



General Certificate of Secondary Education

**Additional Science 4463 /
Physics 4451**

PHY2F Unit Physics 2

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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PHY2F**Question 1**

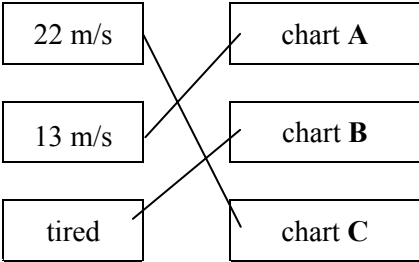
question	answers	extra information	mark
(a)	B or bungee cords		1
	C or springs or playground ride	each additional answer loses 1 mark minimum mark zero	1
	will go back to original shape/size		1
(b)(i)	newton		1
(ii)	0 – 5 (N) or 5	accept 1-5 (N) do not accept 4	1
(iii)	16 (cm)		1
(iv)	2.5 (N)	accept answer between 2.4 and 2.6 inclusive	1
total			7

PHY2F**Question 2**

question	answers	extra information	mark
(a)(i)	mass	do not accept weight	1
	speed	accept velocity answers can be in either order	1
(ii)	zero	accept nothing	1
(b)(i)	100	allow 1 mark for correct substitution of data	2
(ii)	conserved		1
total			6

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Question 3

question	answers	extra information	mark
(a)(i)	constant		1
(ii)	heat		1
(b)(i)	<p>3 links correct</p> 	<p>allow 1 mark for 1 correct link</p> <p>if more than one line is drawn from a condition mark all lines from that condition incorrect</p>	2
(ii)	increased		1
total			5

PHY2F**Question 4**

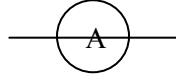
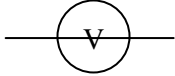
question	answers	extra information	mark
(a)(i)	hairdryer 13 saw 3 mixer 13	all correct allow 1 mark for 2 correct	2
(ii)	fuse melts	accept blows/ breaks/ snaps for melts do not accept blows up do not accept fuse gets hot on its own do not accept does not work on its own	1
(b)(i)	920	allow 1 mark for correct substitution	2
(ii)	no earth (wire) outside / case may become live or danger of electric shock	cause a fire insufficient	1 1
(c)(i)	L and N	both required	1
(ii)	9 (volts)	correct answer only	1
total			9

PHY2F**Question 5**

question	answers	extra information	mark
(a)	top and bottom boxes identified		1
(b)	Medical (treatment) or X-rays	answer must be in table accept treatment for medical treatment	1
(c)	15	allow 1 mark for correctly identifying 300 as the average dose	2
total			4

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Question 6

question	answers	extra information	mark
(a)(i)	ammeter symbol correct and drawn in series	accept  do not accept lower case a	1
	voltmeter symbol correct and drawn in parallel with the material	do not accept 	1
(ii)	adjust / use the variable resistor or change the number of cells	accept change the resistance accept battery for cell accept change the p.d / accept change the voltage accept increase / decrease for change	1
(b)(i)	data is <u>continuous</u> (variable)		1
(ii)	36 (Ω)	correct answer only	1
(iii)	5.4 or their (b)(ii) \times 0.15	allow 1 mark for correct substitution	2
(c)(i)	the <u>thicker</u> the putty the <u>lower</u> the resistance	answer must be comparative accept the converse	1

PHY2F**Question 6 continued**

question	answers	extra information	mark
(ii)	any one from: <ul style="list-style-type: none"> • measuring length incorrectly • measuring current incorrectly • measuring voltage incorrectly • ammeter / voltmeter incorrectly calibrated • thickness of putty not uniform • meter has a zero error 	accept may be different length do not accept different currents do not accept different voltage accept any sensible source of error eg putty at different temperatures do not accept human error without an explanation do not accept pieces of putty not the same unless qualified do not accept amount of putty not same do not accept systematic / random error	1
(iii)	repeat readings	accept check results again accept do experiment again accept do it again accept compare own results with other groups do not accept take more readings	1
total			10

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Question 7

question	answers	extra information	mark
(a)	clothing and seat rub together <u>electrons</u> transfer from seat to driver or <u>electrons</u> transfer from driver to seat	accept friction between clothing and seat accept electrons transfer on its own if first mark scores an answer in terms of <i>rubbing</i> , between clothing and seat and <i>charge</i> transfer without mention of electrons gains 1 mark an answer in terms of <i>friction / rubbing</i> and <i>electron transfer</i> without mention of clothing and seat gains 1 mark	1 1
(b)(i)	how wet the air is affects charge (build up) or damp air is a better conductor or damp air has a lower resistance	accept humidity affects charge do not accept fair test or as a control unless explained	1
(ii)	No – it was only the lowest under these conditions or No – there are lots of other materials that were not tested or Yes – the highest value for cotton is smaller than the lowest value for the other materials	accept answer in terms of changing the conditions may change the results do not accept results show that it is <u>always</u> less / smallest	1
total			4