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ASSESSMENT and QUALIFICATIONS ALLIANCE

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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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: • 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

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Question 1 continued

(ii)	any **one** from: • 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

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Question 2

question	answers	extra information	mark
(a)(i)	digital	correct answer only	1
(ii)	(visible) light infra red	answer in either order accept IR	1 1
(b)(i)	25 (%)	do **not** accept ¼	1
(ii)	increases		1
(c)	tick (✓) in top and bottom box	both required	1
(d)	SHINY surfaces are good reflectors of infra-red radiation **or** black surfaces are POOR reflectors of infra-red radiation **or** black surfaces are good EMITTERS of infra-red radiation **or** black surfaces are good ABSORBERS of infra red radiation	accept white for shiny accept bad for poor accept insertion of 'not' before 'good' in statement	1
total			7

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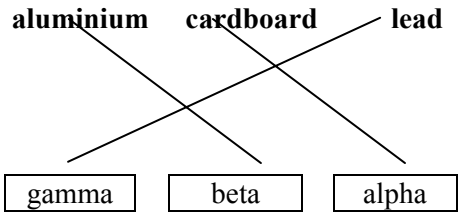
Question 3

question	answers	extra information	mark
(a)(i)	**P**		1
(ii) A	**Q**		1
(b) G	3 lines correct  	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

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Question 4

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

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Question 5

question	answers	extra information	mark
(a)	any **two** from: • *(*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: • coal • oil • (natural) gas	do **not** accept fossil fuel*s* 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 fision 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 energy / power is wasted **or** transfers most / more / a lot of energy power usefully	accept little / less energy / power / heat is wasted do **not** accept it wastes no energy / power	1
(ii)	it decreases the current / uses low current **or** *it* 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 judge 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

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Question 6 continued

question	answers	extra information	mark
(iii)	other possible factors may be responsible **or** have not been investigated		1
	named factor eg environment / genetic		1
(iv)	first box ticked 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	1
	or second box plus reason	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	
total			12