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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Additional Science 4463 / Physics 4451

PHY2F Unit Physics 2

Mark Scheme

2008 examination – June series

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Question 1

	answers	extra information	mark
(a)	53 (m)		1
(b)(i)	Similar shape curve drawn above existing line going through (0,0)	allow **1** mark for any upward smooth curve or straight upward line above existing line going through (0,0)	2
(ii)	rain on road		1
	car brakes in bad condition		1
(c)(i)	all three lines correctly labelled	allow **1** mark for one correctly labelled	2
	top line – C	accept 1.2	
	middle line – B	accept 0.9	
	bottom line – A	accept 0.7	
(ii)	any **two** from: • (table has) both variables are together • both (variables) could/ would affect the reaction time • cannot tell original contribution • need to measure one (variable) on its own • need to control one of the variables	accept tired and music as named variables accept cannot tell which variable is affecting the drive (the most) accept need to test each separately	2
total			9

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Question 2

	answers	extra information	mark
(a)(i)	electrons		1
	jumper		1
(ii)	positive	accept protons accept +	1
(iii)	positively charged	accept any clear way of indicating the answer	1
(b)(i)	copper		1
	it is an (electrical) conductor	only accept if copper is identified do **not** accept it conducts heat accept it conducts heat and electricity accept copper is the best conductor accept correct description of conduction	1
(ii)	current		1
total			7

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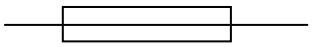
Question 3

	answers	extra information	mark
(a)(i)	blue		1
(ii)	earth		1
(iii)	rubber / plastic	accept any suitable **named** non conductor eg polypropylene do **not** accept bakelite do **not** accept an insulator	1
(iv)			1
(b)	any **two** from: • draws too high a current • socket overloaded • wiring gets too hot / melts • (may) cause a fire • (may) cause sparking • (possible) physical damage to the socket	 accept power for current do **not** accept electricity/ electric for current accept too much current goes through the socket do **not** accept too many currents go through the socket it = socket do **not** accept circuit for socket accept socket for wiring do **not** accept fuse melts or blows do **not** accept plug/ appliances overheating a physical reason, such as stick out from the wall is insufficient ignore reference to electric shocks	2
total			6

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Question 4

	answers	extra information	mark
(a)(i)	0.6	allow **1** mark for correct substitution	2
	newtons	accept N do **not** accept n accept Newtons	1
(ii)	the same as		1
(b)(i)	changed velocity	accept increased/ decreased for change accept speed for velocity accept change direction accept getting faster/ slower accept start/ stop moving accept correct equation in terms of change in speed or change in velocity	1
(ii)	down(wards)	accept towards the ground accept ↓ do **not** accept south	1
(iii)	increase		1
	velocity is increasing **or** it is accelerating	can only credit second mark if answer is increase accept speed for velocity accept is moving faster accept an answer in terms of resultant force downwards mention of weight/ mass increasing negates second mark	1
total			8

Question 5

	answers	extra information	mark
(a)(i)	4 (V)	allow **1** mark for correct substitution	2
(ii)	5 (V) or (9 – their (a)(i)) correctly calculated	e.c.f do **not** allow a negative answer	1
(b)(i)	thermistor	c.a.o	1
(ii)	0°C to 20°C		1
total			5

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Question 6

	answers	extra information	mark
(a)(i)	protons neutrons	answers may be in either order	1 1
(ii)	86		1
(iii)	two **fewer** protons and two **fewer** neutrons **or** 84 protons 134 neutrons	do **not** accept two fewer protons and neutrons do **not** accept 218 protons and neutrons	1
(b)(i)	0.4	accept $\frac{2}{5}$ / accept 40 % for 2 marks allow **1** mark for correct totalling = 1.8 allow **1** mark for a clearly correct method with a clearly incorrect total	2
(ii)	any **one** from: • nuclear weapon testing • nuclear power (stations) • nuclear accidents • medical	 do **not** accept nuclear accept nuclear/ radioactive waste accept X-rays	1
(c)(i)	2	accept 2:1 accept twice as big ignore units	1

Question 6 continues on the next page

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Question 6 continued

	answers	extra information	mark
(ii)	No with a reasonable reason explained only going for two weeks so **or** even staying for a year		1
	total exposure well under lowest limit for causing cancer	**1** mark is for a time frame **1** mark is for correctly relating to a dose	1
	or Yes with a reasonable reason explained all levels of radiation are (potentially) hazardous (1)	accept low doses could still cause cancer accept all levels affect you do **not** accept radiation dose is high(er) do **not** accept level of background radiation is higher in Germany	
	harm caused by lower doses may not have been recorded (1) **or** evidence may not be complete **or** insufficient research into effect of small doses		
total			10