Cambridge Assessment International Education

Cambridge International AS & A Level

PHYSICAL EDUCATION **9396/13**

Paper 1 **May/June 2023**

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

[Turn over

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)	5 marks for: 1 extension; 2 triceps brachii; 3 concentric; 4 plantar flexion; 5 gastrocnemius / soleus;	**5**
1(b)	2 marks for: 1 (knee joint) flexion **AND** extension; 2 (shoulder joint) any 2 of: adduction / abduction / rotation / circumduction; Accept flexion and extension for point 2 if not credited in point 1.	**2**
1(c)	2 marks for any 2 of: 1 bones fit more **tightly** together; 2 **stronger** muscles / tendons; 3 **many** / **strong** ligaments; 4 menisci help bones fit together; 5 **stronger** joint capsule;	**2**
1(d)(i)	3 marks for: 1 A aorta; 2 B **right** atrium; 3 C semilunar valve / aortic valve;	**3**
1(d)(ii)	4 marks for any 4 of: 1 valves prevent backflow of blood; 2 atrioventricular / AV valves forced open by blood pressure **AND** blood enters ventricles; 3 ventricles contract / systole **AND** atrioventricular / AV / tricuspid / bicuspid valves **forced** closed; 4 semilunar valves **forced** open; 5 after blood leaves heart semilunar valves **forced** closed;	**4**

Question	Answer	Marks
1(e)	4 marks for any 4 of: 1 increase in temperature of heart muscle / myocardium; 2 warmer myocardium speeds up conduction process; 3 cardiac / heart muscle / myocardium becomes more elastic / distends further; 4 allows greater (diastolic) filling of heart with blood / increased end diastolic volume; 5 venous return increases during exercise; 6 stretching cardiac / heart muscle / myocardium; 7 (increase in stretch) stimulates sinoatrial node / SAN; 8 increases rate of impulses (of sinoatrial node); Accept opposites to decrease heart rate.	**4**
1(f)	2 marks for any 2 of: 1 (blood velocity high in arteries / aorta) **because** of contraction of heart **OR because** total cross-sectional area of vessels is comparatively small / narrow / small lumen; 2 (velocity decreases) **because** of increasing total cross-sectional area; 3 (velocity decreases) **because** of peripheral resistance of arterioles / capillaries; 4 (velocity decreases) **to** permit exchange / diffusion of gases / nutrients / waste products;	**2**
1(g)(i)	4 marks for 4 of: 1 rings of **cartilage**; 2 maintain passage / prevent collapse of bronchi; 3 contain cilia / ciliated epithelial cells / goblet cells / secrete mucus; 4 remove dust / particles / pathogens; 5 **smooth muscle** / muscular walls; 6 dilate / constrict airways; Max. 2 marks for structures alone. Allow other suitable descriptions. Description must be appropriate for the structure.	**4**

Question	Answer	Marks
1(g)(ii)	2 marks for 2 of: 1 separate lungs from ribs / chest / thoracic wall; 2 secrete (pleural) fluid between membranes; 3 allow friction-free movement / sliding of lungs over chest / thoracic wall;	**2**
1(h)	2 marks for: 1 **dissolved** in plasma; 2 **combined** with proteins / haemoglobin / as carbaminohaemoglobin;	**2**

Question	Answer	Marks
2(a)	3 marks for any 3 of: 1 (suitable) **motor ability** named, e.g. coordination / reaction time / balance / agility / strength; 2 needed as foundation / basis to build skill learning / building block, e.g. you need coordination / agility / balance to be able to kick a ball; 3 develop **fundamental motor skill** of **kicking**; 4 (fundamental motor skill) kicking needs practice / repetition / reinforcement / feedback; 5 (fundamental motor skill) gets refined / adapted / more complex / becomes kicking a ball (in a team game) through teaching / coaching;	**3**
2(b)	3 marks for any 3 of: 1 teaches learner what response is correct / incorrect **OR** strengthens the S/R bond; 2 performers develop specific skills through **repeated practice**; 3 coach can control the skills used in practice session / develop weak skills; 4 specific game-related practices can be developed; 5 modifying / shaping the environment helps success be achieved; 6 use of **reinforcement** increases motivation;	**3**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(c)</td><td>4 marks for any 4 of:

<table>
<tr><th></th><th>open-loop control</th><th>closed-loop control</th></tr>
<tr><td>1</td><td>no conscious control</td><td>may involve (some) conscious control;</td></tr>
<tr><td>2</td><td>movements are automatic</td><td>use of memory trace;</td></tr>
<tr><td>3</td><td>no (time for) feedback during the movement</td><td>involves (intrinsic) feedback during the movement;</td></tr>
<tr><td>4</td><td>no adjustments during the movement</td><td>performer able to adjust during the movement;</td></tr>
<tr><td>5</td><td>whole movement performed</td><td>comparison to perceptual trace;</td></tr>
<tr><td>6</td><td>only for fast / rapid actions</td><td>does not apply to fast / rapid actions;</td></tr>
<tr><td>7</td><td>may accommodate new / flexible skills</td><td>cannot accommodate new / flexible skills;</td></tr>
<tr><td>8</td><td>used mainly for closed skills / predictable / stable environments</td><td>used mainly for open skills / unpredictable / unstable environments;</td></tr>
<tr><td>9</td><td>used for skills that are well-learned</td><td>used for skills that may not be well-learned;</td></tr>
</table>
</td><td>4</td></tr>
<tr><td>2(d)(i)</td><td>3 marks for any 3 of:

1 occurs during / after performance;
2 used to adapt / modify a response OR used to update memory;
3 (uses) sensory consequences;
4 information from knowledge of performance / kinaesthesis / intrinsic feedback / how it felt;
5 (uses) movement outcomes / response outcomes;
6 information from knowledge of results / success / failure;</td><td>3</td></tr>
</table>

Question	Answer	Marks
2(d)(ii)	3 marks for any 3 of: 1 ensure initial basic movement / skill / generalised motor programme is well learned; 2 introduce **varied** practice conditions; 3 provide (frequent) feedback; 4 provide plenty of information; 5 use of slow-motion practice / video analysis / visual aids / guidance; 6 practice relevant to game / conditioned / small-sided games; 7 tasks should be challenging; 8 include transferable information from other sports / ensure performers are aware of transfer possibilities;	**3**
2(e)	4 marks for any 4 of: 1 unlimited capacity; 2 unlimited duration; 3 store of past experiences; 4 store of motor programmes / schema / skills; 5 stored as mental image of movement (to be performed); 6 correct / meaningful / important / rehearsed / relevant / learned / repeated / practised information is stored; 7 information moves between long-term memory and **short-term memory**;	**4**
2(f)	3 marks for: 1 concurrent occurs during performance **AND** for example coach praising part way through gymnastics routine; 2 intrinsic is from within / kinaesthetic **AND** for example the feeling of a perfect gymnastics movement; 3 negative is criticism of performance **AND** for example a gymnastics coach telling you what you did wrong; Requires use of examples from one named physical activity for credit.	**3**
2(g)	3 marks for: 1 (positive) learning one skill **benefits** the learning / performance of another skill; 2 (proactive) learning one skill can affect the learning / performance of another skill in the future / a skill learned in the past influences one being learned now / in the present; 3 (bilateral) learning one skill on a limb influences the learning / performance of skill of limb on the other side of the body;	**3**

Question	Answer	Marks
2(h)	4 marks for any 4 of: 1 increases in motivation / drive / arousal result in increases in performance; 2 performance = habit × drive; 3 linear / straight line / proportional relationship; 4 drawing of diagram with both axes correctly labelled; 5 but, not realistic, performer cannot keep improving; 6 increase in arousal = increase in likelihood of **dominant response**; 7 if dominant response is well learned this will lead to increase in performance; 8 if dominant response is not well learned this will lead to a poorer performance;	**4**

Question	Answer	Marks
3(a)	6 marks for any 6 of: 1 spontaneous; 2 for everyone / anyone; 3 non-serious; 4 intrinsic value; 5 non-productive **OR** result not important; 6 childlike activity; 7 freedom of choice / free will / free time / voluntary; 8 limited moral obligation / commitment; 9 play anywhere / choice of space / venue; 10 no pre-determined rules **OR** few / modified / made-up rules; 11 negotiated involvement / ending; 12 self-officiated **OR** low level of organisation; 13 learn decision-making / problem-solving skills; 14 learn to share / negotiate / learn social interaction / learn to work with others; 15 learn leadership and response to leadership; 16 learn physical skills; 17 encourages confidence; 18 allows children to learn the rules of life / life skills; 19 freedom from authority; 20 mastery over reality / opportunity to pretend / fantasy / creativity; 21 learn to be fair / to make judgements / to make moral decisions;	**6**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>3(b)</td><td>4 marks for any 4 of:

<table>
<tr><th colspan="2">sport</th><th>physical recreation</th></tr>
<tr><td>1</td><td>competitive / winners and losers / extrinsic rewards</td><td>lower levels of competition / intrinsic rewards;</td></tr>
<tr><td>2</td><td>selected / for few</td><td>for all / everybody;</td></tr>
<tr><td>3</td><td>aims to develop specific / few skills / fitness / improve performance</td><td>aims to develop many skills / health-related fitness;</td></tr>
<tr><td>4</td><td>obligation / serious commitment</td><td>non-serious involvement;</td></tr>
<tr><td>5</td><td>requires commitment / training / coaches</td><td>voluntary / less commitment / no requirement for trainer / coach;</td></tr>
<tr><td>6</td><td>excellence / elite OR performance level of pyramid</td><td>participation level of performance pyramid;</td></tr>
<tr><td>7</td><td>set location / area</td><td>location decided by participants;</td></tr>
<tr><td>8</td><td>set rules / organisation / officiated</td><td>few rules / limited organisation / structure / no officials;</td></tr>
<tr><td>9</td><td>set times</td><td>no set time / done in leisure / own time;</td></tr>
<tr><td>10</td><td>may have media interest / spectators / sponsorship / funding</td><td>no media interest / spectators / sponsorship / funding;</td></tr>
</table>
</td><td>4</td></tr>
</table>

Question	Answer	Marks
3(c)	4 marks for any 4 of: 1 sports medicine; 2 physiotherapy; 3 sports rehabilitation; 4 biomechanical analysis; 5 technological developments; 6 sports psychologists; 7 dietary / nutritional advice; 8 fitness testing; 9 strength and conditioning coach / programme; 10 skills coaching; 11 performance / data analysis; Accept alternative wording.	**4**
3(d)	4 marks for any 4 of: 1 run / managed by companies / businesses; 2 trading on normal profit-loss basis / need for profit / self-financed; 3 only available to members / may be able to 'pay as you go'; 4 may be for the few / elitist / feel special; 5 may be high quality / modern facilities; 6 require membership fees; 7 usually have longer opening hours; 8 possibility of personal trainers / programmes available; 9 may provide a service that government do not;	**4**

Question	Answer	Marks
3(e)(i)	4 marks for any 4 of: 1 insufficient money / funding not available; 2 ticket sales / income from spectating insufficient to cover costs of providing event; 3 lack of money to cover the prize money / appearance money to attract top performers; 4 lack of money to accommodate performers / officials demands; 5 lack of money to pay for high cost of security; 6 lack of money to hire high-quality facilities / to provide spectator access; 7 lack of money to promote / advertise event; 8 lack of excess funds to reinvest and develop sport further / develop grass roots;	**4**
3(e)(ii)	4 marks for any 4 of: 1 increased funding for sport; 2 higher standards of performance; 3 increased opportunity to watch sport / increased live coverage / more sport(s) seen; 4 high-quality stadia / facilities; 5 enhanced viewing experience / interactive technology; 6 increase participation / attracts more spectators; 7 greater awareness / knowledge of the sport; 8 creates sporting role models / increasing fame of performers; 9 rules changed to become more exciting spectacle; 10 reduced rule-breaking / gamesmanship by performers; 11 reduction of hooliganism / spectator violence; 12 reduction in irresponsible reporting; 13 globalisation of the sport;	**4**

Question	Answer	Marks
3(f)	4 marks for any 4 of: 1 need to win / win-at-all-costs attitude; 2 frustration; 3 referee's decisions; 4 losing / unable to play well; 5 retaliation / being fouled; 6 local derby / rivalry; 7 importance of game; 8 previous experience of opponents; 9 hostile crowd; 10 gamesmanship / verbal abuse; 11 instinct / trait; 12 social learning / copying others / reinforcement; 13 overarousal of players; 14 nature of activity / physical contact sports / presence of weapons / cues, e.g. hockey sticks; 15 dehumanisation of players, e.g. helmets; 16 use of drugs; 17 emotional / off-the-pitch issues; 18 encouragement / pressure from coach / significant others;	**4**