Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

PHYSICAL EDUCATION **0413/13**

Paper 1 Theory **October/November 2019**

MARK SCHEME

Maximum Mark: 100

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.

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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.

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Note that candidates may only use physical activities listed in the syllabus as examples in their answers to Paper 1.

Question	Answer	Marks
1	*Any 2 of:* essential needs are met; friendship / support; having value in society; ability to mix with other people;	**2**

Question	Answer	Marks
2(a)(i)	*1 mark for one correct response for each type of joint.* A: fixed joint / immovable joint / fibrous joint; B: slightly movable joint / cartilaginous joint;	**2**
2(a)(ii)	*1 mark for naming the type of joint.* *1 mark for naming each component. (2 marks max.)* *1 mark for a function of each named component. (2 marks max.)* type of joint: hinge joint; component: synovial membrane; function: produces synovial fluid / lines cavity of the joint / encloses joint; component: synovial fluid; function: acts as a lubricant / allows smoother movement / reduces wear and tear / reduces friction / absorbs shock; component: joint (fibrous) capsule; function: surrounds and protects the joint / encloses the joint / holds the bones together; component: cartilage; function: stop bones rubbing together / acts as a shock absorber / cushion / reduces friction; component: ligaments; function: holds the bones together / keeps them in place;	**5**

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Question	Answer	Marks
2(b)	*1 mark for each correct type of movement*. *Any 3 of*: flexion; extension; abduction; adduction; rotation; *Accept circumduction.*	**3**

Question	Answer	Marks
3(a)	*1 mark for correctly naming an appropriate physical activity.* *1 mark for an appropriate reason.* an example of an endurance activity, such as cross-country running; reason: the activity requires energy over a period of time / oxygen needs to be supplied to muscles throughout the activity / low intensity / muscles contract slowly / the activity requires little muscular force / the activity requires the performer not to tire quickly / lactic acid is not produced so muscles can contract for a long time;	**2**

Question	Answer	Marks
3(b)	*No mark for naming the activity.* *1 mark for each correct description of different examples.* for example: *football:* a player sprints to get to the ball (anaerobic) then pauses to look for a pass (aerobic); *rugby:* performer moves about the pitch at a steady pace (aerobic) but then sprints to try and score a try (anaerobic); *basketball:* a player when defending is moving mainly at a steady pace (aerobic) when their team wins the ball and fast break the performer will sprint down the court (anaerobic); *cross-country running:* the majority of the race is at a steady pace (aerobic) but then a sprint finish may occur at the end (anaerobic); *Accept reversed situations and other examples.*	**3**

Question	Answer	Marks
4	*1 mark for the position of resistance in the middle.* *1 mark if the other 2 components are correctly positioned and fully labelled.*	**2**

Question	Answer	Marks
5(a)	*1 mark for correctly suggesting an advantage.* for example: not wasting training time / prevents spending time training on unnecessary activities / knows if progress is being made / prevents boredom / reduces the chance of getting injured / avoids overtraining / prevents muscle soreness / prevents over-use injuries / makes training exciting / knows how much training is required / prevents reversibility; *Accept other valid suggestions. Credit advantages of applying specific principles of training.*	**1**

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Question	Answer	Marks
5(b)	*1 mark for naming each principle of training (2 marks max.).* *1 mark max. for correctly explaining how each principle could be applied to swimming.* *Any 2 of:* specificity; progression; overload; reversibility; tedium; for example: *specificity*: training should include (pool work to) work on particular strokes / particular techniques; (weight training to) improve muscular strength / endurance; flexibility training to focus on mobility at the shoulders and hips; *progression*: ensure the programme starts easy and becomes more difficult, for example increase the distance covered each week; *overload*: increase the number of lengths completed in a session / increase the number of lengths swam in a session every month / increase the weights used if using weight training as part of the programme; *reversibility*: when on holiday / when injured the swimmer may use a limited / shorter training session to reduce the loss of fitness; *tedium*: ensure there is a mix of training activities to prevent boredom / due to the nature of swimming training boredom is a factor, e.g. use stretching activities on land / other land-based activities to improve the range of movement in the hip and shoulders / maintain interest;	**4**

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Question	Answer	Marks
5(c)	*Any 3 of:* increases the number of red blood cells / red blood cell count; increases the amount of oxygen reaching muscles; increased cardiovascular endurance / stamina on return to lower altitude; higher VO_2 max; makes training feel harder so you can push yourself more without causing injury; can improve confidence in a performer by expecting to improve; more efficient use of oxygen by muscles;	**3**
5(d)	*1 mark for each correct description.* for example: heart size increases / hypertrophy / thicker walls; resting pulse rate / resting heart rate reduces / bradycardia; stroke volume increases / (maximal) cardiac output increases / the volume of blood pumped in one-minute increases / increase in volume of blood pumped in a single beat; returns to resting heart rate more quickly; increased strength of / stronger contractions; reduction in heart disease / diseases; *Accept other valid descriptions.*	**3**

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Question	Answer	Marks
6(a)(i)	*No mark for naming the activity.* *1 mark for each appropriate skill identified.* *1 mark for an appropriate justification.* for example, in basketball: *open skill*: dribbling the ball in a game; justification: the direction of the dribble will depend on the position of defenders; the speed of the dribble depends on the position on the court; the hand used may depend on the position of opponents; *closed skill*: free throw; justification: the shot takes place from the same position every time / ring height is the same / defenders are not allowed to move or interfere with the shot / the shooter can control the speed at which they shoot;	**4**

Question	Answer	Marks
6(a)(ii)	*Up to 2 marks for describing the difference between a basic and a complex skill.* *1 mark for an example of a basic skill. 1 mark for an example of a complex skill.* complex skills require: higher levels of coordination; more accuracy / more precision; more concentration; combination of multiple parts / sub-routines; basic skills to be mastered first; require practice; require decision making; *Allow reverse arguments for basic skills.* *examples of complex skills could include:* volleyball serve; overhead kick in football; reverse sweep in cricket; passing a ball in basketball; *examples of basic skills could include:* running; throwing; catching; kicking;	**4**

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Question	Answer	Marks
6(b)	*1 mark for naming the stage of learning.* *Max. 2 marks for describing the characteristics.* stage of learning: cognitive; characteristics: *Any 2 of:* low ability / beginner; does not have a mental image of the skill; does not know how to perform the skill / large number of mistakes; needs a high level of support / coach input / does not know how to do the skill without guidance; needs to work slowly and repeat actions; much conscious thought about how to perform the skill;	**3**

Question	Answer	Marks
7	*No mark for naming the physical activity.* *Max. 1 mark per goal-setting principle applied.* *for example, in basketball:* *measurable:* in a training session count how many baskets are scored out of 10, this can be compared to the number scored in the previous session to see if there has been an improvement; *realistic:* set a target that the performer has the ability to achieve, such as a novice performer scoring 2 out of 10 free throws / a performer at a higher level might have a target of 6; *exciting:* the target should motivate a performer, a basketball player may have a target to better the points scored from a previous game to achieve the MVP award;	**3**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>8(a)</td><td>Benefits of both types of fibre for the performer must be included for 2 marks max. per performer.

100 m / 200 m runner:
needs more fast-twitch fibres to have explosive power at the start of a race;
needs more fast-twitch fibres to provide speed over a short distance / over a short period of time;
may need slow-twitch fibres to maintain speed endurance towards the end (of a 200 m race);
may need slow-twitch fibres to speed recovery after a race / aerobic elements of cool down / training;

cross-country runner:
fast-twitch fibres are needed if there is a sprint at the end of the race;
fast-twitch fibres may be needed to maintain position / hold off a challenge;
slow-twitch fibres allow cross-country running to take place at a steady pace;
slow-twitch fibres will allow the runner to perform over a long period of time / over a long distance;</td><td>4</td></tr>
<tr><td>8(b)</td><td>1 mark for each correctly stated difference.

<table>
<tr><th>fast twitch</th><th></th><th>slow twitch</th></tr>
<tr><td>contracts quickly</td><td>AND</td><td>contracts slowly;</td></tr>
<tr><td>produces large force</td><td>AND</td><td>produces little force;</td></tr>
<tr><td>low fatigue tolerance / tire quickly / short period of time</td><td>AND</td><td>high fatigue tolerance / do not tire quickly / long period of time;</td></tr>
<tr><td>good for strength / power / speed</td><td>AND</td><td>good for endurance;</td></tr>
<tr><td>anaerobic energy supply</td><td>AND</td><td>aerobic energy supply;</td></tr>
<tr><td>white colour</td><td>AND</td><td>red colour;</td></tr>
</table>
</td><td>3</td></tr>
</table>

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Question	Answer	Marks
8(c)	*1 mark for naming test.* *3 marks max. for the description of the test.* *Accept alternative standardised tests.* *name of test:* (30-Metre) Sprint Test; *Any 3 of:* distance is marked out on a selected flat running surface; a flying start is used; subject sprints as fast as possible from start through the finishing line; a stopwatch or timing gates can be used to record the time; (the best score from 3 attempts is) compared to normative data tables;	**4**

Question	Answer	Marks
9(a)	*1 mark for a characteristic of the alveoli (2 marks max.).* *1 mark for each explanation (2 marks max.).* characteristic: one cell thick; explanation: small distance for oxygen / carbon dioxide / gasses to diffuse / pass through faster; characteristic: surrounded by capillaries / blood supply; explanation: this increases the amount of blood available for the transfer of gasses / maintains concentration gradient; characteristic: large surface area / large number; explanation: large surface area for gas exchange / diffusion to take place at / more gas can pass through; characteristic: moist walls; explanation: gasses dissolve to pass through; characteristic: walls contain elastic fibres; explanation: allows the walls of the alveoli to increase surface area slightly during inspiration;	**4**

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Question	Answer	Marks
9(b)	*1 mark for the description.* *1 mark for the change during exercise.* *description of tidal volume:* the volume / amount of air entering or leaving with each breath; *change during exercise:* increases;	**2**

Question	Answer	Marks
10(a)	*1 mark for each correct comparison.* for example: both the shot-putter and the long-distance runner will need carbohydrates / fats / protein / water; the runner may have a higher intake of carbohydrates; as he needs a greater energy store compared to the shot putter; the runner will need to perform for a long duration; long-distance running is an endurance activity whereas the shot put is a power activity; the runner may carbo-load on carbohydrates in the week before an event to increase glycogen stores in the muscle whereas the shot putter would not; the shot putter could consume higher levels of protein; to build muscle / increase power; the explosive nature of training for shot put / performing for the shot putter causes a high level of muscle damage / the need for more protein to aid repair; whereas the runner may need lower amounts of protein due to less damage / only needs protein for repair not growth / runner does not need to build muscle mass / runner will consume some protein for muscle repair only; the shot-putter could have to consume more fat than the runner; the runner will need fats as an energy source to use when carbohydrates are used up / shot-putter may use fats to increase body weight / whereas the runner's diet may only contain small amounts of fats to prevent an increase in body weight; the runner may need to consume water to maintain hydration during a longer performance whereas the shot-putter will not due to a shorter performance / the shot putter may need to maintain hydration between throws; *Accept reverse arguments.* *Accept other correct comparisons.*	**4**

Question	Answer	Marks
10(b)	*1 mark for each correct description of a factor.* gender: males generally need more energy than females; age: teenagers need more energy than young children / elderly generally need less energy than young adults; lifestyle: an active lifestyle requires more energy than a sedentary lifestyle; occupation: people who have physically demanding jobs need more energy that people who sit at a desk all day; climate: if people live in a cold climate they need more energy to maintain body temperature; *Accept descriptions of other valid factors.*	**2**
10(c)	*1 mark for each correct explanation.* *Max. 3 marks from 1 area.* *released:* carbohydrates / glucose are the main source of energy; proteins can also be used to release energy; fats can also be used to release energy; muscle cells release energy from glucose during respiration; this can be aerobic / using oxygen; or anaerobic / without oxygen / producing lactic acid; *stored:* glucose gets stored in the muscle as glycogen; glucose that is unused is stored as fat; some glucose gets stored in the liver as glycogen; stored glycogen can be turned back into glucose;	**4**

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Question	Answer	Marks
11(a)(i)	*1 mark for description of each term.* *cognitive anxiety:* the psycological / mental anxiety that a performer feels / fear / worry / doubt; *somatic anxiety:* the physiological / physical changes in the body due to anxiety;	**2**
11(a)(ii)	*1 mark for each suggestion linked to performance.* *Any 2 of:* increase in number of people watching performance / crowd; increase in media coverage of performance; bright lights / novel environment / performing in unusual surroundings; importance of the occasion / match / performance; perceived high quality of opposition at event / during performance; not being fit / training not being completed well before event / being injured / not fully prepared for performance; fear of failure / fear of performing badly during performance; introverts may be more anxious in a team game / extroverts may be more anxious during an individual performance; unfamiliar environmental conditions, e.g. weather / playing surface; too much focus on the outcome / result of event rather than the performance during event; pressure to perform from external source, e.g. team mates / coaches / sponsors / social media; pre-performance anxiety, e.g. in call room / standing waiting to go out; *Accept other appropriate suggestions.*	**2**

Question	Answer	Marks
11(b)	*1 mark for each appropriate description.* for example: *in golf:* visualise the action, e.g. a golfer preparing to drive the ball off the tee imagines where the ball will go; focus / concentrate, e.g. a golfer may ask for quiet as they focus on a shot; *athletics:* high jumper may get the crowd to clap when they start their run up to create a positive / motivational atmosphere; a high jumper may mentally rehearse the run up to the bar; *football:* deep breathing before taking a penalty, e.g. the penalty taker tries to calm themselves; goalkeeper facing a penalty concentrates and focuses on the player taking the penalty rather than worrying about the score or state of the game;	**2**
11(c)	*1 mark for description of why optimal level of arousal can be low:* for example: it is a fine skill / it requires precision / you need to stay calm; *1 mark for description of why optimal level of arousal can be high:* for example: it is a gross skill / it requires an all-out effort / you need controlled aggression;	**2**

Question	Answer	Marks
12(a)	*1 mark for a description of each different example.* for example: adjust the physical position of a player, e.g. move a tennis player's arm in a forehand stroke; support a performer during a handstand; help a performer to develop a feeling for an activity, e.g. floats allow a performer to establish the body position needed; use of harnesses to reduce the danger when performing, e.g. a harness to help a somersault to be completed; *Accept descriptions of other appropriate examples.*	**2**

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Question	Answer	Marks
12(b)	*Any 2 of:* the performer has the ability / understanding to analyse the information from the coach; the performer can process the information during performance; adjustments may be tactical; the relationship with the coach allows for a greater level of discussion over the situation rather than just instructions; changes to techniques are often quite detailed; the coach may not have the ability to demonstrate the changes needed; at half time / between jumps, etc. may be few resources available / little time available during a game to use other types of guidance;	**2**

Question	Answer	Marks
13(a)	*No mark for naming the activity.* *1 mark for each risk (Max. 2 marks).* *1 mark for each relevant strategy (Max. 2 marks).* *for example, in badminton:* risk: injury to joints / named joint; strategy: ensure that performers are taught correct technique / know how to hit the shuttlecock correctly / a qualified or experienced teacher or coach instructs the players / use an appropriate size and weight of racket / ensure a correct warm up before training / games; risk: collision with obstacles in / around the court; strategy: ensure the court is free from obstacles where possible / net is secure / unlikely to fall onto the court / areas around the court have space if players run off the court / ensure spectators are kept away from the court; risk: falling / slipping; strategy: court is clean and free from dust / water, etc. / all players should wear correct footwear with good grip / lighting is of a good standard; *Accept other appropriate risks and relevant strategies.*	**4**

Question	Answer	Marks
13(b)	*2 from:* rest; compression; elevation;	**2**

Question	Answer	Marks
14(a)	*Any 1 of:* a push / a pull / pushing / pulling action (applied upon an object); = mass × acceleration;	**1**
14(b)	*1 mark for each force named. (Max. 2 marks).* *1 mark for each explanation. (Max. 2 marks).* gravity / weight; explanation: pulls the ball downwards / towards the ground; air resistance / drag; explanation: the air will slow the ball down / acts in direct opposition to the ball's movement / increases as speed increases / increases if surface of ball is not smooth; force applied at release / muscular force; the power generated when kicking the ball / is greater than gravitational pull / the harder the ball is kicked the greater the force; *Accept alternative wording.*	**4**

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Question	Answer	Marks
15(a)	*Any 2 of:* carries oxygen; reacts with oxygen to form oxyhaemoglobin; releases oxygen (at tissues / muscles); carries carbon dioxide; reacts with carbon dioxide to form carbaminohaemoglobin;	**2**
15(b)	*1 mark for each function named.* *Max. 2 marks per type of blood vessel.* *artery:* carry blood away from the heart; carry blood at high pressure; generally carry oxygenated blood; *vein:* carry blood towards the heart; stop blood flowing backwards; carry blood at low pressure; generally carry deoxygenated blood; *Credit reference to exception of pulmonary vein and pulmonary artery.*	**4**

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