



General Certificate of Secondary Education

Science B 4462 / Physics 4451

PHY1F Unit Physics 1

Mark Scheme

2008 examination - January series

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

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PHY1F**Question 1**

question	answers	extra information	mark
(a)	electric drill C		1
	MP3 player E		1
	toaster B		1
(b)(i)	2100	no unit required / ignore units accept 2.1 kW must have units for this	1
(ii)	Y		1
(iii)	bar drawn with any height greater than Y	ignore width of bar	1
(c)(i)	any one from: <ul style="list-style-type: none"> • holds more water • works in other countries • boils faster • has a more powerful element • can filter water 	answers must be a comparison do not accept 1 litre of water on its own accept a named country accept works at 2 voltages do not accept 1 kW element on its own ignore can wash filter	1

Question 1 continued on the next page

PHY1F**Question 1 continued**

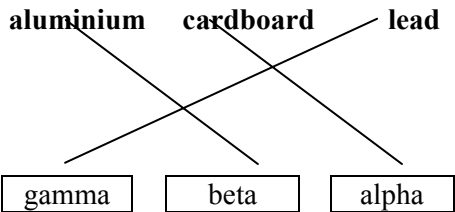
(ii)	any one from: <ul style="list-style-type: none">• it weighs less• smaller to pack• cheaper to use	answers must be a comparison or state why the chosen feature is an advantage accept boils enough for one drink	1
total			8

PHY1F**Question 2**

question	answers	extra information	mark
(a)(i)	digital	correct answer only	1
(ii)	(visible) light	answer in either order	1
	infra red	accept IR	1
(b)(i)	25 (%)	do not accept $\frac{1}{4}$	1
(ii)	increases		1
(c)	tick (✓) in top and bottom box	both required	1
(d)	<p>SHINY surfaces are good reflectors of infra-red radiation</p> <p>or</p> <p>black surfaces are POOR reflectors of infra-red radiation</p> <p>or</p> <p>black surfaces are good EMITTERS of infra-red radiation</p> <p>or</p> <p>black surfaces are good ABSORBERS of infra red radiation</p>	<p>accept white for shiny</p> <p>accept bad for poor</p> <p>accept insertion of 'not' before 'good' in statement</p>	1
total			7

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Question 3

question	answers	extra information	mark
(a)(i)	P		1
(ii) A	Q		1
(b) G	3 lines correct aluminium cardboard lead  <input type="text" value="gamma"/> <input type="text" value="beta"/> <input type="text" value="alpha"/>	allow 1 mark for 1 correct line two lines drawn from any source or box – both incorrect	2
(c)(i)	K		1
(ii)	56	accept 50 – 60 inclusive	1
(iii)	K		1
(iv)	to inject... tracer		1
total			8

PHY1F**Question 4**

question	answers	extra information	mark
(a)	less / no <u>light</u> pollution	accept no / fewer streetlights	1
	less cloud cover / above clouds		1
	less <u>atmospheric</u> pollution	accept air for atmospheric accept idea of thinner atmosphere	1
(b)	microwave	correct answer only	1
(c)	the atmosphere absorbs X-rays		1
total			5

PHY1F**Question 5**

question	answers	extra information	mark
(a)	any two from: <ul style="list-style-type: none"> • (burning) fossil fuels produces greenhouse gases / pollutant gases / acid rain / leads to global warming • nuclear fuels produce dangerous waste • fossil fuels are non-renewable • renewable energy resources produce no pollutant gases • large amounts of energy are available • <u>running</u> costs are low 	accept a named fossil fuel accept a named pollutant gas accept radioactive for dangerous accept reference to dangers of nuclear fuels accept running out of fuels accept renewable won't run out accept any reasonable benefit of renewables accept any reasonable drawback of non-renewables do not accept better for the environment on its own	2
(b)	R U S T	all in correct order allow 2 marks for 2 correct allow 1 mark for one correct	3
total			5

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Question 6

question	answers	extra information	mark
(a)(i)	any one from: <ul style="list-style-type: none"> • coal • oil • (natural) gas 	do not accept fossil fuels accept diesel accept biofuel or a named biofuel eg wood / straw accept household / industrial waste owtte	1
(ii)	0.3	accept 30% if 2 marks not awarded then: allow 1 mark for 30 (without%) allow 1 mark for 0.3 with a unit or % allow 1 mark for identification of energy input and output eg. 20 sq input and 6 sq output or 4 sq input and 1.2 sq output or 40 sq input and 12 sq output even if subsequent working incorrect allow 1 mark for correct expression of 1.2 over 4 or 12 over 40 or 6 over 20 (squares)	2
(iii)	(nuclear) fission	accept fission provided it is not fusion	1

Question 6 continues on the next page

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Question 6 continued

question	answers	extra information	mark
(b)(i)	small proportion of <u>energy</u> / <u>power</u> is wasted or transfers most / more / a lot of <u>energy</u> / <u>power</u> usefully	accept little / less <u>energy</u> / <u>power</u> / <u>heat</u> is wasted do not accept it wastes no <u>energy</u> / <u>power</u>	1
(ii)	it decreases the current / uses low current or <i>it</i> increases the voltage / potential difference or uses high voltage / potential difference smaller the current the smaller the energy loss	accept pd for potential difference accept power / heat for energy	1 1
(c)(i)	as a control	accept to make a comparison do not accept fair test on its own	1
(c)(ii)	so people know how much data the link was based on or people can <u>judge</u> the significance / reliability of the link	accept idea that larger numbers are better do not accept significance / reliability on its own ignore reference to accuracy	1

Question 6 continues on the next page

PHY1F**Question 6 continued**

question	answers	extra information	mark
(iii)	other possible factors may be responsible or have not been investigated named factor eg environment / genetic		1 1
(iv)	first box ticked plus reason or second box plus reason	acceptable reason such as so people know there may be a risk as soon as possible / so that other scientists can use findings acceptable reason such as no point to worry / confuse / panic people (until the research has been confirmed) accept idea that it may lead to wrong advice do not accept in case they are wrong	1
total			12