

# Mark Scheme (Results)

March 2013

GCSE Physics  
5PH1H/01

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Question Number	Answer	Acceptable answers	Mark
<b>1 (a) (i)</b>	D		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1 (a) (ii)</b>	moons (1) heliocentric (1)	must be in correct order	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1 (a) (iii)</b>	A description including two of the following points  Reflecting telescope has mirror(s) (1)  Galilean telescope has only lenses (1)  Reflecting telescope can gather more light / can have a larger objective (1)  Image viewed from the side of reflecting telescope (1)  Image viewed from end of Galilean telescope. (1)	refracting telescope  reverse argument	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1 (b) (i)</b>	5 (cm) (1)  8 (cm) (1)	+5 -5  0.08 m 80 mm	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1 (b) (ii)</b>	B		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2 (ai)</b>	<p>A line connecting a train part with a useful energy transfer as shown below (1)</p> <p>Train part transfer                      useful energy</p> <pre> graph LR     subgraph Train_parts [Train part transfer]         DE[diesel engine]         G[generator]         M[motor]     end     subgraph Useful_energy [useful energy]         CE1[chemical to electrical]         CK1[chemical to kinetic]         EK1[electrical to kinetic]         KC1[kinetic to chemical]         KE1[kinetic to electrical]     end     DE --- CE1     DE --- CK1     G --- EK1     G --- KE1     M --- EK1     M --- KE1 </pre>	<p>Lines need not be straight</p> <p>Ignore any arrow heads drawn</p> <p>Note: if more than one line is drawn from a train part then zero mark for that train part.</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2 (aii)</b>	(transfer of energy to) thermal (1)	heat/sound	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2 (bi)</b>	1400 – 1300 (= 100) (kJ) (1)		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2 (bii)</b>	<p>Substitution (1) 1300 / 1400 x 100</p> <p>Evaluation (1) 93(%) or 0.93</p>	<p>A value which rounds to 93(%) or 0.93</p> <p>Correct answer with no working scores 2 marks</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2 (c)</b>	Any one from  black is a good thermal radiator (1)  (helps to) prevent motors overheating (1)	(good) emitter  (helps to) remove wasted energy/ heat (from the motor)	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)</b>	D		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)</b>	An explanation linking any two of  (presence of Earth's ) atmosphere (1)  causes light to be absorbed/reduced in intensity (1)  causes distortion of the image(1)  (more) <b>light</b> pollution (1)  (bigger) variations in temperature (1)	Accept reverse argument  (more) air/ clouds/ pollution/ dust  blocked / (more) difficult to see through  blurs the image / refracts the light	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)</b>	An explanation linking any three of  galaxies moving (1)  away from Earth / Sun (1)  galaxy 2 (moving away) faster (than galaxy 1) (1)  galaxy 2 is (likely to be) most distant galaxy (1)	          galaxies are (moving) at different speeds / away from each other / universe is expanding	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(d)</b>	<p>A description including the following stages (up to 3 marks)</p> <p>Protostar (1)</p> <p>Main sequence star (1)</p> <p>(super) red giant (1)</p> <p>supernova (1)</p> <p>neutron star (1)</p> <p>(even more massive star can become) black hole (1)</p> <p>more massive stars have shorter life (1)</p> <p>Three stages in the correct sequence (1)</p>		<b>(4)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(ai)</b>	A		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(aii)</b>	A description linking plates move / slip / separate (relative to each other) (1)  sudden (release of energy) (1)	plate rubs against each other friction between plates plate boundary shifts  jerk / jolt	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(bi)</b>	substitution (1) $0.65 = 80 / t$  transposition (1) $t = 80 / 0.65$ (123 seconds)	transposition and substitution can be in either order . Allow reverse calculations eg $speed = 80/120$ (1) $= 0.67$ ( about 0.65) (1) or $distance = 0.65 \times 120$ (1) $= 78 \text{ km}$ (about 80) (1).	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(bii)</b>	A description linking any three detection of arrival of P and S waves (1) measurement of difference in arrival times (1) calculation of distance (from epicentre to station) (1) triangulation/using three / several stations (1)	Reward suitable labelled diagram	<b>(3)</b>



Question Number	Answer	Acceptable answers	Mark
<b>4(b)(iii)</b>	<p>A suggestion including any two of the following</p> <p>Infrasound (1)</p> <p>some animals can hear waves below human frequency range / 20 Hz (1)</p> <p>they could hear P waves arriving before the (stronger) S waves arrive (1)</p>	<p>Some animals have greater audio / tactile sensitivity than humans</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(a)</b>	A		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(b)</b>	<p>alpha particles (In the left section)</p> <p>gamma rays (centre section)</p> <p>infrared radiation (right section) (2)</p>	<p>Any one in correct position for one mark, all three in correct position for two marks</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(c)</b>	C		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(d)</b>	<p>A description to include</p> <p>The purpose of using gamma radiation (1)</p> <p>Some relevant detail about how it achieves the purpose (1)</p>	<p>Purposes may include</p> <p>sterilising food /medical equipment detection / treatment of cancer imaging /detect flaws in materials</p>	<b>(2)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*5(e)</b>	<p>An explanation-including some of the following points</p> <p>Results obtained:</p> <ul style="list-style-type: none"> <li>• Herschel: temperature on thermometer</li> <li>• Ritter: speed of darkening of silver chloride paper</li> </ul> <p>Trend of results:</p> <ul style="list-style-type: none"> <li>• Herschel: hotter towards red end</li> <li>• Ritter: quicker towards blue/violet end</li> </ul> <p>Extension of experiment to get more results:</p> <ul style="list-style-type: none"> <li>• Herschel: measure below red; found it even hotter</li> <li>• Ritter: measure above blue/violet; paper darkened quicker</li> </ul> <p>Conclusion:</p> <ul style="list-style-type: none"> <li>• Herschel: Must be radiation below red ( Infra Red)</li> <li>• Ritter: Must be radiation above blue/violet ( UV)</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content	
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• A limited description of either some results or conclusions from either experiment. For example: They measured temperature across the spectrum and found that temperature changed. They put silver chloride paper in the spectrum and found that it darkened at different speeds with different colours. The answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• <u>spelling, punctuation and grammar are used with limited accuracy</u></li> </ul>	
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• A simple explanation of results and conclusions from both experiments . For example: Herschel measured the temperature across the spectrum and found it hotter towards the red end. This was infra red radiation. Ritter measured the darkening of chloride paper across the spectrum. It was quicker towards the violet end. They had discovered ultra violet.</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• <u>spelling, punctuation and grammar are used with some accuracy</u></li> </ul>	
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed explanation of all the results obtained from both experiments and the conclusions from these results. For example a response as for level 2 given above but with detail about results being obtained from outside the visible spectrum</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• <u>spelling, punctuation and grammar are used with few errors</u></li> </ul>	

Question Number	Answer	Acceptable answers	Mark
<b>6(ai)</b>	Model A because  Model A (can produce up to )7200kWh per year (at 13mph) / will produce 6000 kWh (with given wind speed). (1)	Model B produces less than 6000kWh per year at 13mph /requires wind speed of more than 13mph to produce 6000kWh	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(aii)</b>	Substitution (1) 0.14 x 6000  Evaluation (1) (£)840	Allow incorrect conversion of p to £ such as 0.014 x 6000 for 1 mark only  84 000 p  correct answer with no working shown gains both marks	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(aiii)</b>	Divide the installation cost by the annual saving (to find the time in years) (1)	£840 for annual saving	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(aiv)</b>	A suggestion linking  (energy saving lamps) would not transfer so much thermal energy (1)  he may have to use additional heating / lights (which would cost money to run/ purchase) (1)	not get hot / produce so much heat  reverse argument such as insufficient heat for chicks to thrive  (Ignore references to light output.)	<b>(2)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>* 6(b)</b>	<p>A discussion including some of the following points</p> <ul style="list-style-type: none"> <li>• Both HEP and Solar power are renewable</li> <li>• Both HEP and Solar power would save fossil fuels</li> <li>• HEP only possible in some locations</li> <li>• HEP requires reservoirs and damming of rivers</li> <li>• This can damage environment /takes a lot of land out of use</li> <li>• Energy from solar power installation is currently much less than energy from fossil fuel powered station</li> <li>• Solar power only suitable in certain locations</li> <li>• Solar power reliability dependent on constant sunshine</li> <li>• Neither of them cause atmospheric pollution</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content	
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• a limited description such as at least one relevant detail of each resource eg: Solar power doesn't give off atmospheric pollution. HEP generates more power than solar power.</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>	
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• a simple discussion such as one which gives comparisons between the two or at least an advantage and disadvantage of both. eg: HEP does not use fossil fuels but it can damage the environment where is it located. Solar power will never run out but it requires lots of light/land.</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>	
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed comparison such as one which relates advantages and disadvantages of <b>both</b> HEP and solar power to a particular situation for possible large scale use e.g.: Solar power uses a renewable energy source but it currently does not produce as much energy as fossil fuel station where there is little sunlight. HEP can produce a lot more energy where there are hills and water but only possible in certain geographical locations.</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>	

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