Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICAL EDUCATION **0413/11**

Paper 1 Theory **May/June 2020**

MARK SCHEME

Maximum Mark: 100

Published

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & AS Level components, and some Cambridge O Level components.

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[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.

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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.

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5 <u>'List rule' guidance</u> (see examples below)

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 <u>Calculation specific guidance</u>

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 <u>Guidance for chemical equations</u>

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	Answers	Marks
1	A: femur; B: tibia;	**2**

Question	Answers	Marks
2(a)(i)	fartlek training;	**1**
2(a)(ii)	*3 from:* easily adapted for different physical activities; easily adapted to the fitness level of the performer; trains both aerobic and anaerobic systems; provides variety of activities to prevent boredom / becoming demotivated; provides lower intensity activities to aid recovery; allows for longer periods of exercise; ideal for beginners / performers with lower fitness levels; easy to overload;	**3**
2(b)	*3 from:* to increase body temperature; to increase heart rate; to increase blood flow; to increase oxygen supply to muscles; to stretches the muscle to get them ready for action / increases flexibility; to reduce risk of injury; to increase the range of movement at joints;	**3**
2(c)	*1 mark for each FITT principle explained.* *3 from:* (frequency) increase the number of sessions that takes place each week; (intensity) indicate how the session is increased so the performer works harder / longer; (time) increase the time spent training during each training session; (type method of training) include another method of using Fartlek training by using cycling / swimming sessions or training on a different terrain such as a beach;	**3**

Question	Answers	Marks
3(a)(i)	performance;	**1**
3(a)(ii)	foundation;	**1**
3(b)	*2 from:* age / maturity: younger performers have less experience / physical maturity may restrict developing certain skills / may not have developed the physical attributes required to perform well / impact of school / work commitments / family to relevant age group; culture: some cultures may not provide opportunities to develop certain skills due to restrictions on performers / a person who has certain abilities will use them in sports that are particularly popular in that country; motivation: the willingness and determination to succeed a person has / a performer who lacks motivation is unlikely to develop skills and may drop out when training becomes difficult; anxiety: some performers are naturally more anxious than others / concerned they may let themselves or others down / if a performer sees skills being too difficult, they will take a negative approach towards the outcome / expect to fail; arousal conditions: certain skills require different levels of skills, e.g. if a person has a high level of arousal they may not be able to control fine motor skills / / arousal levels may affect focus with may result in being distracted / the importance of a game can affect arousal levels; facilities: the kind of facilities available and can be accessed / the cost of facilities may affect the ability to access facilities; environment: where a person lives will affect the type of sport e.g. if a person lives in a mountainous area, they are likely to have access to snow that will enable them to ski/ effect of weather on skills; teaching and coaching: the higher quality and quantity of coaching / teaching that is available will affect the speed at which skills are developed; *Also accept* gender: up to the age of 12 there will be little physical difference between males and females but as they enter puberty males will generally become bigger / stronger than females of the same age which may make it easier to develop certain skills / females often maintain greater flexibility which enable them to develop certain skills more easily;	**2**

<table>
<tr><th>Question</th><th>Answers</th><th>Marks</th></tr>
<tr><td>4(a)</td><td>2 from:

carries oxygen / permits aerobic respiration;

reacts with oxygen to form oxyhaemoglobin;

carries carbon dioxide;</td><td>2</td></tr>
<tr><td>4(b)</td><td>increases the number of red blood cells / red blood cell count;
haemoglobin concentration increases;
blood becomes more viscous;</td><td>1</td></tr>
<tr><td>4(c)</td><td><table><tr><td>blood vessel</td><td>feature of wall thickness</td></tr><tr><td>capillary;</td><td>walls are very thin / one cell thick</td></tr><tr><td>artery</td><td>thick muscular walls;</td></tr></table></td><td>2</td></tr>
</table>

Question	Answers	Marks
5	*max 2 marks max for features1 mark for each feature* *max 2 marks mark for each description* *features:* *2 from:* able to cope with stress; can control emotions; feeling good / (good) self-esteem / confidence / motivation; *2 from:* *able to cope with stress*: when participating in physical activities a performer is able to cope with the pressures of an important game (cup final) / able to play in a big game and perform well / a performer is able to cope with responsibility. e.g. taking a penalty in a game; *can control emotions*: when decisions go against them a performer does not react badly to officials / if a performer makes a mistake, they do not allow their performance to suffer/ can accept winning and losing without an extreme response; *feel good / self- esteem / confidence / motivation*: a player`s self- esteem increases when they play well / feels that they are an important part of a team / can find positives in a performance even when they lose / wants to do well;	**4**

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Question	Answers	Marks
6(a)	*max 2 marks for types of guidance.* *max 2 marks for descriptions.* *guidance:* *2 from:* visual; verbal; mechanical; manual; *descriptions:* *2 from:* *activity – e.g. gymnastics:* visual: watching a demonstration of a vault by an elite performer to see how the skill is performed; verbal: a coach can describe the sequence of movements in a floor routine so the performer does not have to stop after each movement; mechanical: use of a harness to support the performer when doing a somersault as it allows then to practice complex moves and prevents them from falling and injuring themselves; manual: supporting the performers legs when practicing a handstand to allow them to feel the position of balance; *accept other activities and examples* *descriptions must relate to named activity*	**4**

Question	Answers	Marks
6(b)	*feedback:* *1 from:* extrinsic; knowledge of results; *explanation* *1 from:* *extrinsic:* coaches can make beginners aware of basic skills and techniques / can motivate a performer / feedback can be specific to a skill / easy to set targets / goals / ensures inexperienced performer have / understand a way forward / helps performers start to develop an ability to use intrinsic feedback / extrinsic feedback will often come from qualified coaches so quality of feedback should be good; *knowledge of results:* feedback is immediate / the performer will know outcome / score / position / time/ distance usually straight away / the performer does not need a coach to be present / feedback should be accurate as it is objective / the performer can set themselves targets / easy to show improvements / can be motivational if results are good;	**2**

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Question	Answers	Marks
7(a)	*3 from:* electronic scoreboards ensure all spectators are aware of the score; service speeds are shown which increases spectator understanding / interest; ball tracking technology so the ball can be correctly called in or out to allow spectators to know the reason for decisions being made, e.g. Hawkeye; video replay so the crowd and players can see why the decision was made; net cord sensors to detect the slightest brush by the ball to reduce debate over the fairness of a serve; court surface, the quality of the surface allows a more consistent bounce and provides better quality games to watch; floodlights mean that the game can continue after day light ceases so spectators can see the end of a game; improvements in seating positions to get a better view; use of a smart-phones allows spectators to follow matches on other courts; *accept examples when applied to other sports / events.*	**3**
7(b)	*examples could include, e.g. for tennis* *3 from:* improvements in training equipment / able to measure progress more accurately which leads to better performances/ players get stronger / faster; equipment technologies: rackets are lighter and stronger which increase the power that the ball can be hit; tennis balls hold pressure for longer so there is no deterioration in the quality of bounce and game; footwear result in better footing so less likely for injuries to occur; video analysis so the performer can see areas that need improving; sports science can improve diet / recovery from injury; *accept examples from other sports*	**3**

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Question	Answers	Marks
7(c)	*4 from*: not all performers have access to the best technologies; performers from wealthier countries have a greater advantage; can slow a game down while decisions are made / reviewed; may see errors or poor decisions if viewing on different platforms which may undermine the officials; video reviews are limited so mistakes are still made; reversed decisions may lead to officials being undermined; some officials may become too reliant on technology to make decisions; high costs can limit some sports ability to introduce certain technologies; some venues may not be able to host major events; lower levels of competitions may not be able to afford technology; change in the nature of a sport (players allowed a particular number of reviews); social media can portray a negative image of the sport very easily;	**4**

Question	Answers	Marks
8(a)	84 – 68 = 16 (beats per minute);	**1**
8(b)	*1 mark for an appropriate line for the working period.* *1 mark for an appropriate line for the recovery period.* *working period*: line should be steeper **and** reach a higher point **and** plateau at a higher point; *recovery period:* line should be shallower / longer line during the recovery period;	**2**
8(c)	*2 from:* *for the less- fit performer:* heart size may be smaller / have thinner walls; weaker heart contractions; has a higher resting heart rate; stroke volume lower / cardiac output lower / lower volume of blood pumped in a single beat; the build up of lactic acid is greater so the heart rate stays elevated to pump more oxygenated blood to muscles; the heart rate remains high for longer to remove carbon dioxide; more likely to be affected heart disease / diseases; *accept reverse for the fit performer*	**2**

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Question	Answers	Marks
8(d)(i)	The amount / volume of blood pumped from the left ventricle / from the heart each minute;	**1**
8(d)(ii)	*calculation*: 13.5; *unit*: litres per minute;	**2**

Question	Answers	Marks
9(a)	contraction: isometric (contraction); description: muscles contract but they stay the same length to maintain the posture of the athlete / muscle contract but there is no movement;	**2**
9(b)	contraction: isotonic (contraction); description: muscles change length as they contract; **OR** contraction: concentric (contraction); description: muscle contraction where the muscles shorten; **OR** contraction: eccentric contraction; description: muscle contraction where the muscles lengthen;	**2**
9(c)	3 from: gravity / weight; air resistance / drag; ground reaction force; friction; muscular force;	**3**

Question	Answers	Marks
10(a)(i)	11.82 metres per second (accept range of 11.7 – 11.9);	**1**
10(a)(ii)	64 metres (accept range within 63–65 meters);	**1**

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Question	Answers	Marks
10(b)	*2 from:* anaerobic / without oxygen being present; coverts glucose into energy; lactic acid is produced as a waste product; energy is produced quickly / high intensity; *also accept, for 1 mark* glucose → lactic acid (+ energy);	**2**
10(c)	*3 from:* after intense exercise the body needs to take in excessive amounts of air / oxygen / breathing rate stays high / **reduces gradually**; heart rate stays high / **reduces gradually**; body temperature stays high / **reduces gradually**; removes carbon dioxide; **removes** lactic acid; allows a performer to maintain high rates of aerobic respiration to aid recovery (provides energy) to return the body to its normal state; restores glycogen;	**3**

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Question	Answers	Marks
10(d)	*2 from*: (intensity of exercise) the harder a person exercises the longer the period of recovery; (age) older people take longer to recover; (sleep) quality / sufficient sleep allows performers to recover more quickly; (quality of equipment) running shoes / protective equipment can reduce impact on joints enabling less damage so quicker recovery; (overtraining) a performer that has been over-training they will tire more quickly / recover slower / fatigue quickly / greater risk of injury so takes longer to recover; (genetics) some people`s genetic make-up enables them to recover faster compared to other people; (environment) exercising in extreme conditions result in longer recovery; (diet) recovery will be slowed if post-exercise nutrition not taken at the right time; (hydration) recovery will be slowed if the performer becomes / stays dehydrated; (use of cool down / massage / ice baths / recovery aids) causes lactic acid to be removed reducing recovery time; (lifestyle) taking drugs / smoking may slow recovery; (level of fitness) a fitter person will have a faster recovery period; and strength: (general health / body weight) poor health or being overweight increases recover time; (the muscle group exercised) major muscle groups need more time to recover than exercises that use smaller muscle groups; (levels of lactic acid in muscles / ability to tolerate or remove lactic acid) if lactic acid is removed more slowly recovery time will be longer;	**2**

Question	Answers	Marks
11	*2 from*: age; gender; genetics; lifestyle; training;	**2**

Question	Answers	Marks
12(a)	*2 from:* fulcrum; effort; resistance; also accept pivot for fulcrum / muscular force for effort / load for resistance.	**2**
12(b)	*2 from:* *air resistance / drag:* explanation: the air in the way of the shuttle is pushed out of the way / the air will slow the movement of the shuttle down; acts in direct opposition to the shuttle; as the surface of the shuttle is not totally smooth there is greater resistance or drag as the shuttle travels through the air; *gravity / weight:* explanation pulls the shuttle towards the ground; the effect of the force applied on the shuttle reduces so gravity overcomes the force and increases the downward pull; *force applied at release / muscular force:* explanation: the power generated when hitting the shuttle is greater than gravitational pull and air resistance which allows the shuttle to go into the air; applied at the point of hitting principally by the deltoid, pectorals and latissimus dorsi;	**2**
12(c)	*3 from.* fluent: the performer is able to able to change direction and play a shot in a single movement; aesthetically pleasing: the performer movements are smooth and look pleasing in the execution of a smash; consistent: the performer rarely hits the shuttle into the net when serving; accurate: the performer's services land in the service area; goal directed – shows determination to achieve goals within the performance e.g. set themselves a target of conceding less-than 7 points in a game; coordinated: able to jump and hit the shuttle at the top of the jump to gain greatest power in the shot; *accept the characteristics applied to different sports*	**3**

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Question	Answers	Marks
13(a)(i)	*max 2 marks for naming components* *max 2 marks for explanations* *2 from:* *component*: flexibility; *explanation:* the performer must have good flexibility in the shoulder to enable arms to stretch as wide as possible; *component*: muscular endurance; *explanation*: muscle throughout the body have to work for a period of time to hold the position; *component*: balance; *explanation:* the performer must be able to hold a static position without losing control; *component*: coordination; *explanation:* to be able to coordinate the position of the arms and the trunk to create the position; *explanation must match component of fitness for mark*	**4**
13(a)(ii)	*1 mark for naming a test.* *3 marks for describing of the test.* **Strength – 1 Rep Max Test** the maximum weight a subject can lift in one repetition is recorded; a variety of exercise can be used (usually leg press or bench press); subject attempts lift once, starting with a high weight that is achievable; weight is increased until subject cannot perform one repetition; a rest of up to 3 minutes is allowed between lifts; maximum weight lifted is divided by body weight; **Hand Grip Dynamometer Test** grip the dynamometer handle in the dominant hand; apply neutral pressure grip with the thumb pointing up; start with the hand raised above the head; bring the arm down to a 90- degree angle; the arm must not touch the body; take a deep breath, as you breathe out squeeze as hard as possible for 10 to 15 seconds; perform at least three trails for each hand with the highest score for each hand recorded; *accept other recognised tests for strength.*	**4**

Question	Answers	Marks
13(b)	*3 from:* suitability for different activities/ some people are better suited to certain distances or a different type of activity; identifying strengths and weaknesses (identifying areas of performance that needs improvement); monitoring improvement / progression (after injury) / check for reversibility (ensure training is appropriate); comparison to others (enables a coach to know when a performer is ready to take part / inform positional choices / are they fit enough?) informing the design of a training programme / set targets / goals (the results may show a different type of training is needed) (test as a source of) motivation;	**3**

Question	Answers	Marks
14(a)	*max 2 marks for naming types of anxiety* *max 2 marks for descriptions).* type of anxiety: cognitive (anxiety); *description*: the mental symptoms that a performer feels, such as fear, worry and doubt (that can occur if the performer is in a state of under arousal or over arousal); type of anxiety: somatic (anxiety); *description:* the physical signs/symptoms of anxiety e.g. 'butterflies in the stomach;	**4**

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Question	Answers	Marks
14(b)	*example – football* *2 from:* people watching / crowd – a larger crowd that usual watch the match / noise made by the crowd; media coverage: media reporting / showing the game; bright lights: playing a game under flood lights can create a different atmosphere at the game; importance of the game: playing in an important game (cup final) / anxiety increases as the game progresses; quality of opposition / fear of injury: playing against opponents who are unbeaten / have lost heavily to opponents before; not being fit / training not being completed well / being injured / not fully fit: first game having been injured for a long period of time / unable to keep up with other players; fear of failure / fear of performing badly: concerned about losing their place in the team if the result is poor / anxiety increases when the opponents score a goal; some personalities types are more likely to feel anxiety: players may become anxious when a simple pass goes wrong; playing in an unusual surrounding: playing a match at a ground that have never visited before; unfamiliar conditions e.g. weather / playing surface: worrying about injury when playing on an artificial surface; uncertainty: feeling they may not be able to achieve e.g. playing in a team for the first time and not knowing the ability of other members of the team; pressure: worrying about the outcome of certain situations – worrying about missing a penalty if you are the regular penalty taker; too much focus on the outcome / result rather than performance: too much focus on winning the game; pressure from teammates / coaches /sponsors: coach trying to motivate the players by shouting at players from the side of the pitch;	**2**

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Question	Answers	Marks
15(a)	*max 2 marks for naming nutrient* *max 2 marks for appropriate benefits .* *max 2 marks appropriate food source* carbohydrates; benefit: intake to provide short term energy / immediate energy that will be the main energy source during the race / Increase the store of glycogen in muscles; food source: pasta, rice, bread, potatoes, grains etc; fat; benefit: intake provides long term energy that becomes important when levels of carbohydrate run low / reduces the amount of carbohydrates consumed to provide energy; food source: red meat, butter, cooking oil, cheese, bacon; protein; benefit: builds muscle and repair damage to muscles which aid recovery after training / can be used as a source of energy; food source – chicken, dairy, eggs, fish;	**6**
15(b)	*3 from:* dehydration; muscle cramps, dizziness, and fatigue / reduce the quality of performance; dangers can arise such as heat exhaustion and heat stroke; body temperature increases / less control of body temperature; fluid leaves the blood stream which raises the proportion of minerals in the blood; the kidney struggles to regulate this balance of minerals in the blood; the heart rate increases as more work is required to move blood around the body / blood viscosity causes the heart to work harder;	**3**

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