

Additional Science A

General Certificate of Secondary Education

Unit **A217/02**: Modules B6, C6, P6 (Higher 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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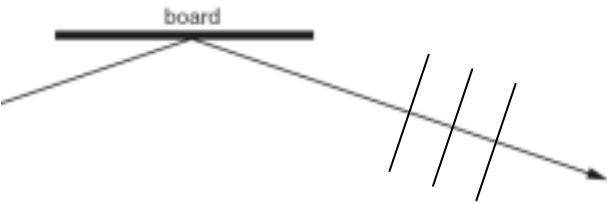
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Question		Answer	Mark	Guidance
1	a	one and zero (1)	1	not one on its own or zero on its own
	b	modulation (1) noise (1) sound (1)	3	
Total			[4]	

2	a	<div style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) </div> <p>... out of step with the direct wave</p>	1	
	b		1	look for <ul style="list-style-type: none"> • three lines on the right • with same (or almost same) spacing as the ones on the left • at right angles (or almost) to the ray three lines can be anywhere along the ray accept any length for the lines accept lines of different length
	c	0.5 m (1)	1	
	d	distance (1) from a crest/trough to the next one (1)	2	not length on its own ignore wave from a named point to the next named point (could be peak, trough, crest, compression, rarefaction, top, bottom, etc)
Total			[5]	

Question		Answer	Mark	Guidance				
3	a	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">infrared</td> <td style="padding: 5px;">visible</td> <td style="padding: 5px;">ultraviolet</td> <td style="padding: 5px;">X-rays</td> </tr> </table>	infrared	visible	ultraviolet	X-rays	1	needs both correct for 1 mark accept IR and UV ignore contents of all other boxes
infrared	visible	ultraviolet	X-rays					
	b	all travel through (empty) space / vacuum (1) with the <u>same</u> speed / at speed of light / at 300 000 km/s (1)	2	accept transverse wave for 1 mark if no other marks awarded accept correct value of speed in other units eg 671 million mph ignore references to photons, electric fields and magnetic fields				
	c	<p style="text-align: center;">... X-rays arriving at the film.</p> <div style="display: flex; justify-content: center; gap: 10px;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </div>	1					
	d	(packets of) energy / momentum (1)	1	allow information				
Total			[5]					

Question		Answer	Mark	Guidance
4	a	Niall (1) Beth (1)	2	accept in either order
	b	language / talking / speech / consciousness / thinking / intelligence / processing information / owtte (1)	1	apply list principle not personality / owtte not memory
	c	electrical stimulation (of the brain) / electro encephalogram/EEG (scan) / functional magnetic resonance imaging fMRI / MRI / positron electron tomography PET (scan) / radioactive (tracer) / studies of patients with traumatic brain damage (1)	1	not CAT scans / X-rays / brain scans / ECG / dissection / electrocution accept (small) electric shocks not Alzheimer's, disease, decay etc
	d	description of any two techniques for 1 mark each: association with a stimulus e.g. sound, colour, smell, past event; repetition; chunking; mnemonic/story/rhyme; clear explanation of how a technique works e.g. strengthening neural pathways, involvement of many different brain areas, limiting working space memory between 5 and 9 ...	3	accept selecting a password which is easy to remember ignore patterns as a technique look for clear, high quality answer for the third mark
Total			[7]	

Question		Answer	Mark	Guidance					
5	a	conditioned; secondary; has no; billions;	3	4 correct = 3 marks 3 correct = 2 marks 2 correct = 1 mark					
	b	<div style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> New pathways linking neurons ... <input checked="" type="checkbox"/> (1) Repeating a stimulus makes ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div>	2	correct pattern for 2 marks one mistake for 1 mark					
Total			[5]						
6		<table border="1" style="margin: auto;"> <tr> <td>D</td> <td>E</td> <td>C</td> <td>A</td> <td>B</td> </tr> </table>	D	E	C	A	B	2	D in first box for 1 mark ECAB in last four boxes for 1 mark
D	E	C	A	B					
Total			[2]						

Question		Answer	Mark	Guidance
7	a	l, g, s, g (1)	1	in that order do not penalise use of capitals not words instead of symbols
	b	impurity is solid / separate / a mixture / not bonded to reactants (1) filtering / decanting / distilling / evaporating (1) after reaction 1 / before reaction 2 / while liquid TiCl ₄ (1)	3	reject filtering if impurity is liquid reject distilling / evaporation of the solid impurity look for separation technique which makes physical sense
	c	speeds up the reaction / reduces activation energy without being used up (1)	1	look for complete answer reject without taking part in reaction ignore explanations of catalyst action
	d	EITHER 2H ₂ O → 2H ₂ + O ₂ OR 2H ₂ O → O ₂ + 2H ₂	2	look for clear subscripts and capitals ignore any words ?H ₂ O → ?H ₂ + ?O ₂ for 1 mark where ? is any number ?H ₂ O → ?O ₂ + ?H ₂ for 1 mark where ? is any number 2H ₂ O → 2H ₂ + O ₂ for 2 marks
Total			[7]	
8		increases surface area of flour (1) increases chance of (successful) collisions with (oxygen) particles (1)	2	reject moves faster / more energy
Total			[2]	

Question		Answer	Mark	Guidance
9	a	calcium + hydrochloric → calcium + carbon + water carbonate acid chloride dioxide	1	the two reactants on the left can be in either order the three products on the right can be in any order look for correct spellings ignore chemical formulae
	b	i		
		pH does not increase <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	
		ii		question removed
				enter NR
	c	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Hydrochloric acid is a solution ... <input checked="" type="checkbox"/> (1)	1	
	d	NO_3^- (1)	1	
Total			[4]	

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