Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

LEVEL 2

PHYSICS

MARK SCHEME

Specimen Paper Mark Scheme

(for first examination in Autumn 2017)

This is a suggested, not a prescriptive, mark scheme.

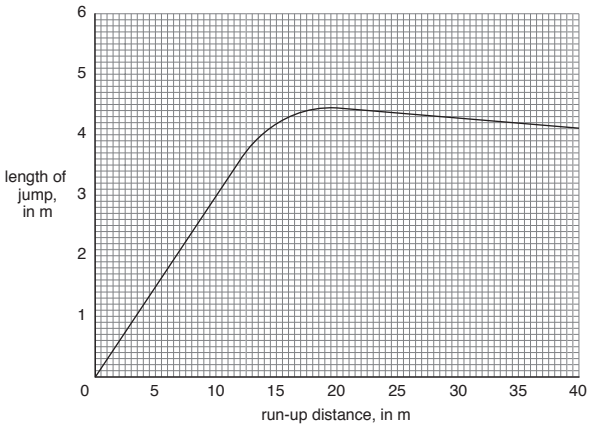
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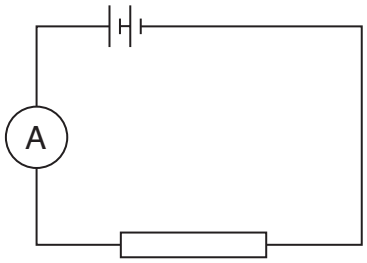
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Although candidates should be encouraged to show their working clearly, full marks should be awarded for the correct answer to numerical questions even if the working is not shown.

Q.	Answer	Mark	Additional Guidance
1. (a)	nuclear	**1**	
(b)	an ammeter	**1**	
(c)	4.6	**1**	
(d)	10 cm^3	**1**	
(e)	in a straight line	**1**	
(f)	Jupiter	**1**	
2. (a)	gravitational potential	**1**	accept just 'gravitational' or just 'potential'
(b) (i)	because energy is conserved (when it is transformed)	**1**	accept 'because it is all converted to kinetic energy'
(ii)	some energy will be lost/converted into thermal energy	**1**	
	due to air resistance/drag	**1**	
(c)	elastic/strain	**1**	
(d)	it lost (a lot of) energy when it bounced	**1**	award 1 mark for 'it has not bounced as high'
	in the form of thermal energy	**1**	do not credit energy lost due to air resistance

Q.	Answer	Mark	Additional Guidance
3. (a)	*decide whether the answer is 'high level' (5 or 6 marks), 'intermediate level' (3 or 4 marks), 'low level' (1 or 2 marks) or should receive no marks* *a 'high level' answer would be clearly organised, would include all of the following 'key ideas' and at least one 'additional idea'* *key ideas:* • mark/measure run up distances • measure the jump distance • repeat jumps for same run-up • vary run-up length *additional ideas include:* • specifies a sensible run-up range, e.g. 5 m to 50 m • rake sand between jumps • other valid points made by the candidate an 'intermediate level' answer is less well organised and might omit one key point, but generally addresses the task a 'low level' answer makes some valid points but fails to address the task properly, e.g. the candidate might not mention that the run-up length must be measured and varied	**6**	
(b)	*any one valid point, e.g:* same person doing the jumping allow recovery time between jumps similar weather/wind conditions	**1**	

Q.	Answer	Mark	Additional Guidance
(c)	*for example:*  	**2**	1 mark for positive gradient line (straight or curved), starting near but not necessarily at the origin 1 mark for gradient reducing/reducing and then going negative
4. (a)	the speed of sound is (much) less than the speed of light/radio waves	**1** **1**	
(b)	to make sure they are reliable	**1**	
(c)	(0.68 + 0.66 + 0.64 + 0.60 + 0.62)/5 0.64 (s)	**1** **1**	
(d)	speed = distance/time	**1**	accept any correct arrangement of this either in words or symbols
(e)	= 340 × 0.64 = 218 (m)	**1** **1**	allow ecf from part (c) allow 217.6 m
(f)	*e.g.* use an electronic timer repeat more times	**1**	any suitable idea that reduces uncertainty

Q.	Answer	Mark	Additional Guidance
5. (a)			deduct 1 mark for each error
	correctly-drawn 2 cells	**1**	
	correctly-drawn ammeter	**1**	
	correctly-drawn resistor	**1**	
	correctly-drawn as a series circuit	**1**	
(b) (i)	length of wire	**1**	
(ii)	current	**1**	
(iii)	use the same type of wire	**1**	
	use the same number of cells	**1**	
(c)	when the current is higher the resistance is lower	**1**	or the inverse of this
(d)	if the current decreases with length	**1**	or the inverse of this
	the resistance must increase (with length)	**1**	
(e)	as the length of the wire increases, the current decreases	**1**	
	so the resistance increases with length	**1**	
	quantitative argument:		
	e.g. as length doubles, current halves so resistance must have doubled	**1**	
(f) (i)	they should be of different diameters	**1**	
(ii)	be made from the same material/metal	**1**	

Q.	Answer	Mark	Additional Guidance
6. (a)	164.8 years	**1**	
(b)	Venus it takes the longest time to rotate	**1** **1**	
(c)	the time for orbit for Neptune is (much) longer than that for Mars which means Neptune's orbit must be much bigger and so further away (from the Sun)	**1** **1**	must compare the orbital times for 2 marks
(d)	*comments might include:* finding out whether there is life outside Earth the origins of the solar system satisfying human curiosity and driving technology forwards	**2**	2 marks for a coherent and thoughtful comment 1 mark for a low level but accurate comment
7. (a)	calculate the anticlockwise moment once balanced, make anticlockwise moment = clockwise moment use clockwise moment and distance to find weight	**1** **1** **1**	
(b)	moment = 0.1 N × 12 cm = 1.2 Ncm	**1**	
(c)	uses anticlockwise moment from (b) 1.2 Ncm = W × 8 W = 0.15 N	**1** **1**	
Total		**60**	