation of sport / structured competition; 3 provision of high-quality facilities / equipment / technology; 4 provision / education of high-quality coaches; 5 provision of centres of excellence / schools / universities / academies; 6 science support / biomechanics / equivalent; 7 medical support / physiotherapy / equivalent; 8 other science-related support / dietary / psychological / equivalent; 9 elitist attitude; 10 widening participation base / school programmes / more reaching top of pyramid; 11 coordinated approach between sporting authorities; 12 education and career support; 	5
3(c)	<p>5 marks for any 5 of:</p> <ol style="list-style-type: none"> 1 to promote a nation through sporting success / shop-window effect / advertising for the country; 2 nation building / foster national pride / feel-good factor / unify states / nation; 3 use as a political weapon / statement about activities in other countries / express political ideologies; 4 increase participation / improve fitness / health of population; 5 develop role models; 6 (hosting) creates infrastructure / transport / housing / regional regeneration; 7 (hosting) economic stimulus / tourism / increase investment; 8 provision of sporting facilities / legacy; 9 demand from the population for national success / opportunity to host; 10 to enable individuals to succeed / reach goals; 	5

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Question	Answer	Marks
3(d)	<p>6 marks for any 6 of:</p> <ol style="list-style-type: none"> 1 low socioeconomic status / lack of money for club membership / kit / equipment / fares; 2 lack of government provision / available facilities / clubs / activities / status of country; 3 lack of transport / distance from 'activity'; 4 do not like exercise / lack of motivation / lack of confidence / low esteem / self-conscious; 5 friends or family do not participate / pressure not to participate / lack of role models; 6 lack of leisure time / need to study / part-time jobs / doing other things; 7 personal safety concerns / do not feel safe walking home; 8 too tired after school / college / work; 9 religious beliefs / cultural expectations / commitments; 10 negative / limited previous experience (at school); 11 disability / poor health / lack of ability / lack of skill; 12 age restrictions for some activities; 13 gender stereotypes; 14 racial stereotypes; <p>Accept any other suitable barriers.</p>	6

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3(e)	3 marks for any 3 of: <table border="1" data-bbox="383 284 1895 810"> <thead> <tr> <th data-bbox="383 284 1137 347">sportsmanship can</th> <th data-bbox="1137 284 1895 347">gamesmanship can</th> </tr> </thead> <tbody> <tr> <td data-bbox="383 347 1137 411">1 help make experience enjoyable</td> <td data-bbox="1137 347 1895 411">stop experience being enjoyable;</td> </tr> <tr> <td data-bbox="383 411 1137 475">2 helps sporting event to flow / run smoothly</td> <td data-bbox="1137 411 1895 475">limits the flow / smooth running of the sporting event;</td> </tr> <tr> <td data-bbox="383 475 1137 579">3 encourage good / calm atmosphere / good will / friendliness / feel-good factor</td> <td data-bbox="1137 475 1895 579">cause bad feeling / retaliation / hostile atmosphere / violence;</td> </tr> <tr> <td data-bbox="383 579 1137 643">4 help officials</td> <td data-bbox="1137 579 1895 643">hinder officials;</td> </tr> <tr> <td data-bbox="383 643 1137 746">5 often be admired / respected / improve status / respect for 'game' / team</td> <td data-bbox="1137 643 1895 746">often be unpopular / decrease status / respect for 'game' / team;</td> </tr> <tr> <td data-bbox="383 746 1137 810">6 promote good role models</td> <td data-bbox="1137 746 1895 810">promote bad role models;</td> </tr> </tbody> </table>	sportsmanship can	gamesmanship can	1 help make experience enjoyable	stop experience being enjoyable;	2 helps sporting event to flow / run smoothly	limits the flow / smooth running of the sporting event;	3 encourage good / calm atmosphere / good will / friendliness / feel-good factor	cause bad feeling / retaliation / hostile atmosphere / violence;	4 help officials	hinder officials;	5 often be admired / respected / improve status / respect for 'game' / team	often be unpopular / decrease status / respect for 'game' / team;	6 promote good role models	promote bad role models;	3
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