

Physics A

General Certificate of Secondary Education

Unit **A332/01**: Unit 2 – Modules P4, P5, P6 (Foundation Tier)

Mark Scheme for June 2011

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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Question		Answer	Mark	Guidance
1		<p>electron</p> <p>conductor</p> <p>electric current</p> <p>negatively charged particle</p> <p>a flow of charge</p> <p>unit of current</p> <p>contains many charges free to move</p>	3	one mark for each correct line
		Total	3	

Question		Answer	Mark	Guidance																									
2	a	<div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> variable resistor <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div>	1																										
	b	400 W (1)	1																										
	c	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">battery electricity</th> <th style="text-align: center;">mains electricity</th> <th style="text-align: center;">both battery and mains electricity</th> <th style="text-align: center;">neither</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">can be used to produce light</td> <td style="text-align: center;">(✓)</td> <td style="text-align: center;">(✓)</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td style="text-align: center;">produced by generators</td> <td></td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">alternating current</td> <td></td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">direct current</td> <td style="text-align: center;">✓</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		battery electricity	mains electricity	both battery and mains electricity	neither	can be used to produce light	(✓)	(✓)	✓		produced by generators		✓			alternating current		✓			direct current	✓				4	one mark per row if more than one tick per row, no marks for that row for the first row, if column three is ticked, ignore ticks in the first two columns
	battery electricity	mains electricity	both battery and mains electricity	neither																									
can be used to produce light	(✓)	(✓)	✓																										
produced by generators		✓																											
alternating current		✓																											
direct current	✓																												
Total			6																										

Question		Answer	Mark	Guidance																
3	a	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>greater in circuit A</th> <th>the same in circuits A and B</th> <th>greater in circuit B</th> </tr> </thead> <tbody> <tr> <td>total resistance of the circuit</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>current in the circuit</td> <td></td> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td>voltage across each bulb</td> <td></td> <td></td> <td style="text-align: center;">✓</td> </tr> </tbody> </table>		greater in circuit A	the same in circuits A and B	greater in circuit B	total resistance of the circuit	✓			current in the circuit			✓	voltage across each bulb			✓	2	3 rows correct = 2 marks 1 or 2 rows correct = 1 mark
	greater in circuit A	the same in circuits A and B	greater in circuit B																	
total resistance of the circuit	✓																			
current in the circuit			✓																	
voltage across each bulb			✓																	
*	b	$R = V/I = 12 / 0.3$ (1) $= 40$ (1) ohms/ Ω (1)	3	40 = 2 marks																
Total			5																	

Question		Answer	Mark	Guidance
4	a	$\text{speed} = 800 / 50 \text{ (1)}$ $= 16 \text{ (m/s) (1)}$	2	16 = 2 marks
	b	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">instantaneous speed</div> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;">the speed at a particular time</div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">Average speed</div> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;">the speed over the total distance</div> </div> <div style="border: 1px solid black; width: 150px; height: 30px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; width: 150px; height: 30px;"></div> </div>	2	one mark per correct line drawn
Total			[4]	

Question			Answer				Mark	Guidance	
5	a	i	force		arrow		3	four correct = 3 marks Three or two correct = 2 marks One correct = 1 mark	
			weight		C				
			reaction force		A				
			counter forces		B				
			driving force		D				
		ii	D <u>and</u> B or A <u>and</u> C				1	must have both parts of the pair for one mark ignore any other response	
		iii	D <u>and</u> B (1)				1	both required for one mark allow driving and counter force	
	b	i					3	one mark for each correct row	
				greater in car A	greater in car B	same in both cars			cannot tell
			velocity			✓			
			momentum		✓				
kinetic energy		✓							
		ii	800 000 (joules) (1)				1	Allow 800 kJ if units clearly changed	
Total						9			

Question		Answer	Mark	Guidance																								
6	a	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>not shown</th> </tr> </thead> <tbody> <tr> <td>wavelength</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>frequency</td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>amplitude</td> <td></td> <td>✓</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	not shown	wavelength	✓					frequency					✓	amplitude		✓				3	one mark per row if more than one tick in a row, no marks for that row
			A	B	C	D	not shown																					
		wavelength	✓																									
		frequency					✓																					
amplitude		✓																										
b	not affected by (1)	1																										
c	i	speed = 60×3 (1) = 180 (m/s) (1)	2	180 = 2 marks																								
	ii	too slow to be an electromagnetic wave (1)	1	ecf depending on relative speed calculated in (c)(i) no mark awarded for simply saying no; the mark is awarded only for the explanation																								
Total			7																									
7	a	always never always sometimes	3	four correct = 3 marks three correct = 2 marks two correct = 1 mark																								
		b			i	Arc shaped waves and spreading out after narrow gap (1)	1	Ignore wavelength																				
					ii	diffraction (1)	1																					
Total			5																									

Question		Answer	Mark	Guidance
8	a	A (an) analogue B (a) digital	1	both answers required for one mark
	b	<p>any two from: noise can be removed from the digital signals ;</p> <p>the 'on' and 'off' states of the digital signal can still be seen ;</p> <p>it is impossible / difficult to know which part of the analogue signal is noise, and which is the signal ;</p>	2	<p>idea that you can clean up the digital / can't clean up analogue</p> <p>idea that you can still see the shape in digital/type B OR you can't see the shape in the analogue/type A</p>
		Total	3	

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