



General Certificate of Secondary Education

Physics 4451

PHY3F Unit Physics 3

Mark Scheme

2008 examination – June series

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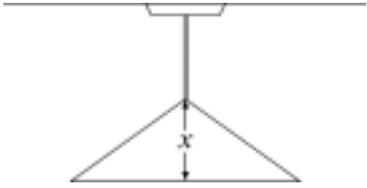
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Question 1

question	answers	extra information	mark
(a)	centre of X should appear to be on the continued line of the flex and in the body of the lamp as judged by eye	example 	1
(b)	below		1
(c)	(D)→B→F→A→C→(E)	all four correct for 3 marks or any two correct for 2 marks or just one correct for 1 mark	3
total			5

Question 2

question	answers	extra information	mark
(a)	step-down (transformer)		1
(b)	alternating current	accept minor misspellings but do not credit 'alternative current'	1
(c)(i) & (ii)	magnet attracts upwards	correct order essential accept 'up'	3
total			5

PHY3F**Question 3**

question	answers	extra information	mark
(a)(i)	A, C and D	any order but all three required and no others	1
(a)(ii)	D and E	either order but both required and no others	1
(b)(i)	20000 (Hz) to 20 (Hz) or vice-versa	accept '19980 (Hz)'	1
(b)(ii)	frequency (of dog whistle) too high (for humans to hear) / frequency above 20000 Hz	accept 'it is ultrasound' accept 'sound from the whistle is ultrasonic'	1
(c)(i)	substance reflection	correct order essential	1 1
(c)(ii)	detector		1
total			7

Question 4

question	answers	extra information	mark
(a)	dust space	accept 'solid (s)' accept 'from supernova / supernovum / supernovas'	1 1
(b)	By atoms joining together	only one ticked or otherwise unambiguously identified	1
(c)	Milky Way (galaxy)		1
(d)	The answer depends on beliefs and opinions, not scientific evidence.	only one ticked or otherwise unambiguously identified	1
total			5

PHY3F

Question 5

question	answers	extra information	mark
(a)(i)	P		1
(a)(ii)	the child's grip / hold / pull (on the roundabout / bar / rail)	or 'the tension in the child's arms' accept 'the child's muscles' accept 'friction between the child and the roundabout' do not accept just 'friction'	1
(a)(iii)	increases	accept any unambiguous indication that this ending has been selected	1
(b)(i)	360 (Nm)	credit either $240 \times 1\frac{1}{2}$ or 240×1.5 with 1 mark	2
(b)(ii)	move to(wards) the left / to(wards) the / his end	or move away from the centre / pivot / axis (of rotation) or move away from the girl / the child / his daughter	1
(c)(i)	C		1
(c)(ii)	friction / grip of the car / tyres / wheels (on the road)	do not accept just 'friction / grip'	1
total			8

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Question 6

question	answers	extra information	mark
(a)(i)	(angle of) refraction	take care not to credit 'angle of reflection'	1
(a)(ii)	normal	do not credit 'horizontal'	1
(b)	either (photographic) <u>film</u> or CCD(s) (charge-coupled device(s)) / CMOS(s) (sensor(s)) / (active) pixel sensor(s)	accept 'LDR(s)' / 'light dependent resistor(s)' not lux meter do not accept light sensor(s)	1
(c)(i)	converging	or 'convex'	1
(c)(ii)	either (0).35 or (0).4(1...)	do not give any credit for an answer greater than 1 or 7 ÷ 20 for 1 mark or clear evidence that appropriate measuring / counting, has been made for 1 mark	2
(d)	otherwise it will have no effect on the light detector or otherwise no (real) light will fall on the light detector	or 'a virtual / imaginary image will have no effect on the light detector' allow error carried forwards for 'light detector' allow so it can be formed on the film	1
total			7

PHY3F

Question 7

question	answers	extra information	Mark
(a)(i)	the higher the altitude the longer the period	<p>or the converse</p> <p>or there is a positive correlation</p> <p>do not credit any reference to 'direct proportion'</p> <p>ignore references to speed / size of orbit</p> <p>allow the higher the altitude the longer <u>it takes to orbit</u></p> <p>do not credit if ambiguity between distance and time</p>	1
(a)(ii)	<p>responses must refer to the (quality) of the data rather than comments on satellites</p> <p>any two from:</p> <ul style="list-style-type: none"> • only four pairs (of results / data / evidence) • the data is (all) for low or high altitudes (with nothing in the middle) • conclusion only valid in the range (shown, of 300 ↔ 36 000 or 1.5 ↔ 24) • the Internet is not always a reliable source 	or 'not enough / insufficient data'	2
(b)	there is a centripetal force	<p>accept force towards centre / Earth</p> <p>or 'the Moon is accelerating towards the (centre of) Earth'</p>	1
	the force (for this) is provided by gravity / gravitational attraction (between the Moon and the Earth)	accept 'caused by gravity'	1

Question 7 continues on the next page

PHY3F

Question 7 continued

question	answers	extra information	Mark
(c)	there is <u>empty</u> space / a vacuum (between the spaceships)	or no medium / particles / air / gas (to carry the sound / vibrations) or sound(s) do not travel through a vacuum do not accept any named gas	1
(d)	the response may be in agreement or disagreement or may support a 'balanced' argument either any general point with appropriate amplification for 2 marks or two general points 1 mark each	eg costs a lot (1) the money could be spent on ... (1) eg we may find new resources (1) eg we may contact aliens (1)	2
total			8