



GCSE

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

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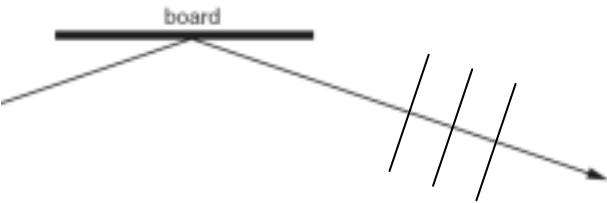
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A217/02

Mark Scheme

June 2011

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]	

A217/02

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Question			Answer	Mark	Guidance
3	a		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-right: 5px;">infrared</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-right: 5px;">visible</div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-right: 5px;">ultraviolet</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">X-rays</div> </div>	1	needs both correct for 1 mark accept IR and UV ignore contents of all other boxes
	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		<div style="text-align: right; margin-right: 20px;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </div> ... X-rays arriving at the film.	1	
	d		(packets of) energy / momentum (1)	1	allow information
			Total	[5]	

A217/02

Mark Scheme

June 2011

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]	

A217/02

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June 2011

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5	a		conditioned; secondary; has no; billions;	3	4 correct = 3 marks 3 correct = 2 marks 2 correct = 1 mark
	b		<div><div><div></div></div><div><div></div></div><div><div>New pathways linking neurons ...</div><div><div>✓</div><div>(1)</div></div></div><div><div>Repeating a stimulus makes ...</div><div><div>✓</div><div>(1)</div></div></div><div><div></div></div></div>	2	correct pattern for 2 marks one mistake for 1 mark
			Total	[5]	

6			<div><div><div>D</div><div>E</div><div>C</div><div>A</div><div>B</div></div></div>	2	D in first box for 1 mark ECAB in last four boxes for 1 mark
			Total	[2]	

A217/02

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June 2011

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 $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$ OR $2\text{H}_2\text{O} \rightarrow \text{O}_2 + 2\text{H}_2$	2	look for clear subscripts and capitals ignore any words $?\text{H}_2\text{O} \rightarrow ?\text{H}_2 + ?\text{O}_2$ for 1 mark where ? is any number $?\text{H}_2\text{O} \rightarrow ?\text{O}_2 + ?\text{H}_2$ for 1 mark where ? is any number $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$ 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]	

A217/02

Mark Scheme

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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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