



Cambridge IGCSE™

PHYSICAL EDUCATION

0413/11

Paper 1 Theory

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MARK SCHEME

Maximum Mark: 100

Published

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

This document consists of **25** printed pages.

General marking principles

All examiners must apply these marking principles when marking candidate responses.

1	Examiners must award marks for each response in line with: - the specific content defined in the mark scheme - the specific skills defined in the mark scheme or in the level descriptions - the standard of response required as exemplified by the standardisation scripts.
2	Examiners must award whole marks (not half marks, or other fractions).
3	Examiners must award marks positively . This means that: - marks are not deducted for errors or omissions - marks are awarded for correct/valid answers as defined in the mark scheme and also for other valid answers which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate - the quality of spelling, punctuation and grammar are judged only when the mark scheme indicates that these features are specifically assessed in the question. However, the meaning of all responses must be unambiguous.
4	Examiners must consistently apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly.
5	Examiners must use the full range of marks defined in the mark scheme, unless limited by the quality of the candidate responses seen.
6	Examiners must award marks according to the mark scheme and must not award marks with grade thresholds or grade descriptions 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	<u>'List rule' guidance</u> For questions that require <i>n</i> responses (e.g. State two reasons ...): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked <i>ignore</i> in the mark scheme should not count towards <i>n</i>. • Incorrect responses should not be awarded credit but will still count towards <i>n</i>. • 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 <i>n</i> 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.

Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	correct point or mark awarded
	incorrect point or mark not awarded
	benefit of the doubt given
	error carried forward applied
	point has been noted, but no credit has been given or blank page seen
	response is too vague or there is insufficient detail in response
	incomplete answer
	linked consideration of points
	linked consideration of points

Annotation	Meaning
REP	repetition in response
A	information missing or insufficient for credit
CON	contradiction in response, mark not awarded

Question	Answer	Marks	Guidance
1	1 mark for each correct type of sponsorship (3 marks max) financial support ; clothing / footwear ; equipment ; provision of specialist facilities ;	3	Accept cars / products – BOD

Question	Answer	Marks	Guidance
2(a)	1 mark for each joint: A: ball and socket (joint) ; C: hinge (joint) ;	2	DNA Synovial joint – in question
2(b)	1 mark each for: range of movement: A has a greater range of movement than B ; stability: B is more stable than A ;	2	Both joints should be mentioned Or Accept greater / more / less etc. as comparison A has a good range of movement tv

Question	Answer	Marks	Guidance
2(c)	1 mark for each correct structure named (3 marks max) 1 mark for an appropriate function (3 marks max) structure: synovial membrane ; function: produces synovial fluid / lines the cavity of the joint / encloses the joint ; structure: synovial fluid ; function: acts as a lubricant / allows smooth movement / reduces wear / reduces friction / absorbs shock ; structure: joint capsule ; function: Holds the structure of the joint / Surrounds the joint ; structure: ligament ; function: holds the bones together / keeps bones in place / stabilises the joint ; structure: cartilage function: stops the bones knocking together / acts as a shock absorber / cushion / reduces friction ;	6	functions must be different Accept: structure: tendon; function: connects muscle to bone / enables the joint to withstand tension; Accept synovial membrane stops fluid leaking out; cartilage prevents wear and tear; bursa / bursae; function: reduces friction between bones and soft tissue; Synovial Capsule – TV Protects the joint – TV

Question	Answer	Marks	Guidance
3	1 mark for each different example (3 marks max) 1 mark for an appropriate explanation (3 marks max) for example, answers relating to association football: example: use of data ; explanation: data tracking of players movement on the pitch so their movements on the pitch can be analysed and improved ; example: facilities ; explanation: training / playing facilities ensure the playing surfaces are of a high standard so greater accuracy when passing the ball during a game / less chance of injury ; example: sports science ; explanation: sports medicine ensures speedy recovery from injury so prevents reduction in performance due to injury ; example: safety equipment ; explanation: facial protection masks to prevent injuries worsening so allows a performer to be confident to head the ball ; example: clothing / footwear ; explanation: studded boots give greater grip so reduces chance of injury / moisture wicking clothing so athletes can continue to play in extreme heat ; example: media ; explanation: use of video so performances can be analysed / strengths and weaknesses can be identified / to access coaching videos ; Accept other appropriate examples.	6	Examples must link to named activity. If activity wrong, no marks for example / explanation Accept use of VAR Improves the performance of official ensuring more accurate decisions Improvements can be referees/officials

Question	Answer	Marks	Guidance												
4(a)	1 mark for each appropriate example. 1 mark for the name of an appropriate test. <table><tr><td>component of fitness</td><td>example</td><td>Name of fitness test</td></tr><tr><td>agility</td><td>to be able to change direction and move quickly to reach a drop shot;</td><td>Illinois (Agility) Test;</td></tr><tr><td>power</td><td>to be able to smash the shuttlecock hard (so it cannot be returned easily);</td><td>Vertical Jump Test;</td></tr><tr><td>flexibility</td><td>To be able to stretch to reach the shuttle (when it is dropping close to the ground);</td><td>Sit and Reach Test;</td></tr></table> Accept other examples. Accept other standardised tests.	component of fitness	example	Name of fitness test	agility	to be able to change direction and move quickly to reach a drop shot;	Illinois (Agility) Test;	power	to be able to smash the shuttlecock hard (so it cannot be returned easily);	Vertical Jump Test;	flexibility	To be able to stretch to reach the shuttle (when it is dropping close to the ground);	Sit and Reach Test;	6	Example must relate to badminton. Generic description TV Tests must be named in full Accept other appropriate standardised tests BOD – Sargent Jump for Vertical Jump
component of fitness	example	Name of fitness test													
agility	to be able to change direction and move quickly to reach a drop shot;	Illinois (Agility) Test;													
power	to be able to smash the shuttlecock hard (so it cannot be returned easily);	Vertical Jump Test;													
flexibility	To be able to stretch to reach the shuttle (when it is dropping close to the ground);	Sit and Reach Test;													
4(b)	3 marks for description. subject stands 2 metres from a (plain) wall ; with a tennis ball in their (right) hand, ball is thrown underarm to rebound off the wall and is caught in the left hand / the ball is then thrown underarm with the left hand to be caught by the right ; this is then repeated as many times as possible OR the number of catches made in 30 seconds ; compared to normative data tables ;	3	BOD – time frame 1 minutes max BOD – answers between 1–3 meters Opposite wall – TV												

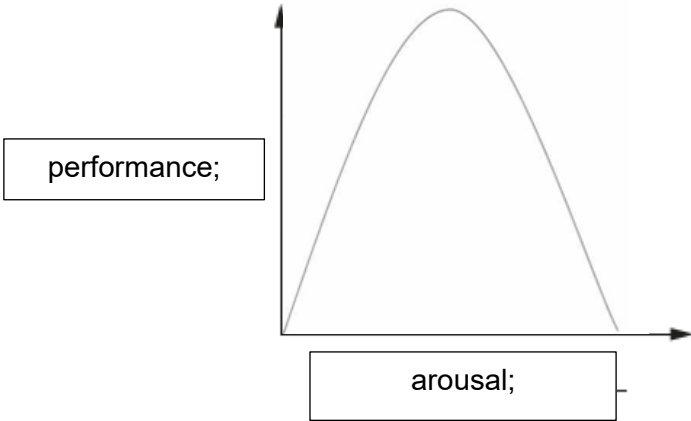
Question	Answer	Marks	Guidance
4(c)	1 mark for each suggestion. 3 from: age of the performer ; equipment / facilities available / location ; targets / goals of a performer ; level of motivation ; intensity of training ; the ability of the performer ; when competitions / matches will take place / time of the year ; time available to train ; frequency of training sessions ; type of activity ; availability of the coach ; Accept other appropriate suggestions.	3	DNA use the results of test on its own

Question	Answer	Marks	Guidance
5(a)	1 mark for: stroke volume: the volume of blood pumped out of the heart in one beat ; Accept alternative wording	1	Answer must include in one beat or similar, to gain a mark
5(b)	1 mark for correct cardiac output 1 mark for correct unit of measure for answer provided cardiac output: 4.8 ; unit: litres per minute ; OR cardiac output: 4800; unit: millilitres per minute ;	2	If the answer is wrong, cannot give the unit mark.

Question	Answer	Marks	Guidance
6(a)	1 mark for a benefit of each training method for each activity. netball: benefits of using circuit training: stations can be used to develop the different skills required in netball ; stations to develop speed to move into space quickly to receive the ball ; stations need to develop strength / power to be able to jump higher to catch the ball ; periods of work and rest can be altered to reflect the positions that players have ; can cover all the fitness components needed in netball ; cricket: benefits of weight training: able to throw a ball with more force from the boundary ; can improve the speed a player can bowl the ball ; increase running speed when fielding ; upper body strength allows the bat to strike the ball with more force / able to hit the ball to the boundary ; table tennis: benefits of HIIT training: training has short period of intense work followed by a rest which reflect rallies in the game ; develops cardiovascular / muscular endurance which can be required for long rallies ; develops explosive power required when smashing the ball ; improves reaction time to return a smash ; develops speed to allow a performer to move around the table faster ;	3	Benefits must be different. Example must relate to the activity. e.g. cricket increase strength TV Cricket – to be able to hit the ball TV
6(b)(i)	1 mark for each A: foundation ; B: performance ; C: elite ;	3	Accept excellence for elite BOD DNA performer for Performance TV

Question	Answer	Marks	Guidance
6(b)(ii)	1 mark for each appropriate suggestion. taking part in organised sporting activities at a club or sports centre ; reference mark to a sound level of performance ; playing in extra-curricular activities at school ; playing for enjoyment ; choose to do in their leisure time ; regular involvement in sport / training sessions ; uses basic skills ; tend to choose 1 or 2 sports ; participate for health / fitness ; Accept other appropriate suggestions	3	

Question	Answer	Marks	Guidance
7	1 mark for each appropriate factor. media coverage: the more television covers a sport more people are likely to participate / more coverage increases the number of role models which may influence younger people to participate / an increase in the number of women's sport shown increases girls participation / if minority sports are shown interest / participation levels will rise ; family: some families traditionally play a sport so young members of family may also take part / if parents take part in a sport children may go to watch and eventually take part / parents may coach a youth team that their children may participate in / parents may provide transport / pay for equipment ; education: some school may offer a wide range of sports that students can take part in / some schools have a history of taking part in a certain sport so all students play that sport / schools promote the value and benefits of playing sports / schools offer exam courses that deepen the understanding of pupils in sports ; discrimination: some sports are not inclusive so certain groups of society cannot take part / due to the politics some countries do not allow certain groups to participate in sports / traditions / religions of some countries prevent females from participating / racial discrimination may result in performers not wanting to participate ;	4	Accept positive and negative responses Answers need to demonstrate either an increase or decrease in participation Media – show more on television tv

Question	Answer	Marks	Guidance
8(a)	1 mark for the shape of the graph. 1 mark for each axis being labelled (max 2 marks) ; 	3	Accept either an inverted U shape / a bell shape or similar for shape mark

Question	Answer	Marks	Guidance
8(b)	1 mark for example of low level of arousal. 1 mark for example of high level of arousal. 1 mark for each justification low level of arousal: examples could include: preparing to take a penalty kick / conversion ; throwing the ball into the line out ; putting the ball into the scrum ; when receiving a pass ; passing the ball ; justification: able to focus on the task / high concentration ; needs to be relaxed / stay calm ; requires accuracy ; fine skill ; high level of arousal: examples could include: tackling an opponent ; pushing in a scrum ; entering a ruck ; lifting a player in a line out ; justification: need to be powerful in contact ; strength required ; use major muscle groups ; gross skill ; requires all out effort ; controlled aggression ; Accept other appropriate examples	4	Answers must relate to situations in rugby

Question	Answer	Marks	Guidance																		
9(a)	1 mark for each muscle correctly named. A: deltoid ; B: pectorals ;	2																			
9(b)	1 mark for correctly naming the muscle. 1 mark for each description of the role of the muscle (2 marks max) C: biceps ; role: acts as the agonist / prime mover ; pulls the radius towards the shoulder ; the bicep creates an isotonic / concentric contraction / muscle shortens ;	3	DNA flexion as in the question																		
9(c)	1 mark for each appropriate comparison. 2 from: <table border="1"><thead><tr><th>fast twitch muscle fibre</th><th></th><th>slow twitch muscle fibre</th></tr></thead><tbody><tr><td>produce a large amount of force</td><td>AND</td><td>produce a little force ;</td></tr><tr><td>low fatigue tolerance / tire quickly / short period of time</td><td>AND</td><td>high fatigue tolerance / does not tire quickly / long period of time ;</td></tr><tr><td>good for strength and power activities</td><td>AND</td><td>good for endurance ;</td></tr><tr><td>pale in colour</td><td>AND</td><td>red in colour ;</td></tr><tr><td>anaerobic</td><td>AND</td><td>Aerobic ;</td></tr></tbody></table> Accept other appropriate comparisons.	fast twitch muscle fibre		slow twitch muscle fibre	produce a large amount of force	AND	produce a little force ;	low fatigue tolerance / tire quickly / short period of time	AND	high fatigue tolerance / does not tire quickly / long period of time ;	good for strength and power activities	AND	good for endurance ;	pale in colour	AND	red in colour ;	anaerobic	AND	Aerobic ;	2	Answer must refer to both slow and fast twitch fibres for mark. Accept use of more than / greater etc. as a comparison. DNA accept answers relating to speed of Contraction
fast twitch muscle fibre		slow twitch muscle fibre																			
produce a large amount of force	AND	produce a little force ;																			
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pale in colour	AND	red in colour ;																			
anaerobic	AND	Aerobic ;																			

Question	Answer	Marks	Guidance
10	1 mark for identifying each movement. X: flexion ; Y: extension ; Z: plantar flexion ;	3	Accept X extension to flexion Y flexion to extension Z dorsi flexion to plantar flexion

Question	Answer	Marks	Guidance										
11(a)(i)	1 mark for a function from each named structure. left atrium: receives (oxygenated) blood from the lungs / pulmonary vein ; contracts to send (oxygenated) blood to the left ventricle ; right ventricle: receives (deoxygenated) blood from the right atrium ; contracts to send (deoxygenated) blood to the lungs / pulmonary artery ;	2											
11(a)(ii)	1 mark for each correct answer. <table><tr><th>Component of blood</th><th>function</th></tr><tr><td>red blood cells</td><td>contains haemoglobin / carries oxygen ;</td></tr><tr><td>white blood cells</td><td>defends against pathogens / creates antibodies to fight disease ;</td></tr><tr><td>Platelets ;</td><td>causes blood to clot to prevent blood loss during injury</td></tr><tr><td>Plasma ;</td><td>allows substances to dissolve and be transported easily</td></tr></table>	Component of blood	function	red blood cells	contains haemoglobin / carries oxygen ;	white blood cells	defends against pathogens / creates antibodies to fight disease ;	Platelets ;	causes blood to clot to prevent blood loss during injury	Plasma ;	allows substances to dissolve and be transported easily	4	Correct answer in bold Immune system alone – TV
Component of blood	function												
red blood cells	contains haemoglobin / carries oxygen ;												
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Platelets ;	causes blood to clot to prevent blood loss during injury												
Plasma ;	allows substances to dissolve and be transported easily												

Question	Answer	Marks	Guidance												
11(b)(i)	1 mark for each difference <table><tr><td>arteries</td><td></td><td>veins</td></tr><tr><td>thick / muscular walls</td><td>and</td><td>thin walls ;</td></tr><tr><td>narrow lumen</td><td>and</td><td>wide lumen ;</td></tr><tr><td>do not have valves</td><td>and</td><td>has valves ;</td></tr></table>	arteries		veins	thick / muscular walls	and	thin walls ;	narrow lumen	and	wide lumen ;	do not have valves	and	has valves ;	2	Answers must demonstrate the difference in structure between arteries and veins. DNA Function of veins / arteries on own Accept any reference to thicker / thinner walls as suggest difference Also accept arteries have elastic wall and veins do not
arteries		veins													
thick / muscular walls	and	thin walls ;													
narrow lumen	and	wide lumen ;													
do not have valves	and	has valves ;													
11(b)(ii)	1 mark for each. In the lungs / alveoli ; in the muscles ;	2													

Question	Answer	Marks	Guidance
12(a)	1 mark for each advantage (3 marks max) 1 mark for each disadvantage (3 marks max). advantages: can see the skill in context / how it should be performed ; demonstration by a coach can highlight a certain aspect of a skill ; skills can be broken down into sub routines ; watching a video allows for skill to be repeated ; watching a video allows analysis of technique ; building a mental picture of the skill ; useful in all stages of learning ; better for visual learners ; disadvantages: a demonstration might be poor / incorrect / learning inappropriate skills ; may not be repeated / limited access / live demonstration learner unable to watch repeat ; can be difficult to see fine movements of the skill ; performer may need to see the skill performed from different angles ; performer may not retain visual information / usually needs verbal guidance to be used alongside demonstration / may lack understanding of what they see ; not being able to replicate the skill can lead to anxiety / stress Accept other appropriate advantages / disadvantages	6	

Question	Answer	Marks	Guidance
12(b)	1 mark for the type of feedback 1 mark for an appropriate justification type of feedback: intrinsic ; justification: the performer can make immediate adjustments to performance ; helps the solve problems which develops a better understanding of their sport ; intrinsic feedback is needed to refine complex skills ; performer is not reliant on a coach to be present ; type of feedback knowledge of performance ; justification: feedback can be tailored to the level of understanding of the performer ; will needs to be specific / complex and detailed ; Accept other justifications	2	If type of feedback is wrong, do not mark justification. DNA – external or internal Also accept Positive and negative Concurrent and terminal also accept: type of feedback: knowledge of results; justification: the performer can immediately see any improvement / maintaining level of performance; does not need a coach to be present to get feedback; can motivate the performer if they see improvement; know if they are ready for match / event; type of feedback: extrinsic; justification: a coach helps to identify problems that might not be apparent to the performer; a coach offer solutions to problems; can be used to strengthen intrinsic feedback; video can be used for detailed analyse of performances; video can be stored to compare performance;

Question	Answer	Marks	Guidance
12(c)(i)	1 mark for each A: input ; B decision making ; C: output ;	3	
12(c)(ii)	1 mark from short- term memory has a limited capacity / amount of information it can store BUT long-term memory is thought to be limitless ; short-term memory can be forgotten (if not practiced) BUT it is retained in the long-term memory (without practice) ; short-term memory receives all new information BUT information cannot go directly into the long-term memory ; short-term memory runs motor programmes BUT long-term memory stores motor programmes ; long-term memory holds information for long periods of time BUT short-term memory holds information for a short period of time.	1	

Question	Answer		Marks	Guidance
13	1 mark for each correct answer.		4	Accept physical / social / mental on own
	statement	component of health and well-being		
	ability to mix with other people	social health and well-being ;		
	all body systems work well	physical health and well-being ;		
	feeling good	mental health and well-being ;		
	able to carry out everyday tasks	physical health and well-being ;		

Question	Answer	Marks	Guidance
14(a)	1 mark for each disadvantage health implications ; financial penalty ; public humiliation / ruined reputation ; disqualification ; banned ; loss of sponsorship ; negative media coverage ; effect on other competitors / unfair advantage ; loss of titles / medals / trophies Accept other appropriate disadvantages	3	For health issues, only accept one example. Addiction BOD for health

Question	Answer	Marks	Guidance
14(b)	1 mark for each appropriate PED (2 marks max) 1 mark for each effect (2 marks max) PED: diuretics ; effects mask the taking of other PEDs ; makes it easier to pump blood through the body ; decrease blood pressure ; helps weight loss / prevents the performer from carrying excessive weight ; PED: anabolic steroids ; effects: allows a performer to train for longer ; reduces recovery time ; increases muscle growth / strength ; enhances muscular endurance ; PED: stimulants ; effects: reduces fatigue and tiredness increases focus / alertness ; can give a surge of energy / maintain intensity ; can increase stamina and endurance ; PED: Beta Blockers ; reduces anxiety ; lowers heart rate ; reduces blood pressure ; causes depression ; heart failure ; causes tiredness ; calms ;	4	DNA enhances performance Also accept Narcotic analgesic; Reduces the level of pain; Mask injury; Increases the pain threshold; EPO; Builds muscle; Helps repair muscle tissue; Increase oxygen transport;

Question	Answer	Marks	Guidance
14(c)	1 mark for each description 3 from: using different types of testing / manage testing programmes ; education and awareness of the effect of drugs ; implement sanctions / banning the use of drugs ; legislation over the use of drugs ; training for coaches over the signs and symptoms of drug usage ; research and development to create more sophisticated testing methods ; working with international agencies such as WADA ; intervention programmes ;	3	