Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICAL EDUCATION **0413/12**

Paper 1 Theory **October/November 2020**

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.

Cambridge International is publishing the mark schemes for the October/November 2020 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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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.

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.

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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	*1 mark for each component.* *combines with oxygen:* red (blood) cells / haemoglobin; *clots blood:* platelets;	**2**

Question	Answer	Marks
2	*1 mark for naming each personality type. (2 marks max.)* *1 mark for justifying an appropriate physical activity. (2 marks max.)* personality type: introvert; for example: long distance running / cross country running / swimming / (road) cycling / other mainly individual activities justification: able to train / perform on their own / does not require support from others / arousal levels are low / requires high level of concentration / enjoys activities with little social interaction / social mixing / not usually involved in team games / shy with others / mainly an individual activity; personality type: extrovert; for example: football / basketball / netball / other mainly team activities justification: able to mix with others / enjoys the interaction with others / enjoys contact sports / enjoys sports which are very active or played at a fast pace / working with others / enjoys communicating with others / mainly team activity;	**4**

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Question	Answer	Marks
3(a)	*1 mark max. for each activity.* *tennis:* allows more accurate decision making / ensures accuracy of umpire's decisions when a player is serving, e.g. use of Hawkeye; enhancing performance as rackets are lighter / enable the performer to hit the ball harder; video recording and playback of a serving action to identify areas to improve; improvements in footwear reduce slipping on court; *cycling:* use of drug testing can result in a cyclist being banned / competitions are fair; more aerodynamic clothing / equipment means less drag / faster times; the heart rate of the cyclist can be monitored throughout the race to ensure correct effort levels are being applied; improvements in materials means better safety equipment e.g. helmets; *javelin throwing:* use of lasers ensures the distances recorded are accurate; officials can measure the mass / shape of javelins very accurately to ensure that no performer has an advantage by throwing a lighter javelin etc.; the javelin is designed to reduce the effect of air flow / resistance; improved communication systems between officials to ensure safety when throwing takes place; *Accept other examples.*	**3**

Question	Answer	Marks
3(b)	*1 mark for each description.* available 24 hours a day / easy to use / internet available in public areas / access to other web sites / available on phones; makes communication with a coach and other players easier / able to set up chat groups to share ideas / technical performance ideas with like-minded performers; easier to attract a sponsor / raise funds by crowd funding; easier to research training updates / sports science / diet; easier to compare performance to others; easier to see reviews on and buy equipment; easier planning of train journeys / travel to events; easier to find out about events / enter events / plan season's commitments; provides opportunities to link with / follow elite players; easy to research opponents / venues; easy to look at analysis of performance / video of skills practice / able to review own performance post-event; easy to watch live streamed games; praise on social media can result in an increase in confidence / supply motivation; raises the profile of the performer; get scouted / find a coach / find a team;	**3**

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Question	Answer	Marks
3(c)	*2 marks max. for description of advantages. 2 marks max. for description of disadvantages.* advantages: viewers can watch sports from a variety of venues around the world / watch more games; greater choice of sports / competitions to watch; viewers get a better view of the action / more views; viewers develop a better understanding / watch expert analysis / see statistics / information; encourage participation / increase participation; able to see their favourite sport / team / player more often; can be cheaper to watch on television than attend a live game / no need to travel long distances; able to watch / record events at any time of the day; disadvantages: when a sport is often on the television people get bored with it / over exposure / loss of interest; fewer people attend live games as it can be cheaper to watch on television / less atmosphere at live games; increased coverage often increases the cost of pay to / per view / satellite / cable television / can deny some people access to a sport; media can change the time of events / may cause people to miss attending a live game; increased coverage can result in changes to the rules / how a game is played may reduce enjoyment; fake news / sensationalisation can mislead; games may be disrupted due to advertising breaks;	**4**

Question	Answer	Marks
4(a)	*1 mark for naming each type of joint.* joint type at A: fixed / immovable / fibrous; joint type at B: slightly movable / cartilaginous; joint type at C: freely movable / synovial / hinge joint;	**3**
4(b)	*1 mark for each bone named.* femur; tibia; *Accept patella.*	**2**

Question	Answer	Marks
4(c)	*1 mark for naming each component of a joint. (3 marks max.) 1 mark for each description of a different function of the named component. (3 marks max.)* synovial membrane; surrounds the joint capsule / produces synovial fluid / lines the cavity of the joint / encloses the joint; synovial fluid; acts as a lubricant / allows smooth movement / reduces wear / reduces friction / absorbs shock; joint (fibrous) capsule; surrounds / protects the joint / holds the joint together / encloses the joint; ligament; holds the bones together / keeps bones in place; cartilage; stops the bones knocking together / acts as a shock absorber / cushion / reduces friction; *Accept other suitable components and appropriate descriptions of functions.*	**6**
4(d)	*1 mark for a description of the difference in range of movement between joints C and D. 1 mark for a description of the difference in stability between joint C and D.* movement: joint D has a greater range of movement than C; joint C and joint D can both provide flexion and extension **but** joint D can also provide adduction, abduction, rotation, (also accept circumduction); joint D has more planes of movement than joint C; stability: joint D has less stability than joint C; joint D is shallow and can more easily dislocate than joint C / joint D has more irregular shaped articulating bones; *Accept reverse arguments.*	**2**

Question	Answer	Marks
5	*1 mark for each described example.* (ability to mix with other people) example: by joining a sport team mixing with other people on a regular basis; playing sports can develop cooperation / teamwork leadership skills; (friendship and support) example: can meet with other people who have similar interests by joining a weekly fitness class and establish friendship and support; (having value within society) example: taking responsibility at a sports club and becoming the club secretary; (essential human needs are met) example: being involved in a sports team allows a person to have fun and interact with team mates and opponents; *Accept other examples.*	**2**

Question	Answer	Marks
6(a)	*1 mark for each explanation.* the activity takes place in a stable environment; the swimming race takes place in a lane which has limited interference from other swimmers; the skills being used are repeated throughout the race and need little adjustment / performed the same way each time;	**2**

Question	Answer	Marks
6(b)	*1 mark for naming each different continuum. 2 marks max.* *1 mark for a suitable justification of a stated classification on each named continuum. 2 marks. max.* fine–gross continuum; classification and justification: gross, the swimmer is using major muscle groups / large movements; basic–complex continuum; classification and justification: basic, it is the foundation for other swimming strokes; **OR** complex, the movement requires high levels of concentration / coordination, e.g. of arms and legs / movement of the head turning to breathe; *Accept other continua and other classifications if an appropriate justification is given.*	**4**

Question	Answer	Marks
7(a)	*1 mark for each factor.* for example: access; age; gender; disability; social and cultural influences; discrimination, e.g. by age / gender / religion / social status / certain age restrictions due to safety; education; environment and climate; family / friends / peer influences; financial considerations; media coverage; role models; time and work commitments; *Accept other examples.*	**3**

Question	Answer	Marks
7(b)	*1 mark for each named characteristic. 1 mark for each description of an example applied to an appropriate activity.* *characteristic:* *2 from:* fluent; aesthetically pleasing; consistent; accurate; goal-directed; coordinated; *examples could include:* in tennis: fluent: a player is able to hit the ball using a full swing of the racket in a flowing movement; aesthetically pleasing: movement about the court looks pleasing to spectators; consistent: the player is able to hit most first serves with control into the opponent's court; accurate: the movements are precise so the player is able to keep the majority of balls in court; goal-directed: shows a performer being determined to achieve their target such as hitting shots to an opponent's weakness; coordinated: the player is able to link the throwing of the ball into the air with the striking of the ball with the racket to produce a good service; *Accept other examples.*	**4**

Question	Answer	Marks
7(c)	*1 mark for each named type of guidance (2 marks max.). 1 mark for an appropriate example of each type of guidance in the appropriate named activity. (2 marks max.)* *type of guidance:* visual; verbal; manual; mechanical; for example in gymnastics: visual: use demonstrations of a headstand to allow performers to see the skill performed in isolation / demonstrations can be repeated from different angles; verbal: while the gymnast completes their headstand the coach can describe the placement of the hands to achieve a balanced position / immediately after the gymnast's attempt the coach can use questions to check understanding; manual: the coach can place their hands on the gymnast's back to allow them to feel when they are holding a balanced position; mechanical: using a harness when the gymnast is learning to perform a headspring without putting themselves at risk; *Accept other physical activities and examples.*	**4**

Question	Answer	Marks
8(a)	*1 mark for each description.* pulse raiser: doing exercises that increase heart rate / exercise that increases blood flow to muscles; stretches: doing exercises that increase mobility at joints / increase flexibility of muscles; familiarisation / skill-related activities: doing / practising activities that allow the performer get use to the environment / state of the pitch / weather conditions / lighting / practice relevant skills;	**3**

Question	Answer	Marks
8(b)	*1 mark for description of an appropriate exercise that relates to the named activity.* for example in football: phase 1: jogging around the outside of the pitch / short 10-metre sprints; phase 2: heel flicks bringing the heels up to the hips; phase 3: a goalkeeper taking crosses / players shooting at the goal before the game; *Accept other appropriate examples from the appropriate named physical activity.*	**3**
8(c)	*1 mark for each benefit.* for example: allows the performer to reflect on the game / own performance / opportunity for feedback; helps a performer to return to a calm state / gives performer time to calm down / relax / reduce arousal / reduce anxiety; helps transition to daily activities / other tasks;	**2**

Question	Answer	Marks
9(a)(i)	*1 mark for a different food source for each nutrient.* for example: carbohydrate: bread / potatoes / pasta / rice; protein: eggs / fish / pulses / chicken; fats: butter / oils / avocado; *Accept other appropriate food sources.*	**3**

Question	Answer	Marks
9(a)(ii)	*1 mark for a description of each example. Examples must come from the same activity.* sprinter: aids building of muscle to increase power allowing a sprinter to drive out of the blocks at the start of the race; aids building of muscle allowing a sprinter to maintain speed during the race; aids the repairing of muscles between races to allow the sprinter to be ready to perform; shot putter: aids building muscles to provide power to enable a shot putter to throw further; a shot putter will need to repair muscle fibres to be able to continue training; a shot putter's muscles need to recover quickly after a heavy weight-training session; cycling: a long distance cyclist may need protein as an alternative energy source to complete a race; high protein diet allows body weight to be maintained more easily so the cyclist will not have to carry additional weight on mountain climbs; a cyclist needs muscle strength to produce speed during a sprint finish; *Accept other examples if applied to a single appropriate physical activity.*	**3**
9(b)	gain weight / become overweight / obese / fat;	**1**

Question	Answer	Marks
10(a)(i)	*1 mark for:* 10 minutes;	**1**
10(a)(ii)	*1 mark for:* 150 beats per minute; (accept heart rate between 148 and 152 beats per minute);	**1**

Question	Answer	Marks
10(b)	*1 mark for stating each effect. 2 marks max. 1 mark for each appropriate explanation if factor stated. 2 marks max. Allow other combinations. Explanation required for second mark. Effects must be different.* *2 from:* effect: breathing rate increases; explanation: to meet the demand for more oxygen to working muscles; effect: sweating; explanation: sweat will cool the body down / sweat will maintain body temperature / evaporation causes cooling; effect: fatigue (feeling tired); explanation: energy sources become depleted due to the intensity of the activity; effect: suffering from nausea / feeling light headed; explanation: blood is diverted to working muscles from the gut / lack of hydration / taking part in activities that restrict blood flow; effect: more adrenaline is released into the blood; explanation: adrenaline is released when the performer is scared / excited / aroused; effect: body temperature increases / muscles become warmer; explanation: muscles produce heat during activity; effect: more carbon dioxide is produced; explanation: working muscles produce an increase in carbon dioxide as a waste product; effect: increase in stroke volume; explanation: more blood is required by the working muscles; effect: increase in cardiac output; explanation: more blood is required by the working muscles; effect: increase in tidal volume; explanation: more oxygen is required by the body;	**4**

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Question	Answer	Marks
10(b)	effect: increase in minute ventilation; explanation: more oxygen is required by the body; effect: increase blood flow to muscles / oxygen supply to muscles; explanation: blood vessels dilate to carry more blood to working muscles / during exercise the body needs more oxygen / needs to remove more carbon dioxide; effect: increase blood pressure; explanation: increase in the demand for oxygen by the muscles / the heart beats with more force so more blood is pushed out of the heart under more pressure; effect: blood vessels closer to the skin enlarge / vasodilation / become red faced; explanation: to lose heat / helps the body return to normal temperature / redistribution of blood to skin;	
10(c)	*1 mark for each explanation.* for example: 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 the impact on joints so less damage and so quicker recovery; overtraining: if a performer has been overtraining they will recover more slowly / risk overuse injury so take longer to recover; genetics: some people inherit from their parents the ability to recover more quickly than other people; environment: exercising in extreme conditions results in longer recovery time; diet: recovery will be slowed if post-exercise nutrition is not taken at the right time / diet does not contain nutrients to repair muscle tissue / replenish energy stores; hydration: recovery will be slower if the performer becomes / stays dehydrated / does not hydrate during aerobic activity; use of cool down / massage / ice baths / recovery aids: use of these aids / techniques may reduce recovery time; lifestyle: taking some drugs can speed up or slow down recovery / alcohol or smoking may reduce recovery; level of fitness: a fitter performer will have a faster recovery / take less time to recover; general health: poor health / existing medical conditions can result in recovery taking longer; muscle groups exercised: major muscle groups need more time to recover than smaller muscle groups;	**4**

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Question	Answer	Marks
11(a)	*1 mark for a description of each difference.* the cognitive performer would use mainly extrinsic feedback **AND** the autonomous performer would use mainly intrinsic feedback; the cognitive performer would use mainly knowledge of results **AND** the autonomous performer would use mainly knowledge of performance; the cognitive performer copes better with positive feedback **AND** the autonomous performer can cope with negative feedback; *Accept alternative wording.*	**2**
11(b)	*No mark for naming the activity. 1 mark for each cause of anxiety related to an appropriate physical activity.* for example: fear of failure / playing badly; opposition is thought to be better than you; not fit enough to play in the game / training not being completed well before an event / carrying an injury; not sure of the role in a game / asked to play as a scrum-half not having played there before; might get injured because the opposition forwards are much bigger than their team; pre-performance anxiety, e.g. build up to the game / team talk / waiting in call room; pressure from coach / team mates / sponsors / social media; level of media coverage at the event; playing for a better / bigger team / higher level for the first time; importance of the occasion / match; playing in front of a big noisy crowd / increase in the number of people watching; playing in an unfamiliar environmental conditions e.g. weather / playing surface / bright lights / not used to playing under flood lights; *Accept other examples.*	**2**

Question	Answer	Marks
12(a)	the volume of air left in the lungs after you breathe out (as hard as possible);	**1**

Question	Answer	Marks
12(b)	*1 mark for each named muscle. 2 marks max.* *1 mark for explanation of the function of each muscle. 2 marks max.* muscles: diaphragm; intercostal muscles; functions: diaphragm – inhalation: the diaphragm contracts / becomes flatter **AND** increases the chest cavity volume **OR** reduces pressure in the lungs; diaphragm – exhalation the diaphragm relaxes / domes **AND** decreases the chest cavity volume **OR** increases pressure in the lungs; intercostal muscles – inhalation: contract to move the rib cage outwards / upwards **AND** increase the chest cavity volume **OR** reduce pressure in the lungs; intercostal muscles – exhalation: relax to allow the rib cage to move inwards / downwards **AND** decrease the chest cavity volume **OR** increase pressure in the lungs; *Allow correct ref. to internal / external intercostal muscles.*	**4**

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Question	Answer	Marks
12(c)	*1 mark for each characteristic. (3 marks max.)* *1 mark for each appropriate explanation. (3 marks max.)* for example: characteristic: one cell thick (alveoli or capillaries); explanation: smaller distance of oxygen / carbon dioxide / gases to diffuse; characteristic: alveoli are surrounded by capillaries / blood supply; explanation: increase the amount of blood available for the transfer of gases / maintain concentration gradient; characteristic: large surface area / large number of alveoli; explanation: greater area for diffusion to take place / more gas can pass through at once / faster diffusion; characteristic: walls of the alveoli are moist; explanation: gasses dissolve to pass through; alveoli wall contains elastic fibres; explanation: allows the walls of the alveoli to stretch / increase surface area slightly during inspiration;	**6**

Question	Answer	Marks
13(a)	*1 mark for of each type of risk.* real risk: the amount of danger that actually exists / the level of actual risk / objective risk in an activity; perceived risk: an individual's subjective / personal judgement / fear / worry about the dangers of an activity;	**2**

Question	Answer	Marks
13(b)	*1 mark for each appropriate strategy. Strategies must be different.* for example: *risk: boat capsizes causing the performers to fall into the water:* participants briefed and shown the capsize drill prior to going on the water; instructors close by to assist; ensure ratios of instructors are maintained; safety boats ready to attend; all participants should wear a life jacket / preserver; wear a helmet in case of obstacles in the water; wearing other protective clothing / equipment; *risk: injury while sailing:* all instructors are first-aid trained / first-aid pack in all safety boats / safety boats present; ensure constant supervision / effective group control / ensure ratios of instructors are maintained; helmets to be worn to reduce risk of head injury / wear proper safety equipment; ensure all participants know how to sail craft correctly / correct techniques / follow rules; wear appropriate footwear / clothing, e.g. footwear with good grip; maintaining hydration; use of warm up; *risk: collisions with other boats:* make sure area is clear; instructors to teach performers acceptable protocols when steering the boat; instructors to set designated sailing area to operate in / use of lanes / markers; suitable level of competition; participants told not to sail with intent to collide with other boats / following rules; communicate / loud horn;	**3**

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Question	Answer	Marks
14(a)	*1 mark for naming an appropriate test. 3 marks max. for describing test.* Multi-Stage Fitness Test; performer must run in time with the bleeps on a CD / equivalent; 20-metre / measured shuttles are performed; time between bleeps reduces as test progresses / bleeps get closer together / the subject must run faster; subject runs until they can no longer keep up with the bleeps; the level achieved and the number of shuttles performed within the level are recorded; scores are compared to standardised normative data; **OR** 12-Minute Cooper Run Test; subject runs / walks as far as possible; test duration is 12 minutes; a measured course is used, e.g. with cones placed at regular intervals to help identify the exact distance covered / measured laps; calculate the distance covered; the distance covered is compared to standardised normative data; *Accept other recognised and standardised tests.*	**4**
14(b)	*1 mark for an advantage. 1 mark for a disadvantage.* *advantage:* does not require much equipment / easy to overload / easy to measure progress / develops aerobic fitness needed for the event / training directly linked to the event; *disadvantage:* does not help anaerobic fitness / does not help the ability to sprint / easy to become demotivated / boring / requires high level of motivation / recovery in the early stages of training can be slow so progress is also slow / danger of overuse injuries; *Accept other advantages / disadvantages.*	**2**

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Question	Answer	Marks
14(c)	for example: the performer would want to be able to sprint at the end of the race / the performer may want speed to overtake another runner / greater speed will allow a performer to record a faster time for a race / quicker to finish / to improve their position;	**1**

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