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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Physics 4451

PHY1F Unit Physics 1

Mark Scheme

2008 examination – June 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)	iron	answers can be in any order	1
	hairdryer		1
	kettle		1
(b)	sound		1
(c)	is more efficient than		1
total			5

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Question 2

question	answers	extra information	mark
(a)	gas oil		1 1
(b)	(both) use steam to drive a turbine	accept (both) use turbines to drive generators do **not** accept both have a turbine /generator / use steam must describe a step in the process accept heat / thermal energy transformed to kinetic / electrical energy	1
(c)	140 (^{o}C)	correct answer only allow **1** mark for method clearly shown on graph accept a cross or other indication at correct position on the line accept correct description accept even if numerical answer is incorrect	2

Question 2 continues on the next page

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Question 2 continued

question	answers	extra information	mark
(d)	any **one** from: • very large energy source / reserves • no polluting / harmful gases produced • reduces carbon emissions • no fuel needed • energy is free • can generate energy for a long time • renewable (energy source) • fossil fuels are running out	do **not** accept answers purely in terms of disadvantages of other methods except for fossil fuels are running out accept named gas CO_2 SO_2 NO_x accept reduces harmful carbon emissions accept does not contribute to global warming accept energy available for a long time accept it saves fossil fuels / non-renewable accept reduces the amount of fossil fuels being burnt accept a named fossil fuel Better for the environment / environmentally friendly insufficient it is cheaper is insufficient	1
total			6

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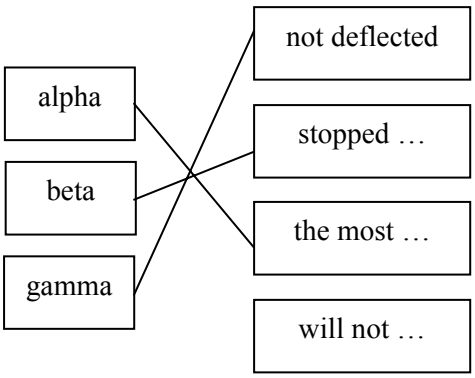
Question 3

question	answers	extra information	mark
(a)	3 lines correctly drawn  	**1** mark for each correct line if more than one line is drawn from a box in List **A** all lines from that box are wrong	3
(b)	nucleus	accept nuclei do **not** accept nuclear	1
(c)	**Y**	do **not** accept gamma	1
	any **two** from:	do **not** accept other properties of gamma	2
	• least dangerous (inside the body)	do **not** accept not dangerous accept not as harmful as alpha (inside the body)	
	• least ionising		
	• penetrates through the body	do **not** accept can be detected externally	
	• is a gas / can be breathed in	accept it is not a solid (cannot score if **Z** chosen) if **X** chosen can score this gas mark if **Z** chosen can score **both** gamma marks	

Question 3 continues on the next page

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Question 3 continued

question	answers	extra information	mark
(d)	any **one** from: • longer shelf life • food can be supplied from around the world • wider market for farmers • cost to consumers (may be) lower • less likely to / will not get food poisoning	do **not** accept kills bacteria accept stays fresh longer / stops it going bad / mouldy accept infection / disease / ill for food poisoning	1
total			8

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Question 4

question	answers	extra information	mark
(a)	atmosphere distorts / blocks image	accept clouds block light / global dimming accept because of the atmosphere accept weather conditions	1
	or		
	atmosphere scatters light	accept light pollution	
(b)		do **not** accept answers in terms of mirror size	
	Correct statement related to distance		1
	Sensible comment related to access		1
	eg		
	Hubble telescope is close enough (1) for a spacecraft / astronauts to reach (1)		
	or		
	James Webb is too far away (1) for astronauts to travel to (1)		
		do **not** accept easier to service on it's own	
(c)	To test the design ….		1
(d)	gamma rays	answers in any order	1
	X-rays		1
(e)	Big bang		1
total			7

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Question 5

question	answers	extra information	mark
(a)	£19.20	allow **1** mark for correct substitution ie 160 × 12 allow **1** mark for an answer (£)1920 an answer of 1920p gains **both** marks an answer of £40.80 gains **both** marks allow **1** mark for 340 × 12	2
(b)	340	allow **1** mark for correctly using the reading 62580 ie 62920 − 62580 accept £40.80 for **both** marks	2
total			4

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Question 6

question	answers	extra information	mark
(a)(i)	soil		1
(a)(ii)	type of surface is a categoric (variable)	accept surface is not a continuous (variable) do **not** accept data is discrete	1
(a)(iii)		mark is for a feasible reason linked to either the skier or golfer accept radiation for UV	1
	skier		
	exposed to high(er) level reflected UV **or** less UV absorbed by the atmosphere	accept snow is a good reflector of UV do **not** accept snow reflects UV accept snow is a poor absorber of UV do **not** accept snow absorbs UV	
	golfer		
	out when Sun's intensity is highest **or** larger area of skin / body exposed	accept when Sun is stronger / hotter accept golfer is outside for longer	
(a)(iv)	any **one** from: • (skin) cancer • premature skin ageing	 accept kills / damages cells accept a correct description do **not** accept suntan accept burn (it)	1

Question 6 continues on the next page

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Question 6 continued

question	answers	extra information	mark
(b)(i)	level of UV **transmitted** is very low	accept energy / rays for UV accept answers in terms of absorbed / blocked	1
	for all wavelengths shown / up to 400 nm	only scores if first mark scores accept an answer in terms of cannot support 95% claim as measurements cannot be taken from the graph **or** an attempted calculation	1
(b)(ii)	glass transmitted most / a lot of UV **or** glass absorbed little UV	accept energy / rays for UV do **not** accept light for UV do **not** accept all UV accept results (almost) same as no absorbing material accept blocks / stops for absorbed do **not** accept no UV	1
(c)(i)	Publicity and education ….		1
(c)(ii)	implication of financial gain	accept to promote the product sunglasses cost a lot of money is insufficient	1
total			9

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Question 7

question	answers	extra information	mark
(a)	any **three** from: • (air) particles / molecules / atoms gain energy • (air) particles / molecules / atoms move <u>faster</u> • (air) particles / molecules / atoms move apart • air expands • air becomes less dense • warm / hot air rises	ignore reference to skewer do **not** accept move more do **not** accept move with a bigger amplitude / vibrate more do **not** accept particles expand do **not** accept heat rises if credit is to be given for answers in terms of particles it must be clear they are air particles **not** gas particles	3
(b)	conduction	accept conductor	1

Question 7 continues on the next page

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Question 7 continued

question	answers	extra information	mark
(c)	any **one** from: • temperature of the potato • temperature of the surroundings / room / surface / atmosphere • size / mass / weight / volume of the potato • shape of the potato • surface area of the potato • nature of the surface of the potato • type of surface it is placed on • in a draught • type of potato • whether the skewers are left in or taken out	 do **not** accept heat for temperature accept how hot the potato / room is potato cut open insufficient	1
(d)	(foil) reflects heat (back towards potato) **or** (foil) is a poor emitter (of heat radiation)	reduces heat loss is insufficient do **not** accept reflects hot air accept reduces / stops heat loss by <u>radiation</u> do **not** accept heat is trapped	1
total			6