



# Cambridge International AS & A Level

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**PHYSICAL EDUCATION**

**9396/12**

Paper 1

**May/June 2023**

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 May/June 2023 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

**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	<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.

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(a)	4 marks for: 1 pivot joint; 2 rotation; 3 gliding joint; 4 flexion / extension / rotation / circumduction / abduction / adduction;  Joint type must be correct to credit type of movement.	<b>4</b>
1(b)	4 marks for: 1 extension; 2 latissimus dorsi / deltoid / pectoralis major; 3 flexion; 4 iliopsoas / sartorius;	<b>4</b>
1(c)	2 marks for: 1 (synergists) assist action of the agonist / prime mover <b>OR</b> stabilise the <b>joint OR</b> act as fixator; 2 (antagonists) relax to allow the agonist / prime mover to work <b>OR</b> oppose movement at the joint;	<b>2</b>
1(d)(i)	3 marks for: 1 (heart rate) 100–220 beats per minute; 2 (stroke volume) 100–200 millilitres; 3 (cardiac output) 10–40 litres per minute;  Must give appropriate units for credit.	<b>3</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(d)(ii)	5 marks for any 5 of: 1 impulse / wave of depolarisation / action potential; 2 (starts at) sinoatrial / SA node; 3 passes through atria <b>OR</b> causes atrial systole / contraction; 4 impasses on to the atrioventricular / AV node; 5 impulse passes down bundle of His / septum (to apex of heart); 6 <b>delays</b> ventricular systole / contraction; 7 impulse spreads through ventricles <b>OR</b> impulse causes ventricular systole / contraction; 8 via Purkyne fibres;	<b>5</b>
1(e)	3 marks for any 3 of: 1 vasomotor control centre / VCC (in the medulla); 2 vasodilation / widening of arterioles (to working muscles); 3 sympathetic nervous impulses <b>OR</b> sympathetic nervous system; 4 relaxation of smooth muscle; 5 opening / dilation / action of pre-capillary sphincters; 6 decreased vascular / peripheral resistance;	<b>3</b>
1(f)	3 marks for any 3 of: 1 <b>increased</b> cardiac output / heart rate / stroke volume; 2 <b>stronger / more</b> forceful heart / cardiac contractions <b>OR increased</b> ejection fraction; 3 <b>increased</b> venous return; 4 <b>greater</b> (diastolic) filling <b>OR greater</b> (diastolic) preload; 5 <b>increased</b> peripheral / vascular resistance; 6 <b>increased</b> blood viscosity;	<b>3</b>

Question	Answer	Marks
1(g)	3 marks for:  1 (diaphragm relaxing) <b>decreases</b> volume of thoracic cavity / <b>increases</b> pressure <b>OR</b> causes expiration <b>OR</b> ribs move down / in; 2 (sternocleidomastoids contracting) <b>increases</b> volume of thoracic cavity / <b>decreases</b> pressure <b>OR</b> causes inspiration <b>OR</b> ribs move up / out; 3 (internal intercostals contracting) <b>decreases</b> volume of thoracic cavity / <b>increases</b> pressure <b>OR</b> causes expiration <b>OR</b> ribs move down / in;	<b>3</b>
1(h)	3 marks for any 3 of:  1 increased breathing rate; 2 increased tidal volume / depth of breathing; 3 reduced concentration gradient; 4 gaseous exchange less efficient / more difficult; 5 less oxygen diffuses into (pulmonary) capillaries / blood; 6 less oxygen binds to haemoglobin <b>OR</b> haemoglobin is less saturated;	<b>3</b>

Question	Answer	Marks
2(a)	3 marks for any 3 of:  1 goal directed; 2 follows technical model; 3 aesthetically pleasing; 4 learned;  Accept other suitable characteristics of skilful performance.	<b>3</b>
2(b)	2 marks for:  1 innate; 2 enduring;  Accept alternative wording.	<b>2</b>



Question	Answer	Marks
2(c)	4 marks for any 4 of:  1 manipulating the environment to get a desired response; 2 e.g. use of target areas / mechanical feeders / equipment; 3 learning is based on (strengthening) S/R bond; 4 trial and error (learning); 5 use of reinforcement / satisfier / rewards to get a desired response; 6 use of punishment / annoyer to decrease the probability of an unwanted response <b>OR</b> use of punishment to weaken S/R bond;	<b>4</b>
2(d)(i)	3 marks for any 3 of:  1 this control is internal <b>OR</b> involves proprioceptors / kinaesthesia; 2 (information used) to detect / correct errors <b>OR</b> make adjustments (during performance); 3 movements initiated by a <b>memory trace</b> ; 4 <b>perceptual trace</b> acts as record of movement made; 5 (perceptual trace) compared to <b>memory trace</b> ; 6 if traces match, movement continues; 7 if traces do not match memory trace is updated <b>OR</b> if traces do not match adjustments are made to movement / corrections; 8 improvement / learning occurs if correct movements are reinforced; 9 <b>memory trace</b> may be incorrect or <b>perceptual trace</b> may be inaccurate;	<b>3</b>
2(d)(ii)	2 marks for any 2 of:  1 some skills are too quick / ballistic; 2 some skills have no time for feedback / adjustment; 3 there are too many stored movements required for memory capacity; 4 closed loop control cannot be used in unpredictable / unstable environments; 5 closed loop control cannot accommodate <b>new</b> skills; 6 closed loop is not applicable to most <b>open</b> skills; 7 closed-loop control cannot accommodate flexible movement patterns;	<b>2</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(e)(i)	3 marks for:  1 (reaction time) is the time from the ball being kicked / flicked / thrown to the <b>start</b> of the save; 2 (movement time) is the time from <b>start</b> of the save to the <b>completion</b> of save; 3 (response time) is the time from the ball being kicked / flicked / thrown to the <b>completion</b> of the save;	<b>3</b>
2(e)(ii)	3 marks for any 3 of:  1 slows / increases response time <b>OR</b> response takes longer; 2 one signal / stimulus is processed before others can be processed <b>OR</b> you can only deal with one stimulus at a time; 3 called single-channel hypothesis / bottleneck theory / limited channel capacity; 4 causes a delay in processing of a second stimulus; 5 opponents can induce this by dummying / feinting / faking;	<b>3</b>
2(f)	4 marks for:  1 (proactive) practising / learning one <b>skill</b> affects performance of another <b>skill</b> in the <b>future OR</b> a skill learned in the <b>past</b> influences one being learned <b>now</b> / in the <b>present</b> ; 2 suitable proactive practical example, e.g. learning an over arm throw of a ball will help with the action of a tennis serve in the future; 3 (retroactive) practising / learning one <b>skill</b> affects the performance of a <b>previously learned skill</b> ; 4 suitable retroactive practical example, e.g. learning a football throw-in could improve your already learned skill of lineout throwing in rugby;	<b>4</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>														
2(g)	<p>2 marks for 2 of:</p> <table border="1" data-bbox="344 284 1928 810"> <thead> <tr> <th data-bbox="344 284 1137 347">type of feedback</th> <th data-bbox="1137 284 1928 347">justification (autonomous performers...)</th> </tr> </thead> <tbody> <tr> <td data-bbox="344 347 1137 411">1 intrinsic;</td> <td data-bbox="1137 347 1928 411">2 can correct their own errors;</td> </tr> <tr> <td data-bbox="344 411 1137 475">3 negative;</td> <td data-bbox="1137 411 1928 475">4 can accept criticism;</td> </tr> <tr> <td data-bbox="344 475 1137 539">5 delayed;</td> <td data-bbox="1137 475 1928 539">6 can remember performance;</td> </tr> <tr> <td data-bbox="344 539 1137 603">7 concurrent;</td> <td data-bbox="1137 539 1928 603">8 can take in information during performance;</td> </tr> <tr> <td data-bbox="344 603 1137 707">9 knowledge of performance;</td> <td data-bbox="1137 603 1928 707">10 can compare / remember successful past performance;</td> </tr> <tr> <td data-bbox="344 707 1137 810">11 extrinsic;</td> <td data-bbox="1137 707 1928 810">12 may need feedback to be technical / specific to performance;</td> </tr> </tbody> </table> <p>Accept other types of feedback and appropriate justifications. Justifications must be appropriate to the type of feedback. Max. one mark for type of feedback. Max. one mark for appropriate justifications.</p>	type of feedback	justification (autonomous performers...)	1 intrinsic;	2 can correct their own errors;	3 negative;	4 can accept criticism;	5 delayed;	6 can remember performance;	7 concurrent;	8 can take in information during performance;	9 knowledge of performance;	10 can compare / remember successful past performance;	11 extrinsic;	12 may need feedback to be technical / specific to performance;	<b>2</b>
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11 extrinsic;	12 may need feedback to be technical / specific to performance;															
2(h)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 drawing of graph, both axes correctly labelled;</li> <li>2 at a low level of arousal / underarousal performance is low;</li> <li>3 as level of arousal increases so does performance;</li> <li>4 at optimum arousal performance is high;</li> <li>5 at a high level of arousal / overarousal performance is low / decreases;</li> <li>6 level of arousal needed for optimum performance depends on the nature of the task;</li> <li>7 level of arousal needed for optimum performance depends on the personality of the performer;</li> <li>8 level of arousal needed for optimum performance depends on the ability / skill level of the performer;</li> </ol>	<b>4</b>														

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Question	Answer		Marks
3(a)(i)	4 marks for any 4 of:		<b>4</b>
sport		physical education	
1	matches are <b>always</b> competitive	only <b>some</b> aspects are competitive;	
2	(played) after school / at clubs / in free time	(learned) in schools / lessons;	
3	for few / selected	for all / everybody;	
4	voluntary	compulsory;	
5	aims to develop specific / few skills	aims to develop general / many skills;	
6	aims to develop fitness <b>OR</b> fitness needed	health-related / relieve stress / increase participation;	
7	aims to develop specific tactics	aims to develop generalised tactics;	
8	coach-led	teacher-led;	
9	gamesmanship may be encouraged	sportsmanship / fair play may be encouraged;	
10	more extrinsic rewards	fewer extrinsic rewards;	
11	stricter rules / laws	may have less strict rules;	
Accept other suitable differences between sport and physical education.			

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
3(a)(ii)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 voluntary <b>OR</b> you choose whether to take part or not;</li> <li>2 fun / enjoyment;</li> <li>3 social / with friends;</li> <li>4 in leisure time;</li> <li>5 standard of skills is not important <b>OR</b> no training needed <b>OR</b> low physical demand;</li> <li>6 often non-competitive / less emphasis on winners / losers;</li> <li>7 non-serious;</li> <li>8 (often) no officials / self-officiated;</li> <li>9 (simplified / adapted) rules;</li> <li>10 limited structure / organisation / no need for a coach;</li> <li>11 (may be played) for fitness / health benefits;</li> </ol>	<b>4</b>
3(b)(i)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 central / lottery / governmental funding;</li> <li>2 sponsorship / endorsements;</li> <li>3 appearance money;</li> <li>4 grants / scholarships / NGB funding;</li> <li>5 parental support;</li> <li>6 part-time employment / self-funded;</li> <li>7 employed by military / state;</li> <li>8 professional contracts;</li> </ol> <p>Accept other suitable ways that elite performers may be funded.</p>	<b>4</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
3(b)(ii)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 national governing body sport-specific initiatives;</li> <li>2 government / state initiatives;</li> <li>3 use of specialist schools / colleges / universities;</li> <li>4 specialist training venues / high-quality facilities / centres of excellence;</li> <li>5 high-quality coaching structure;</li> <li>6 high levels of organisation of the sport;</li> <li>7 structured levels of competition;</li> <li>8 scientific support structures / sports science / fitness / conditioning / biomechanics support;</li> <li>9 medical support structures / physiotherapy support;</li> <li>10 other support structures / nutritional / psychological / media training / performance analysis;</li> </ol>	<b>4</b>
3(c)	<p>6 marks for 6 of:</p> <p>individual (sub-max. 4 marks)</p> <ol style="list-style-type: none"> <li>1 learns <b>sport</b> skills <b>OR</b> knowledgeable in a sport;</li> <li>2 gains enjoyment / fun / intrinsic values;</li> <li>3 achieves satisfaction of success / strives to achieve high standards;</li> <li>4 experiences personal challenge of competition;</li> <li>5 learns <b>life</b> skills <b>OR</b> learn leadership / teamwork;</li> <li>6 possibility of earning a living / career;</li> <li>7 gains fame / praise / medals / status;</li> <li>8 learns a hobby <b>OR</b> occupies a person's time;</li> <li>9 learns cultural values <b>OR</b> learns ethics / fair play;</li> </ol> <p>society (sub-max. 4 marks)</p> <ol style="list-style-type: none"> <li>10 channels people's energies positively;</li> <li>11 social control <b>OR</b> crime prevention;</li> <li>12 more productive workforce;</li> <li>13 facility development / neighbourhood regeneration;</li> <li>14 success at international level / national pride;</li> <li>15 encourages inclusiveness / integration of community;</li> <li>16 creates employment / jobs;</li> </ol>	<b>6</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
3(d)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 spectators of minority sports suffer <b>OR</b> not all sports benefit (impact on facilities);</li> <li>2 (corporate hospitality taking tickets which means) lack of ticket availability <b>OR</b> high ticket prices;</li> <li>3 (inconvenient) changes to start times;</li> <li>4 fewer spectators (needed) at event (reducing atmosphere);</li> <li>5 <b>expensive</b> TV subscriptions;</li> <li>6 <b>expensive</b> merchandise / replica kits;</li> <li>7 (spectators unhappy at) loss of tradition;</li> <li>8 (spectators unhappy at) rule changes;</li> <li>9 (may cause increase in deviant behaviour) unpleasant to watch / negative role models;</li> <li>10 event interrupted to accommodate adverts <b>OR</b> too many commercial breaks;</li> <li>11 franchises may change location of favourite team;</li> </ol> <p>Accept other negative effects of commercialism on spectators.</p>	<b>4</b>
3(e)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 some unhealthy products reflect badly on performer / may not suit the performer's image;</li> <li>2 need to win / pressure to perform well / play when injured to maintain sponsorship;</li> <li>3 performer 'tied' to sponsors' demands / meet media commitments / disruption of recovery / training;</li> <li>4 performer restricted to using / wearing certain products;</li> <li>5 sponsorship can be easily removed <b>OR</b> sponsors may pull out at any time <b>OR</b> short-term contracts;</li> <li>6 sponsorship may lead to cheating / deviant behaviour;</li> <li>7 poor performance may damage <b>future</b> marketability / sponsorship deals;</li> <li>8 performers in some sports miss out <b>OR</b> not all sports / performers are equally sponsored;</li> </ol>	<b>4</b>