



# Cambridge International AS & A Level

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**PHYSICAL EDUCATION**

**9396/13**

Paper 1

**October/November 2022**

**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 2022 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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This document consists of **15** 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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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(a)(i)	1 mark for: 1 pivot (joint);	<b>1</b>
1(a)(ii)	2 marks for: 1 pronator teres; 2 supinator;  Accept other correct muscles.	<b>2</b>
1(b)(i)	2 marks for: 1 (the upward phase from A to B) concentric; 2 (the stationary phase at B) isometric;	<b>2</b>
1(b)(ii)	2 marks for: 1 (the upward phase from A to B) muscle shortens; 2 (the stationary phase at B) muscles stay same length;	<b>2</b>
1(c)	3 marks for: 1 abduction; 2 deltoid; 3 gluteus medius / gluteus minimus;	<b>3</b>
1(d)	4 marks for any 4 of: 1 (from vena cava) flows into <b>right</b> atrium; 2 (from right atrium) through <b>right atrioventricular / tricuspid valve</b> ; 3 (through right atrioventricular / tricuspid valve) into <b>right</b> ventricle; 4 (from right ventricle) through <b>semilunar / pulmonary valves</b> ; 5 (through semilunar / pulmonary valves) into <b>pulmonary artery</b> ;  Answers must be in appropriate sequence.	<b>4</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(e)	<p>4 marks for any 4 of:</p> <p>1 cardiac output depends on heart rate <b>AND</b> stroke volume / heart rate <math>\times</math> stroke volume / <math>Q = SV \times HR</math>;</p> <p>2 dependent on fitness / age dependent;</p> <p>(at rest)</p> <p>3 the performers have different resting heart rates <b>OR</b> the performers have different resting stroke volumes;</p> <p>(maximal exercise)</p> <p>4 <b>higher</b> stroke volume is caused by cardiac hypertrophy / larger heart / stronger heart;</p> <p>5 one performer has high(er) / greater <b>maximal</b> stroke volume;</p> <p>6 one performer has higher <b>maximal</b> heart rate;</p> <p>Accept reverse arguments.</p>	<b>4</b>
1(f)	<p>4 marks for any 4 of:</p> <p>1 (increased venous return) <b>more</b> blood into heart;</p> <p>2 increased diastolic filling / preload;</p> <p>3 increased stretch of cardiac muscle / elastic;</p> <p>4 increased force of contraction / stronger / powerful;</p> <p>5 explained by Starling's law;</p> <p>6 higher percentage of blood ejected from heart <b>per beat</b> / increased ejection fraction;</p> <p>7 end systolic volume lower than at rest;</p>	<b>4</b>

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Question	Answer	Marks
1(g)	<p>3 marks for any 3 of:</p> <p>(in the blood)</p> <ol style="list-style-type: none"> <li>1 oxygen combines with haemoglobin / forms oxyhaemoglobin;</li> <li>2 oxygen <b>dissolves</b> in plasma;</li> <li>3 haemoglobin can carry up to <b>four</b> molecules of oxygen (when fully saturated);</li> <li>4 oxygen diffuses into the muscle cell because of the diffusion gradient / diffusion from high to low concentration / movement from high to low partial pressure;</li> </ol> <p>(at the muscle cell)</p> <ol style="list-style-type: none"> <li>5 (oxygen diffuses from haemoglobin to myoglobin) because myoglobin has higher affinity for oxygen than haemoglobin / haemoglobin has a lower affinity;</li> <li>6 myoglobin acts as a temporary store / transporter of oxygen to the mitochondria / site of aerobic respiration;</li> </ol>	<b>3</b>
1(h)	<p>5 marks for 5 of:</p> <p>(sub-max. 3 marks for points 1 to 4)</p> <ol style="list-style-type: none"> <li>1 thermoreceptors detect <b>increase</b> in temperature;</li> <li>2 baroreceptors detect changes in blood pressure;</li> <li>3 stretch receptors detect inflation of the lungs;</li> <li>4 <b>Hering–Breuer</b> reflex;</li> <li>5 information sent to the respiratory control centre / RCC / medulla;</li> <li>6 increased <b>sympathetic</b> nerve impulses;</li> <li>7 to diaphragm / external intercostal muscles;</li> <li>8 (nor)adrenaline release <b>increases ventilation</b> rate;</li> </ol>	<b>5</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(a)(i)	3 marks for:  1 goal directed; 2 follows technical model; 3 aesthetically pleasing;  Accept other correct relevant characteristics.	<b>3</b>
2(a)(ii)	3 marks for:  1 open: the environment for the goalkeeper changes / is unpredictable / is unstable; <b>OR</b> closed: the environment for the goalkeeper may stay the same; 2 discrete: clear beginning and end to the save; <b>OR</b> serial: made up of discrete (named) elements / many subroutines, e.g. perceive flight of ball then dive to one side then extend arms; 3 simple: one stimulus for the goalkeeper, e.g. the ball / limited information to process / one / few decisions to make / limited cognitive demand / limited perceptual requirements / limited decision making, e.g. the ball; <b>OR</b> complex: many stimuli for the goalkeeper / lots of information to process / many decisions to make / increased perceptual requirements, e.g. the body action of the penalty taker, environmental conditions and decide high / low / left / right / one-handed / two-handed save;	<b>3</b>
2(b)	3 marks for any 3 of:  1 the younger you start the more likely it is for learning to take place; 2 effect of time / opportunity to practise skills; 3 effect of learning from parents / significant others / role models; 4 effect of money / finances; 5 effect of access to clubs / facilities / equipment / coaching; 6 effect of cultural / social acceptance;	<b>3</b>



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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(c)	3 marks for any 3 of: <ol style="list-style-type: none"> <li>1 insight learning / Gestaltist theory;</li> <li>2 involves discovery learning;</li> <li>3 performer experiences the whole movement / holistic / wholeness;</li> <li>4 involves problem solving / thinking about the solution to a problem using previous experiences;</li> <li>5 awareness of link between sub-routines / recognise relationship between stimulus and response / learner draws together many variables / learner develops an understanding of requirements of skill;</li> <li>6 'Eureka moment';</li> </ol>	<b>3</b>
2(d)	3 marks for any 3 of: <ol style="list-style-type: none"> <li>1 some skills have no time / too quick / ballistic for feedback / corrections;</li> <li>2 closed-loop control is not applicable to most <b>open skills</b>;</li> <li>3 there would be too many stored movements for memory capacity;</li> <li>4 not all environments are predictable / stable;</li> <li>5 closed-loop control cannot accommodate new or novel skills;</li> <li>6 closed-loop control cannot accommodate flexible movement patterns;</li> </ol>	<b>3</b>
2(e)(i)	3 marks for: <ol style="list-style-type: none"> <li>1 selective attention;</li> </ol> (points 2 to 4 sub-max. 2 marks) <ol style="list-style-type: none"> <li>2 filter out unnecessary information;</li> <li>3 focus on relevant information;</li> <li>4 too much information for limited processing capacity;</li> </ol>	<b>3</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(e)(ii)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> <li>1 <b>relevant</b> practice / <b>relevant</b> repetition / gain <b>relevant</b> experience / <b>relevant</b> overlearning;</li> <li>2 anticipation / expectation / you see what you are waiting to see;</li> <li>3 point out / highlight relevant cues;</li> <li>4 increase intensity of stimulus;</li> <li>5 manipulate distractions;</li> <li>6 appropriate level of arousal / alertness / motivation;</li> <li>7 drugs that make you more alert;</li> <li>8 use of mental rehearsal / visualisation / imagery;</li> <li>9 transfer of learning linked to past experience;</li> <li>10 make information / practice enjoyable / interesting / memorable;</li> <li>11 appropriate level of hydration;</li> </ol>	<b>3</b>
2(f)	<p>3 marks for 3 of:</p> <ol style="list-style-type: none"> <li>1 suitable example such as dummies / feinting / faking / deflected shot / tennis ball hits net and goes over;</li> </ol> <p>(sub-max. 2 marks for explanation)</p> <ol style="list-style-type: none"> <li>2 increases reaction time / reactions slow / takes longer;</li> <li>3 one / first signal / stimulus is processed;</li> <li>4 before others can be processed / can only deal with one stimulus at a time;</li> <li>5 causes delay in processing / dealing with second stimulus;</li> <li>6 called single-channel hypothesis / bottleneck theory;</li> </ol>	<b>3</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(g)	3 marks for any 3 of: <ol style="list-style-type: none"> <li>1 allow time to practise;</li> <li>2 provide (extrinsic) feedback;</li> <li>3 encourage development of <b>intrinsic</b> feedback;</li> <li>4 provide (positive) reinforcement / praise / rewards / motivation;</li> <li>5 provide (manual / mechanical / verbal / visual) guidance;</li> <li>6 focus on gross / major errors of technique initially;</li> <li>7 as performer progresses more specific errors can be highlighted;</li> <li>8 use of mental rehearsal / imagery / visualisation;</li> </ol> Accept other relevant strategies.	<b>3</b>
2(h)	3 marks for any 3 of: <ol style="list-style-type: none"> <li>1 performer has a drive to achieve a <b>goal</b> / master <b>skill</b>;</li> <li>2 when the task is mastered / goal achieved <b>OR</b> performer fatigued / bored / cannot do skill <b>OR</b> performer sees no reason to try and improve;</li> <li>3 performer has a loss of / decreased motivation / reactive inhibition / loses interest;</li> <li>4 further / new goal needed to re-motivate;</li> </ol>	<b>3</b>

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Question	Answer	Marks														
3(a)(i)	3 marks for any 3 of:  sport has: 1 complex / many rules <b>OR</b> predetermined rules; 2 high structure / organisation / leagues / cups; 3 pre-determined playing area / boundaries; 4 set player numbers; 5 time constraints; 6 playing roles; 7 standardised equipment / facilities; 8 specific kit; 9 officials; 10 tactics / strategies; 11 may have extrinsic rewards; 12 high level of commitment / effort / training / practice;	<b>3</b>														
3(a)(ii)	3 marks for any 3 of: <table border="1" data-bbox="338 823 1890 1315" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">physical education</th> <th style="width: 50%; text-align: center;">physical recreation</th> </tr> </thead> <tbody> <tr> <td>1 compulsory / obligation</td> <td>voluntary / choice / no obligation;</td> </tr> <tr> <td>2 activity done in school time / lessons</td> <td>activity done in leisure time / free time / own time;</td> </tr> <tr> <td>3 formal teaching and learning environment / assessment / serious</td> <td>informal / relaxed / casual / enjoyable;</td> </tr> <tr> <td>4 teacher in authority</td> <td>self-regulated / individual controls activity;</td> </tr> <tr> <td>5 highly structured / activities / rules</td> <td>limited organisation / structure / limited rules;</td> </tr> <tr> <td>6 foundation level on the participation pyramid</td> <td>participation level on the participation pyramid;</td> </tr> </tbody> </table> <p>Accept other valid comparisons.</p>	physical education	physical recreation	1 compulsory / obligation	voluntary / choice / no obligation;	2 activity done in school time / lessons	activity done in leisure time / free time / own time;	3 formal teaching and learning environment / assessment / serious	informal / relaxed / casual / enjoyable;	4 teacher in authority	self-regulated / individual controls activity;	5 highly structured / activities / rules	limited organisation / structure / limited rules;	6 foundation level on the participation pyramid	participation level on the participation pyramid;	<b>3</b>
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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
3(b)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 increase in national prestige / feel-good factor / improve morale;</li> <li>2 success acts as advertisement for the country / shop-window effect;</li> <li>3 improvements in trade / tourism / economy;</li> <li>4 encourage increase in participation / creation of positive role models;</li> <li>5 may allow individuals to succeed / reach goals;</li> <li>6 increase in general health / less strain on health service;</li> <li>7 legacy / provision of sporting facilities / reduces crime / social control;</li> <li>8 demand / expectation from population for national success;</li> <li>9 success can act as confirmation of political superiority / political popularity;</li> </ol>	<b>4</b>
3(c)	<p>5 marks for any 5 of:</p> <ol style="list-style-type: none"> <li>1 described government initiatives;</li> <li>2 described National Governing Body sport-specific initiatives;</li> <li>3 selection procedures / talent-identification programmes;</li> <li>4 use of specialist schools / colleges / universities;</li> <li>5 specialist training venues / centres of excellence;</li> <li>6 elite coaching structure / high-level coaches;</li> <li>7 role of development programmes / talent pathways;</li> <li>8 structured levels of competition;</li> <li>9 progression / communication between schools / clubs / local / regional / national;</li> <li>10 scientific support structures / sports science / fitness / conditioning / biomechanics support;</li> <li>11 medical support structures / physiotherapy support;</li> <li>12 other support structures / nutritionist / psychological / media training / performance analysis;</li> <li>13 description of funding methods / scholarships / grants / state-funded / national lottery;</li> </ol>	<b>5</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
3(d)	<p>3 marks for 3 of:</p> <p>1 (gamesmanship) dysfunctional behaviour within the rules / bending the rules;</p> <p>sub-max. 2 marks</p> <p>2 holding the ball in the corner to use up time;</p> <p>3 sledging during a cricket match to distract opponents;</p> <p>4 taking unnecessary toilet breaks to recompose and focus;</p> <p>5 feigning injury to use up time;</p> <p>6 calling coach / trainer unnecessarily onto court / pitch to gain advice;</p> <p>Accept alternative examples.</p>	<b>3</b>
3(e)	<p>3 marks for any 3 of:</p> <p>1 run / managed by a company / business;</p> <p>2 (usually) primary aim is to make profit;</p> <p>3 financed by high / monthly membership fees;</p> <p>4 members only / may be able to 'pay as you go';</p> <p>5 may be for the few / elitist / feel special;</p> <p>6 may provide high-quality facilities;</p> <p>7 possible personal trainer / better trainers;</p> <p>8 may provide a service (local) government do not;</p>	<b>3</b>

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Question	Answer	Marks
3(f)	<p>5 marks for any 5 of:</p> <ol style="list-style-type: none"> <li>1 lack of money;</li> <li>2 lack of facilities / clubs / activities / equipment;</li> <li>3 no transport / distance from 'activity';</li> <li>4 do not like exercise / lack of motivation;</li> <li>5 lack of confidence / esteem / self-conscious / do not think any good;</li> <li>6 friends or family do not participate / peer pressure not to participate;</li> <li>7 lack of role models;</li> <li>8 limited time due to study / part-time jobs / doing other things;</li> <li>9 risk of / not allowed out at night / do not feel safe walking home;</li> <li>10 too tired after school / college / work;</li> <li>11 religious / cultural beliefs / norms;</li> <li>12 stereotyping / discrimination / prejudice;</li> <li>13 negative / limited previous experience;</li> <li>14 poor health / injury / disability;</li> <li>15 age restrictions for some activities;</li> </ol> <p>Accept alternative barriers.</p>	<b>5</b>
3(g)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> <li>1 (anatomical benefits) to build muscle / increase red blood cell count;</li> <li>2 (fitness benefits) increase speed / strength / power / endurance / decreased reaction time;</li> <li>3 mask pain;</li> <li>4 (psychological benefits) steady nerves / increase arousal / increase aggression / reduce anxiety;</li> <li>5 delay fatigue / train harder / recover quicker / heal faster;</li> <li>6 performer's win-at-all-costs attitude;</li> <li>7 pressure from others (from coaches / sponsors / media / family);</li> <li>8 money / fame / to extend career / to stay at top;</li> <li>9 belief that everyone else is taking drugs <b>OR</b> the only way to succeed <b>OR</b> create a level playing field;</li> <li>10 lose weight / make weight category;</li> <li>11 granted TUE (therapeutic use exemption) <b>OR</b> prescribed for health benefits;</li> <li>12 punishments are not a sufficient deterrent;</li> <li>13 may become addicted to a drug <b>OR</b> other drugs no longer as effective;</li> </ol>	<b>4</b>