



Cambridge International AS & A Level

PHYSICAL EDUCATION

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Paper 3

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

This document consists of **13** 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)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> 1 only usable form of energy in body OR energy currency of body; 2 high-energy phosphate compound / molecule OR high-energy bonds OR potential energy; 3 phosphate bond / ATP is broken down to release energy; 4 $ATP \rightarrow ADP + P + \text{energy}$; 5 $\text{energy} + ADP + P \rightarrow ATP$; 6 coupled reaction OR combination of endothermic AND exothermic reactions; 	4
1(b)	<p>6 marks for 6 of:</p> <p>(availability of oxygen)</p> <ol style="list-style-type: none"> 1 if insufficient oxygen then anaerobic energy systems are used; 2 if sufficient / enough oxygen then aerobic energy system is used; 3 if exercise is high intensity then anaerobic systems used OR if exercise is low / moderate intensity then aerobic system used; <p>(level of fitness) (sub-max. 5 marks)</p> <ol style="list-style-type: none"> 4 fitter performer will use aerobic system more / earlier / quicker OR less time using anaerobic systems; 5 fitter athlete can transport / use greater volumes of oxygen; 6 because of aerobic adaptations to training OR named adaptation, e.g. more mitochondria; 7 fitter performer can work aerobically at higher intensity; 8 because OBLA reached later / delay OBLA; 9 fitter performers may use lactic acid system for longer; 10 because better at buffering / removing lactic acid OR greater tolerance to lactic acid; 11 fitter performer can use ATP/PC system for longer; 12 due to greater stores of PC / quicker replenishment of PC stores; 	6
1(c)(i)	<p>2 marks for:</p> <ol style="list-style-type: none"> 1 (strength endurance) the ability to sustain repeated muscular contractions OR the ability of the muscles to withstand fatigue during prolonged work; 2 (static strength) the ability to apply a force where the length of the muscle does not change OR the ability to apply a force where there is no movement at a joint OR the ability to apply a contract muscle isometrically; <p>Credit other suitable descriptions of each type of strength.</p>	2

Question	Answer	Marks
1(c)(ii)	4 marks for any 4 of: 1 calibrate the dynamometer OR adjust to suit subject; 2 squeeze the dynamometer as hard as possible; 3 for (approximately) 3–5 seconds; 4 arm is static OR held at 90° angle OR arm is moved (downwards) as test is performed; 5 test is performed 3 times (with rest between attempts); 6 (best) score is recorded AND compared to normative data; 7 dominant hand only OR left- and right-hand scores are compared; 8 test must be performed consistently for valid results;	4
1(c)(iii)	3 marks for: 1 (repetitions) 10–20; 2 (sets) 3–8; 3 (resistance) 40–75% of one repetition maximum / 1 RM / the maximum you can lift once;	3
1(c)(iv)	2 marks for: 1 (energy system) lactic acid / glycolytic system; 2 (food fuel) glucose / glycogen / carbohydrates;	2
1(d)	5 marks for any 5 of: 1 body composition is the percentage of body weight / mass that is fat compared to lean body mass; 2 mass / weight divided by height squared OR based on height and mass / weight; 3 a BMI of more than 30 is classed as obese; 4 a high BMI can lead to health problems; 5 elite athletes often have an extreme BMI; 6 elite athletes tend to have a high percentage of muscle; 7 elite athletes generally have very low percentage of fat; 8 muscle weighs more than fat; 9 elite athletes tend to have high bone density; 10 BMI does not distinguish between types of tissue; 11 BMI is not a valid test of body composition for elite athletes;	5

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Question	Answer	Marks
1(e)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> 1 blood is removed from performer, stored AND reinjected; 2 use of blood transfusions OR injections of EPO OR injections of red blood cells / haemoglobin OR injections of synthetic oxygen carriers; 3 increase number of red blood cells / haemocrit / haemoglobin; 4 more oxyhaemoglobin formed; 5 improves oxygen carrying capacity of blood; 6 more oxygen to working muscles; 7 increases aerobic capacity / stamina / VO₂ max; 	4

Question	Answer	Marks
2(a)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> 1 highly / very competitive; 2 high levels of alertness / focused; 3 works at a fast pace / efficient; 4 perfectionist tendencies; 5 high task persistence; 6 more aggressive / short-tempered / quick to become angry / more passionate; 7 needs to be in control; 8 highly stressed; 	3
2(b)	<p>4 marks for any 4 of:</p> <ol style="list-style-type: none"> 1 links between personality AND competition / competitiveness; 2 explains how people react to success / competition; 3 need to achieve / Nach AND need to avoid failure / Naf; 4 (Nach) show approach behaviour / task persistence / take risks / like a challenge / enjoy evaluation; 5 (Naf) show avoidance behaviour / give up easily / avoid responsibility; 6 an interactionist approach; 7 dependent on perception of success / incentive of task; <p>Accept other suitable characteristics of Nach and Naf.</p>	4

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Question	Answer	Marks
2(c)(i)	3 marks for any 3 of: 1 (actual) productivity = potential productivity – losses due to faulty processes; 2 (actual) productivity is how the group performed; 3 (potential productivity) is the best possible performance of the group; 4 (losses due to faulty processes) are any actions that negatively affect performance; 5 faulty processes may be caused by coordination or motivation problems;	3
2(c)(ii)	4 marks for any 4 of: 1 social loafing / lack of effort / motivation AND e.g. footballer does not try to track back after losing ball; 2 Ringelmann effect / lack of coordination / communication / size of group AND e.g. rugby move from scrum breaks down as a player runs wrong line; 3 lack of identifiable roles / goals / accountability AND e.g. basketball player is not clear what his role is in defence; 4 lack of cohesion / belief that others are not trying / presence of cliques AND e.g. netballer thinks teammate is not trying so stops trying; 5 poor leadership / tactics / strategies AND e.g. volleyball team keep setting to a weak spiker; 6 injury / illness AND e.g. playmaker in hockey is injured; 7 level of competition too high or low / unachievable goals AND e.g. opposition in rugby are just too good; 8 environmental factors / weather / crowd AND e.g. hostile crowd at football match;	4

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Question	Answer	Marks
2(d)	<p>6 marks for any 6 of: (max. 5 marks if no practical example used)</p> <ol style="list-style-type: none"> 1 leader should choose the approach that suits the situation; 2 if situation is dangerous / time is limited, e.g. rock climbing, autocratic is preferable; 3 if situation has no time constraints / focus is on enjoyment / group is small democratic is preferable; 4 (leader characteristics) leader's personality / skill level / experience / preferred leadership style OR leader prefers one leadership style (which will affect leader behaviour); 5 leader may choose the approach that suits their personality; 6 leader should choose the approach that suits the members; 7 if members are beginners / males / young, autocratic style may be preferred; 8 if members are experienced / females / older, democratic style may be preferred; 9 if leader behaviour matches member characteristics AND situational characteristics then performance / satisfaction will be high; 10 if the requirements of situation and member characteristics do not match then performance / satisfaction will be reduced; 	6
2(e)	<p>4 marks for:</p> <ol style="list-style-type: none"> 1 (short-term) a goal that is measured in days / weeks / microcycle; 2 (example) score a try in next week's rugby match; 3 (long-term) a goal that is measured in months / years / macrocycle; 4 (example) be selected for the Olympic boxing squad for 2024; 	4
2(f)	<p>3 marks for:</p> <p>(for optimum performance)</p> <ol style="list-style-type: none"> 1 (personality) introverts need lower arousal; 2 (ability level) novices need lower arousal OR elite need higher arousal; 3 (complexity) complex skills need lower arousal OR simple skills need higher arousal: 	3

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Question	Answer	Marks
2(g)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> 1 aggression is a trait; 2 innate characteristic / genetic / inherited / natural; 3 stable / enduring characteristic; 4 inevitable behaviour (that builds up in our body); 5 aggression needs a release (or will be dangerous to well-being); 6 this release is called catharsis; 7 sport can provide an acceptable way to release aggression; 	3

Question	Answer	Marks
3(a)(i)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> 1 not allowed to compete; 2 married women not allowed to attend stadium / spectate / coach; 3 single women were allowed to spectate; 4 priestess (of temple of Demeter) allowed to attend; 5 women had separate Games; 	3
3(a)(ii)	<p>5 marks for any 5 of:</p> <ol style="list-style-type: none"> 1 no women's participation in 1896 OR only role of women was to present wreaths to winners; 2 limited involvement / some women's sport introduced in 1900 (tennis, golf); 3 low numbers of participants before Second World War; 4 role of Alice Milliat / Women's Olympics created in response to IOC refusal to allow women's athletics in 1920 / 1924; 5 mixed-gender events included; 6 all sports should have a male and female equivalent; 7 acceptance of women as judges / officials; 8 women co-opted on to IOC; 9 some IOC members are women; 10 IOC conference on women and sport; <p>Accept other suitable descriptions.</p>	5

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Question	Answer	Marks
3(b)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> 1 enhancing national prestige; 2 promoting a political ideology; 3 platform for political confrontation; 4 using athletes as pawns for their governments; 5 preventing certain athletes from competing; <p>Accept specific historical examples that have been used at the Olympic Games.</p>	3
3(c)	<p>5 marks for any 5 of:</p> <p>(transition happened because)</p> <ol style="list-style-type: none"> 1 early modern Olympic Games were amateur only OR amateurism seen as a noble concept; 2 amateurism excluded those who could not afford to take part; 3 Olympic success requires full-time training; 4 costs of equipment / facilities / travel; 5 costs of coaches / physio / nutritionist / psychologist / support staff; 6 Olympic Games needs the best athletes (for commercial reasons); 7 abuse of amateur ideals / shamateurs (when Games were amateur); 8 professional athletes have proved to be positive role models; 9 professionalism no longer seen as a negative concept; 10 other major events had professionals (e.g. World Cup) (while Olympics did not allow them) OR conflict with other major events; 	5
3(d)	<p>3 marks for any 3 of:</p> <ol style="list-style-type: none"> 1 high income; 2 sponsorships / endorsements; 3 public appearances / opportunities for work; 4 media spotlight OR gain fame OR become role models; 5 honour of representing country; 6 competing at the highest level in sport; 7 socialising with other elite athletes; 8 once-in-a-lifetime experience / opportunity to travel OR cultural experience; 	3

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Question	Answer	Marks
3(e)(i)	3 marks for any 3 of: <ol style="list-style-type: none"> 1 use of drugs / PEDs; 2 cheating; 3 gamesmanship; 4 use of violence / aggression; 5 bribery of officials; 6 age / gender falsification; 7 modification of equipment; 8 deliberately losing a match / tanking to gain a better draw in the next round; 9 match fixing; 	3
3(e)(ii)	4 marks for any 4 of: <ol style="list-style-type: none"> 1 drug testing / out-of-season testing; 2 punishments; 3 funding to World Anti-Doping Agency / WADA OR closer monitoring of national anti-doping agencies; 4 biological passport; 5 education; 6 use of positive role models; 7 better / stronger officiating OR better vetting of officials; 8 support of National Olympic Committees (NOC); 9 encourage whistleblowing; 10 liaise with betting companies; 11 age-verification systems; <p>Accept other suitable methods.</p>	4

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Question	Answer	Marks
3(f)	4 marks for any 4 of: 1 in the name of every athlete; 2 spoken by one athlete at the opening ceremony (from host nation); 3 to respect / abide by rules; 4 without doping / drugs; 5 in spirit of sportsmanship / fair play; 6 for the glory of sport; 7 and the honour of the team; 8 (oath taken) while holding (a corner of) Olympic flag; 9 (usually) in the language of the host city; 10 separate oaths taken by coaches / officials;	4