



GCSE

## Additional Science A

General Certificate of Secondary Education A217/02

Unit 3: Modules B6, C6, P6 (Foundation Tier)

## Mark Scheme for June 2010

---

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2010

Any enquiries about publications should be addressed to:

OCR Publications  
PO Box 5050  
Annesley  
NOTTINGHAM  
NG15 0DL

Telephone: 0870 770 6622  
Facsimile: 01223 552610  
E-mail: publications@ocr.org.uk

Question		Expected Answers	Marks	Additional Guidance
1	a	300 m/s (1)	[1]	
	b	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">intensity</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">waves per second</div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">amplitude</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">energy per second</div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">frequency</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">size of disturbance</div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">wavelength</div> <div style="border: 1px solid black; padding: 2px;">distance between crests</div> </div>	[1] [2] correct pattern = 2 marks one or two mistakes = 1 mark  a mistake is a missing line or a line in the wrong place	
	c	decreases stays the same	[1]	<b>accept</b> gets smaller / reduces (owtte) <b>accept</b> remains constant / doesn't change (owtte) both required for the mark
		<b>Total</b>	[4]	

Question		Expected Answers	Marks	Additional Guidance
2	a	digital modulate noise pulses	[2]	all four correct = 2 marks any two or three correct = 1 mark
	b	i		<p>look for straight line from transmitter to wall, then straight line from wall to Jane with equal angles of incidence and reflection</p> <p>on or between red and green lines of template</p> <p>no breaks in the line from transmitter to Jane</p> <p><b>not</b> freehand lines</p> <p><b>ignore</b> arrows</p>
		ii		<p>look for one whole cycle of the wave in antiphase</p> <p><b>accept</b> any amplitude</p> <p>must cross zero on or between lines of template</p>

Question			Expected Answers		Marks	Additional Guidance
2	b	iii		<input type="checkbox"/>	[1]	correct pattern = 1 mark
			Waves which arrive in step ...	<input checked="" type="checkbox"/>		
				<input type="checkbox"/>		
			There is an interference pattern ...	<input checked="" type="checkbox"/>		
			Total		[5]	

Question		Expected Answers	Marks	Additional Guidance
3	a	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">The light does not ...</div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">... enters and leaves ...</div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">The light slows ...</div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">... reflects off the glass.</div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">The light speeds ...</div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">... enters the glass.</div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">The light refracts ...</div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">... leaves the glass.</div> </div>	[2]	<p>correct pattern = 2 marks one or two mistakes = 1 mark</p> <p>a mistake is</p> <ul style="list-style-type: none"> <li>• a line in the wrong place</li> <li>• a missing line</li> </ul>
	b	<p><b>any two from:</b> speed decreases; wavelength decreases; frequency remains unchanged;</p>	[2]	<p>no ecf from incorrect speed change all marking points are independent</p>
	c	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">radio</div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">(visible) light</div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px; margin-bottom: 10px;">gamma</div> </div>	[1]	<p>all three correct =- 1 mark</p> <p><b>accept</b> visible or light on its own <b>ignore</b> TV <b>accept</b> <math>\gamma</math> instead of gamma <b>ignore</b> rays or photons</p>
		<b>Total</b>	[5]	
4	a	<p>removing impurities is expensive / impure acid is cheaper (1) impurities do not stop acid doing the job (1)</p>	[2]	<p><b>not</b> acid becomes impure as it is used <b>ignore</b> references to strength of acid</p>
	b	<p>use a probe/meter <b>and</b> look for reading/number (1) use paper/indicator <b>and</b> look for colour (1)</p>	[2]	<p><b>accept</b> universal/litmus/UI/pH in any order must have both device and observation for each mark</p>
		<b>Total</b>	[4]	

Question		Expected Answers			Marks	Additional Guidance												
5		<table border="1"> <thead> <tr> <th>student</th><th>experiment 1</th><th>experiment 2</th></tr> </thead> <tbody> <tr> <td>Arthur</td><td>B</td><td>A</td></tr> <tr> <td>Ben</td><td>B</td><td>C</td></tr> <tr> <td>Chet</td><td>B</td><td>A</td></tr> </tbody> </table>			student	experiment 1	experiment 2	Arthur	B	A	Ben	B	C	Chet	B	A	[4]	all six correct = 4 marks five correct = 3 marks four correct = 2 marks three correct = 1 mark lose 1 mark for each mistake
student	experiment 1	experiment 2																
Arthur	B	A																
Ben	B	C																
Chet	B	A																
		<b>Total</b>			[4]													

6	a	Mg(OH) <sub>2</sub> NaOH	[1]	both required for the mark
	b	sodium nitrate carbon dioxide water	[2]	all three correct = 2 marks two or one correct = 1 mark accept CO <sub>2</sub> for carbon dioxide accept H <sub>2</sub> O for water accept NaNO <sub>3</sub> for sodium nitrate
	c	CuO + 2HCl → CuCl <sub>2</sub> + H <sub>2</sub> O correct formulae for chemicals before arrow (1) correct formulae for chemicals after arrow (1) 2 in front of HCl with rest of equation correct (1)	[3]	subscript must be at least half of full character size u in Cu and l in Cl must look lower case ignore state symbols eg (aq)
		<b>Total</b>	[6]	

Question		Expected Answers	Marks	Additional Guidance
7	a	retrieval storage	[1]	both required for 1 mark
	b	billions experience transmit	[2]	all three correct = 2 marks two or one correct = 1 mark
	c	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> The variety of potential pathways ... <input checked="" type="checkbox"/> (1)	[1]	
		<b>Total</b>		
			[4]	

Question			Expected Answers	Marks	Additional Guidance
8	a	i	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">response</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">puppy eats food</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">puppy barks</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">primary stimulus</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">puppy produces saliva</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">secondary stimulus</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">smell of food</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">sound of bell</div> </div>		

Question		Expected Answers	Marks	Additional Guidance
8	b	<p>disadvantage: difficult to respond to new situations (1)</p> <p>advantages: <b>any two from:</b> aids survival; helps to find food; helps to find a mate; speeds up response; involuntary;</p>	[3]	<p><b>accept</b> cannot learn new response <b>accept</b> cannot adapt / change response</p> <p><b>accept</b> avoid danger / predators</p> <p><b>accept</b> get away quicker <b>accept</b> no need to think / choose response</p> <p>must have one disadvantage and two advantages for 3 marks</p>
		<b>Total</b>		[6]

9		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>E</td><td>B</td><td>C</td><td>J</td><td>G</td></tr> </table> <p>first box E (1) last box G (1) B before C (1) C before J (1)</p>	E	B	C	J	G	[4]	
E	B	C	J	G					
		<b>Total</b>		[4]					

**OCR (Oxford Cambridge and RSA Examinations)**  
**1 Hills Road**  
**Cambridge**  
**CB1 2EU**

**OCR Customer Contact Centre**

**14 – 19 Qualifications (General)**

Telephone: 01223 553998

Facsimile: 01223 552627

Email: [general.qualifications@ocr.org.uk](mailto:general.qualifications@ocr.org.uk)

**www.ocr.org.uk**

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

**Oxford Cambridge and RSA Examinations**  
is a Company Limited by Guarantee  
Registered in England  
Registered Office: 1 Hills Road, Cambridge, CB1 2EU  
Registered Company Number: 3484466  
OCR is an exempt Charity



**OCR (Oxford Cambridge and RSA Examinations)**  
Head office  
Telephone: 01223 552552  
Facsimile: 01223 552553