Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

LEVEL 2

PHYSICS

MARK SCHEME

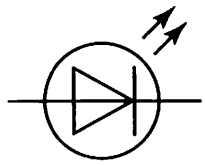
This is a suggested, not a prescriptive, mark scheme.

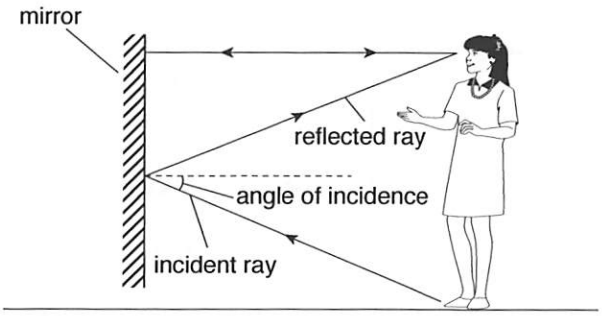
Wednesday 7 November 2012

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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)	30 g	**8**	
(b)	Mars		
(c)	chemical energy		
(d)	4		
(e)	11 cm		
(f)			
(g)	a north-seeking pole		
(h)	the upward force and the downward force are balanced		
2. (a)	series	**1**	
(b)	off off on	**2**	1 mark if two correct
(c)	AND	**1**	
(d)	*any suitable suggestion with some detail* *e.g.:* for safety on power-tools, such as hedge trimmers, so that both switches have to be closed before the machine operates	**2**	

<table>
<tr><th>Q.</th><th>Answer</th><th>Mark</th><th>Additional Guidance</th></tr>
<tr><td>3. (a) (i)</td><td>
</td><td>2</td><td>1 mark for rays correctly drawn from toes to eyes

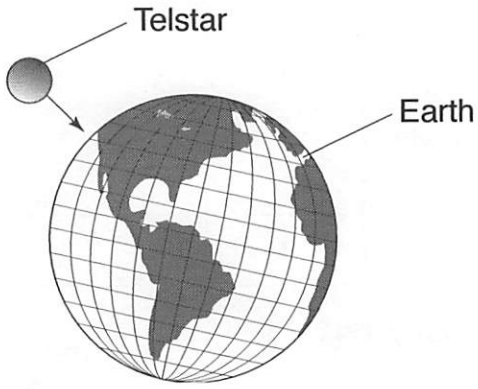
1 mark for angles approx. correct (by eye)

ignore absent arrows

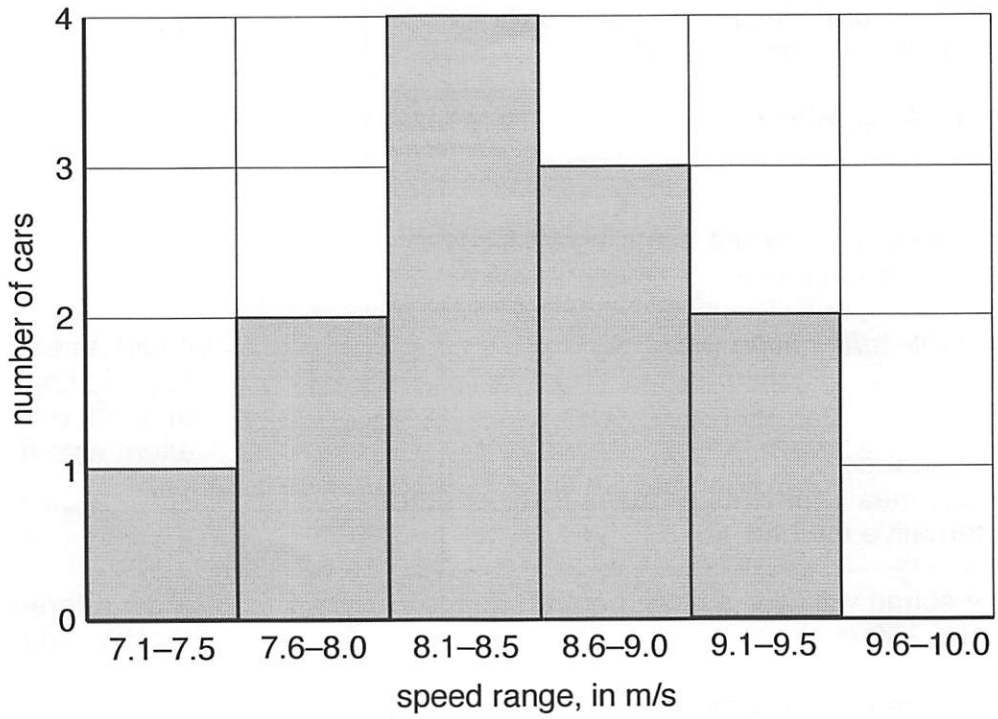
penalise incorrect arrows</td></tr>
<tr><td>(ii)</td><td>see diagram</td><td>2</td><td>2 marks for all three correct

1 mark for 1 correct</td></tr>
<tr><td>(b)</td><td>she can see her toes because the ray from her toes reaches her eye</td><td>1</td><td></td></tr>
<tr><td>(c)</td><td>half as tall as the person</td><td>1</td><td></td></tr>
<tr><td>4. (a)</td><td>because sound travels (much) more slowly than light</td><td>1</td><td></td></tr>
<tr><td>(b)</td><td><u>amplitude</u></td><td>1</td><td></td></tr>
<tr><td>5. (a)</td><td><table><tr><th></th><th>energy input</th></tr><tr><td>coal-fired power station</td><td>(chemical)</td></tr><tr><td>biomass generator</td><td>chemical</td></tr><tr><td>hydroelectric power station</td><td>gravitational potential</td></tr><tr><td>solar cell in a calculator</td><td>light</td></tr><tr><td>wind turbine</td><td>kinetic</td></tr><tr><td>gas-fired power station</td><td>chemical</td></tr></table></td><td>5</td><td>accept ‘kinetic’</td></tr>
<tr><td>(b)</td><td>coal and gas-fired power stations</td><td>2</td><td>1 mark for each correct answer

–1 for each incorrect</td></tr>
<tr><td>(c)</td><td>the Sun</td><td>1</td><td></td></tr>
</table>

Q.	Answer	Mark	Additional Guidance
6. (a)	300	1	ignore unit
(b)	pressure = force/area	1	or any correct arrangement
(c)	total force = 320 N pressure = 320/1800 = 0.18 (N/cm^2)	2	allow ecf from (a) 1 mark for 300/1800 = 0.17
(d)	the area of their feet is less than that of the sledge so pressure (on the snow) is greater	2	
7. (a) (i)	gravity	1	
(ii)		1	arrow towards centre of Earth (not vertical)
(b)	communication is not possible if the satellite is not visible this would limit the time available for continuous communication	2	
(c)	*a use plus a brief description* *e.g.:* weather observation – measuring temperatures, cloud positions and wind speed GPS – providing information for satellite navigation systems space observation – taking pictures of distant stars spy satellites – watching what is happening in other countries	2	1 mark for statement of use 1 mark for some detail
(d)	it reflects sunlight	1	
(e)	the Moon	1	

Q.	Answer	Mark	Additional Guidance
8. (a)	more accurate/less uncertainty/error in measurement has less effect	1	
(b) (i)	*suitable suggestion* *e.g.:* it is easy to miscount the 'clicks'/difficult to go in a straight line	1	
(ii)	*suitable suggestion with detail* *e.g.:* measure several times and take an average of the measurements or use a laser or other alternative method	2	could be an improved use of trundle wheel method, or a better alternative method
(c) (i)	the sound will take a time (about 0.6 s) to travel 200 m	1	allow reference to reaction time
(ii)	any means of sending the information faster, e.g. use of a mobile phone, with explanation	2	
(d)	21	1	value should be in the table
(e) (i)	speed = distance/time	1	any correct arrangement
(ii)	speed = 200/21 = 9.5(2) m/s	2	value should be in the table

Q.	Answer	Mark	Additional Guidance
(f)		**1**	
(g)	two cars	**1**	allow ecf from (e) or (f)
(h)	*suitable suggestion with a reason which backs up the suggestion* *e.g.:* there is not much point in having a stopwatch able to measure to 0.1 s since human reaction time is longer than this and therefore there is uncertainty in the measurement greater than 0.1 s anyway *or* it would be useful to have a stopwatch able to measure to 0.1 s since this will give more precise measurements of speed to see which cars are breaking the speed limit	**3**	the question is looking for some appreciation of the limits of measurement and accuracy or precision any answer which links a suggestion with a valid reason should be given credit
Total		**60**	

