



**GCSE**

# **Additional Science A (Twenty First Century)**

General Certificate of Secondary Education **J631**

## **Mark Schemes for the Units**

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**January 2009**

**J631/MS/R/09J**

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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.

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#### MARK SCHEMES FOR THE UNITS

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## Guidance for Examiners

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Each separate marking point is indicated by a (1) at the end of that marking point.
4. Abbreviations, annotations and conventions used in the detailed Mark Scheme:
  - ORA = or reverse argument
  - NOT = point that is not given credit
  - AW/owtte = alternative wording/or words to that effect: allow any expression that is clearly equivalent
  - / = alternative and acceptable answers for the same marking point
  - point = point must be present to gain the mark
  - (description) = description which need not be present to gain the mark

E.g.

mark scheme shows 'work done in lifting / (change in) gravitational potential energy'

work done = 0 marks

work done lifting = 1 mark

change in potential energy = 0 marks

gravitational potential energy = 1 mark
5. If a candidate alters his/her response, examiners should accept the alteration.
6. The list principle: if a list of responses greater than the number requested is given, you work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, i.e. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.
7. If an answer is crossed out but not replaced, mark the crossed out answer.

A215/01

Mark Scheme

January 2009

## A215/01 Modules B4, C4, P4 Foundation

Question			Expected Answers	Marks	Rationale
1	(a)		<p>He will sweat less <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>He will start to shiver <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	2	1 mark for each correct choice more than 2 choices, each extra choice loses 1 mark
	(b)	(i)	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>core body temperature is below 35 °C <input checked="" type="checkbox"/> (1)</p>	1	more than one tick = 0 marks
		(ii)	<p>confusion (1)</p> <p>drowsiness (1)</p> <p>slurred speech (1)</p>	3	1 mark for each choice <b>allow</b> any clear indication of correct choice more than 3 choices, then each extra choice loses 1 mark
<b>Total</b>				6	

A215/01

Mark Scheme



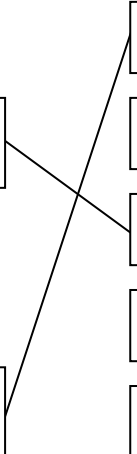
January 2009

Question			Expected Answers	Marks	Rationale						
2	(a)		<table border="1"><tr><td>C</td><td>F</td><td>B</td><td>D</td><td>A</td><td>E</td></tr></table>	C	F	B	D	A	E	4	C before F = 1 mark F before B = 1 mark B before D = 1 mark D before A = 1 mark <b>accept</b> any clear indication of response .eg numbers at the side of the letters in the question
C	F	B	D	A	E						
	(b)	(i)	<div>to replace water lost by sweating</div> <div><div><input type="checkbox"/></div><div><input checked="" type="checkbox"/> (1)</div><div><input type="checkbox"/></div></div>	1	more than one tick = 0 marks						
		(ii)	kidney (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks						
		(iii)	<table border="1"><tr><th>increase in urine volume</th><th>decrease in urine volume</th></tr><tr><td>A</td><td>B C D</td></tr></table>	increase in urine volume	decrease in urine volume	A	B C D	2	all 4 correct = 2 marks 2 or 3 correct = 1 mark 1 response correct = 0 marks  <b>ignore</b> letters appearing in both columns <b>allow</b> names of substances instead of letters any letter written on the middle line is wrong		
increase in urine volume	decrease in urine volume										
A	B C D										
			Total	8							

A215/01

Mark Scheme




January 2009

Question			Expected Answers	Marks	Rationale
3	(a)		<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  to kill microbes in the water <input checked="" type="checkbox"/> (1) </div>	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(b)		<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;">  C </div> <div style="margin: 0 20px;">  D </div> <div style="text-align: center;">(1)</div> </div>	1	both required for 1 mark any clear indication of correct response = 1 mark
	(c)		<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> <div style="border: 1px solid black; padding: 5px;">sodium chloride</div>   <div style="border: 1px solid black; padding: 5px;">potassium chloride</div> </div> <div style="margin: 0 20px;">  </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px;">KCl</div>  <div style="border: 1px solid black; padding: 5px;">KCl<sub>2</sub></div>  <div style="border: 1px solid black; padding: 5px;">NaCl</div>  <div style="border: 1px solid black; padding: 5px;">NaCl<sub>2</sub></div>  <div style="border: 1px solid black; padding: 5px;">PCl</div>  <div style="border: 1px solid black; padding: 5px;">PCl<sub>2</sub></div> </div> </div>	2	if more than two lines are drawn each extra line loses 1 mark  1 mark for each correct line  any clear indication of correct response eg formula written in or underneath the name boxes

A215/01

Mark Scheme

January 2009

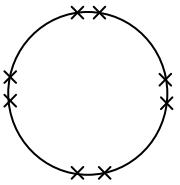
Question			Expected Answers	Marks	Rationale
3	(d)		   <div> <div>flammable</div> <div>toxic</div> <div>irritant</div> </div> <div> <div>keep away from naked flames</div> <div>wear protective clothing</div> <div>do not swallow or inhale</div> <div>evacuate the area</div> </div>	4	<p>mark each side independently</p> <p>left hand side: if more than three lines are drawn each extra line cancels one correct line three lines correct = 2 marks two lines correct = 1 mark one line correct = 0 marks</p> <p>right hand side: if more than three lines are drawn each extra line cancels one correct line three lines correct = 2 marks two lines correct = 1 mark one line correct = 0 marks</p>
	(e)		bromine (1)	1	<p>any clear indication of correct response = 1 mark more than one response = 0 marks</p>
<b>Total</b>				<b>9</b>	



A215/01

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
4	(a)		D (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(b)		A (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(c)		8 electrons in outer shell any arrangement e.g. <div style="text-align: center;">   (1)         </div>	1	any clear indication of correct response = 1 mark spacing of the 8 electrons is irrelevant the same symbol does not have to be used for all 8 electrons eg 7 crosses and 1 dot gets the mark
			<b>Total</b>	<b>3</b>	

5	(a)		some copper has got into the flame <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	more than one response = 0 marks
	(b)		C (1)	1	<b>accept</b> any clear indication of response more than one response = 0 marks
			<b>Total</b>	<b>2</b>	

A215/01

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
6	(a)		100/8 (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(b)		C (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(c)		equal to (1) opposite (1)	2	both correct = 2 marks one correct = 1 mark
	(d)		<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">to increase the time it takes ...</div> <div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)  <input type="checkbox"/> </div> </div>	1	any clear indication of correct response = 1 mark more than one response = 0 marks
			<b>Total</b>	<b>5</b>	

7	(a)		weight (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(b)		$600 \times 20$ (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(c)		gravitational potential (1) momentum (1)	2	both correct = 2 marks one correct = 1 mark
	(d)		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 20px;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">weight</div> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;">vertically down</div> </div> <div style="display: flex; align-items: center; margin-bottom: 20px;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"></div> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;">vertically up</div> </div> <div style="display: flex; align-items: center; margin-bottom: 20px;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"></div> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;">up the slope</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;">friction</div> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;">down the slope</div> </div> </div>	1	both lines correct = 1 mark  of more than two lines drawn = 0 marks
			<b>Total</b>	<b>5</b>	

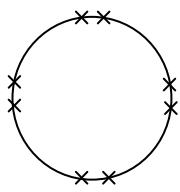
A215/01

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
8	(a)		<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">when the ball is moving upwards</div> <div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/> </div> <div style="margin-left: 10px;">(1)</div> </div>	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(b)		increases decreases increases stays the same	3	four correct = 3 marks three correct = 2 marks two correct = 1 marks one correct = 0 marks
			<b>Total</b>	<b>4</b>	

## A215/02 Modules B4, C4, P4 Higher

Question			Expected Answers	Marks	Rationale
1	(a)	(i)	D (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
		(ii)	A (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(b)		8 electrons in outer shell any arrangement e.g.  (1)	1	any clear indication of the correct response = 1 mark spacing of the 8 electrons is irrelevant the same symbol does not need to be used for all 8 electrons e.g. 7 crosses and 1 dot gets the mark
			<b>Total</b>	<b>3</b>	
2	(a)		C (1)	1	any clear indication of the correct response = 1 mark more than one response = 0 marks
	(b)		C and E (1)	1	either order
			<b>Total</b>	<b>2</b>	

A215/02

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
3	(a)	(i)	Salma (1)	1	more than 1 choice = 0 marks
		(ii)	Julia (1)	1	more than 1 choice = 0 marks
	(b)		NaBrO <sub>3</sub> (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(c)	(i)	OC <sup>-</sup> (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
		(ii)	left side: 4 (1) right side: 2 (1)	2	mark each side of the equation independently <b>allow</b> O <sub>2</sub> in the <b>right</b> hand box as an alternative to 2, ignoring any other numbers
	(d)		2ClO <sub>2</sub> [aq] → Cl <sub>2</sub> [g] + 2O <sub>2</sub> [g]	3	all species correct = 1 mark i.e. Cl <sub>2</sub> and O <sub>2</sub> on the right hand side balanced = 1 mark all state symbols = 1 mark
			<b>Total</b>	<b>9</b>	

A215/02

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale						
4	(a)		<table border="1"> <tr> <td>C</td><td>F</td><td>B</td><td>D</td><td>A</td><td>E</td></tr> </table>	C	F	B	D	A	E	4	C before F = 1 mark F before B = 1 mark B before D = 1 mark D before A = 1 mark <b>accept</b> any clear indication of response e.g. numbers at the side of the letters in the question
C	F	B	D	A	E						
	(b)		<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>            ... best at an optimum temperature. <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>            ... stop working at high temperatures. <input checked="" type="checkbox"/> (1)         </div>	2	if more than 2 choices, deduct 1 mark for each extra choice						
	(c)		dilate (1) increases (1) increases (1) vasodilation (1)	4	only one choice allowed per sentence						
			<b>Total</b>	<b>10</b>							

A215/02

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
5	(a)		<div style="text-align: right;"> <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input type="checkbox"/> </div> <p>To keep the cell contents ...</p>	1	any clear indication of correct response = 1 mark more than one response = 0 marks
5	(b)		<div style="display: flex; flex-direction: row-reverse;"> <div style="border: 1px solid black; padding: 5px; margin: 5px;">blood salt concentration rises</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">blood salt concentration falls</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">blood sugar concentration rises</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">blood sugar concentration falls</div> </div> <div style="display: flex; flex-direction: row-reverse; margin: 0 10px;"> <div style="border: 1px solid black; padding: 5px; margin: 5px;">more ADH is secreted</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">less ADH is secreted</div> </div> <div style="display: flex; flex-direction: row-reverse;"> <div style="border: 1px solid black; padding: 5px; margin: 5px;">a small amount of concentrated urine is made</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">a small amount of dilute urine is made</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">a large volume of concentrated urine is made</div> <div style="border: 1px solid black; padding: 5px; margin: 5px;">a large volume of dilute urine is made</div> </div>	2	mark each side independently 1 mark for 2 correct lines on LHS 1 mark for 2 correct lines on RHS more than two lines drawn on a side = 0 marks for that side

A215/02

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
5	(c)		<div style="text-align: right;"> <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input type="checkbox"/> </div> A process that reverses ...	1	any clear indication of correct response = 1 mark more than one response = 0 marks
			<b>Total</b>	<b>4</b>	

Question			Expected Answers	Marks	Rationale
6	(a)		<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)  <input type="checkbox"/> </div> when the ball is moving upwards	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(b)		increases decreases increases stays the same	3	four correct = 3 marks three correct = 2 marks two correct = 1 mark one correct = 0 marks
			<b>Total</b>	<b>4</b>	



A215/02

Mark Scheme

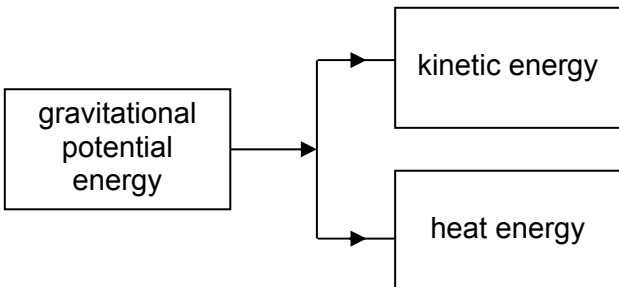
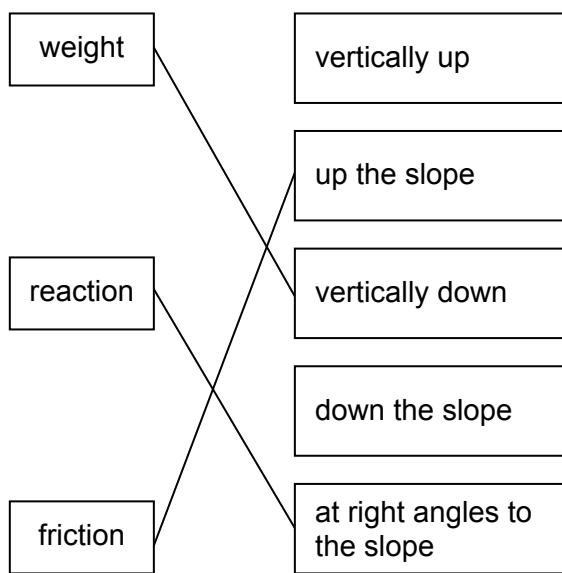
January 2009

Question			Expected Answers	Marks	Rationale
7	(a)		200 N (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(b)		B (1)	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(c)		driving counter  driving counter	2	treat as two pairs of responses both pairs correct = 2 marks only one pair correct = 1 mark
	(d)		It increases the duration ... <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	1	any clear indication of correct response = 1 mark more than one response = 0 marks
			<b>Total</b>	<b>5</b>	

A215/02

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
8	(a)			1	<b>allow</b> kinetic and heat energy either way round all 3 required for 1 mark <b>allow</b> GPE for gravitational potential energy
	(b)		$\frac{7800}{650} \quad (1)$	1	any clear indication of correct response = 1 mark more than one response = 0 marks
	(c)		Bess (1)	1	any clear indication of correct response = 1 mark e.g. 12m/s more than one response = 0 marks
	(d)			2	three correct lines = 2 marks two correct lines = 1 mark one or no correct lines = 0 marks
			<b>Total</b>	<b>5</b>	

A216/01

Mark Scheme

January 2009

## A216/01 Modules B5, C5, P5 Foundation

Question			Expected Answers					Marks	Rationale																				
1	(a)		<table><tr><td>substance</td><td>atmos</td><td>bio</td><td>hydro</td><td>litho</td></tr><tr><td>liquid water</td><td></td><td></td><td>✓</td><td></td></tr><tr><td>sand</td><td></td><td></td><td></td><td>✓</td></tr><tr><td>CO<sub>2</sub> gas</td><td>✓</td><td></td><td></td><td></td></tr></table>					substance	atmos	bio	hydro	litho	liquid water			✓		sand				✓	CO <sub>2</sub> gas	✓				2	mark each row separately all rows correct = 2 marks two rows correct = 1mark  one or no row correct = 0 marks
			substance	atmos	bio	hydro	litho																						
			liquid water			✓																							
			sand				✓																						
			CO <sub>2</sub> gas	✓																									
	(b)		Thomas (1) Ruth (1)					2	either order if answer lines blank, <b>accept</b> any clear indication of correct answers																				
			Total					4																					

2	A		B (1)					1	if answer line blank, <b>accept</b> any clear indication of correct letter
	B		A (1)					1	if answer line blank, <b>accept</b> any clear indication of correct letter
	C		D (1)					1	if answer line blank, <b>accept</b> any clear indication of correct letter
	D		E (1)					1	if answer line blank, <b>accept</b> any clear indication of correct letter
			Total					4	

A216/01

Mark Scheme

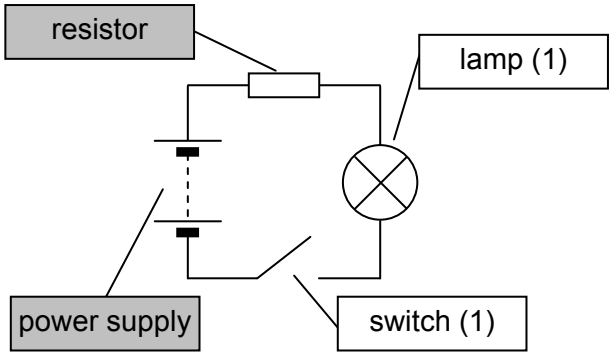
January 2009

Question			Expected Answers	Marks	Rationale
3	(a)		<div> <input type="checkbox"/>            electrons move through the copper wires           <input checked="" type="checkbox"/> (1)  <input type="checkbox"/> </div>	1	
	(b)	(i)	<div> <div>A C E B D</div> </div>	2	A anywhere before C C anywhere before E E anywhere before B  all correct = 2 mark 2 correct = 1 mark 1 or 0 correct = 0 marks
		(ii)	CDA	1	
	(c)		<div>           Gold is a good electrical conductor <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>            Gold does not corrode <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input type="checkbox"/> </div>	2	
Total				6	

A216/01

Mark Scheme

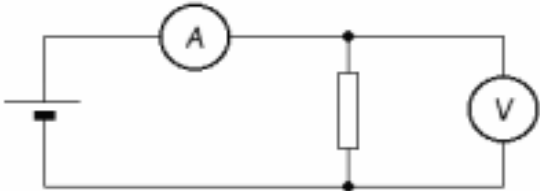
January 2009

Question		Expected Answers	Marks	Rationale
4	(a)		2	1 mark for each if boxes blank, <b>accept</b> any clear indication of correct answer for each box <b>allow</b> bulb or light for lamp
	(b)	series (1) current (1)	2	if answer lines blank, <b>accept</b> any clear indication of correct word for each space
	(c)	<p>It reduces the flow of charge through the circuit</p> <div style="display: flex; align-items: center;"> <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input type="checkbox"/> </div>	1	
		<b>Total</b>	<b>5</b>	

A216/01

Mark Scheme

January 2009

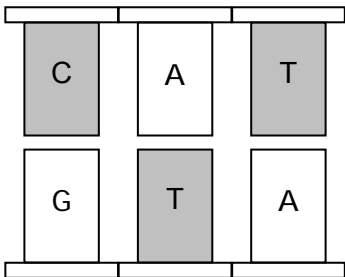
Question			Expected Answers	Marks	Rationale									
5	(a)			2	A = 1 mark V = 1 mark if circles blank, <b>accept</b> any clear indication of correct answer for each circle									
	(b)		voltage (1)	1										
	(c)		<table><tr><th>decrease</th><th>increase</th><th>stays same</th></tr><tr><td></td><td>✓</td><td></td></tr><tr><td></td><td>✓</td><td></td></tr></table>	decrease	increase	stays same		✓			✓		2	mark each row separately 1 mark for each correct row
decrease	increase	stays same												
	✓													
	✓													
			<b>Total</b>	<b>5</b>										

6	(a)		The joule is a very small amount of energy <div><input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></div>	1	
	(b)	(i)	2.1 x 3 x 8 (1)	1	<b>accept</b> "50.4" if response not clear
		(ii)	Alan (1)	1	if answer line blank, <b>accept</b> any clear indication <b>allow</b> <u>6</u> x 100 instead of 'Alan' 2.1x3
	(c)		charge (1)	1	if answer line blank, <b>accept</b> any clear indication of correct letter
			<b>Total</b>	<b>4</b>	

A216/01

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
7	(a)		<div> <input type="checkbox"/>  genes are made of DNA <input type="checkbox"/> (1)  <input checked="" type="checkbox"/>  DNA is a set of instructions for making proteins <input type="checkbox"/> (1)  <input type="checkbox"/> </div>	2	
	(b)			2	all correct = 2 marks one or two correct = 1 mark
	(c)		<div> <input type="checkbox"/>  <input type="checkbox"/>  Genes that are not needed are switched off <input checked="" type="checkbox"/> (1)  <input type="checkbox"/> </div>	1	
Total				5	

A216/01

Mark Scheme

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Question			Expected Answers	Marks	Rationale				
8	(a)		<table><tr><th>mitosis</th><th>meiosis</th></tr><tr><td>A D E</td><td>B C</td></tr></table>	mitosis	meiosis	A D E	B C	2	<b>allow</b> any order of responses within a column. do not mark any letter which appears in both columns  all correct = 2 marks 4 or 3 correct = 1 mark 1 or 2 correct = 0 marks
			mitosis	meiosis					
A D E	B C								
			<table><tr><td>B</td><td>D</td><td>C</td><td>A</td></tr></table>	B	D	C	A	2	D anywhere before C = 1 mark C anywhere before A = 1 mark repeated letters, apply strictly as above, e.g. ACA =1 mark
B	D	C	A						
			Total	4					



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Mark Scheme

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Question			Expected Answers	Marks	Rationale
9	(a)	(i)	phototropism (1)	1	
		(ii)	<p>allows plants to get more light <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	1	
	(b)	(i)	<p><input type="checkbox"/></p> <p>some plant cells are unspecialised <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p>unspecialised cells turn into root cells <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	2	
		(ii)	<p><input type="checkbox"/></p> <p>It is a complete plant that is a clone of the parent plant. <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	1	
			<b>Total</b>	<b>5</b>	

## A216/02 Modules B5, C5, P5 Higher

Question			Expected Answers	Marks	Rationale
1	(a)		B (1)	1	if answer line blank, <b>accept</b> any clear indication of correct letter
	(s)		A (1)	1	if answer line blank, <b>accept</b> any clear indication of correct letter
	(d)		D (1)	1	if answer line blank, <b>accept</b> any clear indication of correct letter
	(f)		E (1)	1	if answer line blank, <b>accept</b> any clear indication of correct
			<b>Total</b>	<b>4</b>	

2	(a)		<table><tr><th>element</th><th>very common</th><th>smaller amounts</th></tr><tr><td>carbon</td><td>✓</td><td></td></tr><tr><td>hydrogen</td><td>✓</td><td></td></tr><tr><td>nitrogen</td><td>✓</td><td></td></tr><tr><td>oxygen</td><td>✓</td><td></td></tr><tr><td>phosphorus</td><td></td><td>✓</td></tr><tr><td>sulfur</td><td></td><td>✓</td></tr></table>	element	very common	smaller amounts	carbon	✓		hydrogen	✓		nitrogen	✓		oxygen	✓		phosphorus		✓	sulfur		✓	2	<p><b>accept</b> nitrogen in either column (so ignore nitrogen row)</p> <p>do <b>not</b> allow any other response which appears in both columns</p> <p>remaining 5 rows correct = 2 marks 4 correct = 1 mark 3 or less correct scores = 0 marks</p> <p><b>OR</b> (ignoring Nitrogen line) no errors = 2 marks 1 error = 1 mark 2 or more errors = 0 marks</p>
element	very common	smaller amounts																								
carbon	✓																									
hydrogen	✓																									
nitrogen	✓																									
oxygen	✓																									
phosphorus		✓																								
sulfur		✓																								
	(b)	(i)	'H' approximately above the vertical line (1)	1	<p>the 'H' must be a capital letter <b>allow</b> 'H<sub>1</sub>' but not 'H1' do <b>not</b> allow alterations elsewhere in the formula</p>																					
		(ii)	C <sub>3</sub> H <sub>7</sub> O <sub>2</sub> NS (1)	1	<p>numbers <b>MUST</b> be either smaller or subscripted <b>allow</b> elements in any order so long as their subscripts are correct <b>accept</b> C<sub>3</sub>H<sub>7</sub>O<sub>2</sub>N<sub>1</sub>S<sub>1</sub> (<b>reject</b> C<sub>3</sub>H<sub>7</sub>O<sub>2</sub>N1S1) the subscripts on N<sub>1</sub> and S<sub>1</sub> are not normally used, but are not incorrect, so the mark can be awarded</p>																					
		(iii)	C (1)	1	<b>accept</b> any clear indication of box C																					
Total				5																						

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Mark Scheme

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Question			Expected Answers	Marks	Rationale
3	(a)		<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>            electrons move between ions <input checked="" type="checkbox"/> (1)            in the lattice  <input type="checkbox"/>  <input type="checkbox"/> </div>	1	
	(b)		[l], [l], [l], [g]	1	<b>accept</b> upper case letters, do not accept words (eg “gas”, “liquid”, “liq”)
	(c)		3, 2, 2	1	boxes must contain numbers only
	(d)		<div style="text-align: right;"> <input type="checkbox"/>            Gold is less reactive than copper. <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>            Gold holds its outer electrons quite weakly. <input checked="" type="checkbox"/> (1) </div>	2	if answer line blank, <b>accept</b> any clear indication of correct letter if only 2 responses given, and one or both is then crossed out, mark both responses
			<b>Total</b>	<b>5</b>	

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Question			Expected Answers	Marks	Rationale
4	(a)		<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)         </div> <p>The closed switch allows charge to flow through the lamp</p>	1	
	(b)		<div style="display: flex; justify-content: space-between;"> <span>current (1) moving</span> <span>stationary (1)</span> </div>	2	first line correct = 1 mark second line correct = 1 mark <b>allow</b> oscillating instead of stationary
	(c)		$3.0 \times 1.5$ (1)	1	
	(d)		<div style="text-align: right;"> <p>the resistor keeps the current in the lamp at the correct value</p> <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> </div>	1	
			<b>Total</b>	<b>5</b>	

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Mark Scheme

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Question			Expected Answers	Marks	Rationale
5	(a)		The joule is a very small amount of energy <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	
	(b)	(i)	2.1 x 3 x 8 (1)	1	<b>accept</b> "50.4" if response not clear
		(ii)	Alan (1)	1	if answer line blank, <b>accept</b> any clear indication <b>allow</b> $\frac{6}{2.1 \times 3} \times 100$ instead of 'Alan'
	(c)		charge (1)	1	if answer line blank, <b>accept</b> any clear indication of correct letter
			<b>Total</b>	<b>4</b>	

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Question			Expected Answers	Marks	Rationale									
6	(a)		0.36 W (1)	1										
	(b)		<table><tr><td>decrease</td><td>increase</td><td>stays the same</td></tr><tr><td></td><td>✓</td><td></td></tr><tr><td></td><td>✓</td><td></td></tr></table>	decrease	increase	stays the same		✓			✓		1	both rows correct = 1 mark
decrease	increase	stays the same												
	✓													
	✓													
	(c)	(i)	<table><tr><td>decrease</td><td>increase</td><td>stays the same</td></tr><tr><td></td><td></td><td>✓</td></tr><tr><td></td><td>✓</td><td></td></tr></table>	decrease	increase	stays the same			✓		✓		1	both lines correct = 1 mark
decrease	increase	stays the same												
		✓												
	✓													
		(ii)	<div><div>Both resistors have the same potential difference across them</div><div><div><input type="checkbox"/></div><div><input checked="" type="checkbox"/> (1)</div><div><input type="checkbox"/></div><div><input type="checkbox"/></div></div><div><div>both resistors have the same current</div><div><div><input checked="" type="checkbox"/> (1)</div><div><input type="checkbox"/></div></div></div></div>	2	<div>both ticks correct = 2 marks</div> <div>one correct = 1 mark</div> <div>if more than two ticks:</div> <div>(6 rows correct = 2 marks)</div> <div>5 rows correct = 1 mark</div> <div>4 rows correct = 0</div>									
			Total	5										

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Mark Scheme

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Question			Expected Answers	Marks	Rationale								
7	(a)		<table><tr><th>mitosis</th><th>meiosis</th></tr><tr><td>A</td><td>B</td></tr><tr><td>D</td><td>C</td></tr><tr><td>E</td><td></td></tr></table>	mitosis	meiosis	A	B	D	C	E		2	<b>allow</b> any order of responses within a column do <b>not</b> mark any letter which appears in both columns  all correct = 2 marks 4 or 3 correct = 1 mark 1 or 2 correct = 0 marks
mitosis	meiosis												
A	B												
D	C												
E													
			<table><tr><td>B</td><td>D</td><td>C</td><td>A</td></tr></table>	B	D	C	A	2	D anywhere before C = 1 mark C anywhere before A = 1 mark repeated letters apply strictly as above, e.g. ACA = 1 mark				
B	D	C	A										
			Total	4									

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Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale																					
8	(a)		<table><tr><th>statement</th><th>true</th><th>false</th></tr><tr><td>four bases</td><td>✓</td><td></td></tr><tr><td>order not important</td><td></td><td>✓</td></tr><tr><td>DNA in cytoplasm</td><td></td><td>✓</td></tr><tr><td>bases pair up differently</td><td></td><td>✓</td></tr><tr><td>copy of DNA into cytoplasm</td><td>✓</td><td></td></tr><tr><td>order of bases determines amino acid order</td><td>✓</td><td></td></tr></table>	statement	true	false	four bases	✓		order not important		✓	DNA in cytoplasm		✓	bases pair up differently		✓	copy of DNA into cytoplasm	✓		order of bases determines amino acid order	✓		3	<p><b>accept</b> any unambiguous response</p> <p>all correct = 3 marks 5 or 4 rows correct = 2 marks 3 or 2 rows correct = 1 mark 1 row correct = 0 marks</p> <p><b>or</b></p> <p>all correct = 3 marks 1 or 2 errors = 2 marks 3 or 4 errors = 1 mark 5 or 6 errors = 0 marks</p>
statement	true	false																								
four bases	✓																									
order not important		✓																								
DNA in cytoplasm		✓																								
bases pair up differently		✓																								
copy of DNA into cytoplasm	✓																									
order of bases determines amino acid order	✓																									
	(b)		<div><div>TAAGCCTGT</div><div><div><div></div><div></div><div>✓</div><div></div></div><div>(1)</div></div></div>	1																						
			<b>Total</b>	<b>4</b>																						

Question			Expected Answers	Marks	Rationale
9			meristems (1) auxins (1) clones (1)	3	<b>must</b> be in correct order
			<b>Total</b>	<b>3</b>	



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Question			Expected Answers	Marks	Rationale
10			<input type="checkbox"/>	3	7 or 6 correct = 3 marks 5 or 4 correct = 2 marks 3 correct = 1 mark 2 or 1 correct = 0 marks
			Up to the eight cell stage ... <input checked="" type="checkbox"/>		
			Specialised cells can ... <input checked="" type="checkbox"/>		
			<input type="checkbox"/>		
			Some genes in the nucleus ... <input checked="" type="checkbox"/>		
			<input type="checkbox"/>		
			Both embryonic and adult ... <input checked="" type="checkbox"/>		
			<b>Total</b>	<b>3</b>	

## A217/01 Modules B6, C6, P6 Foundation

Question			Expected Answers	Marks	Rationale
1	(a)		radio (1)	1	<b>accept</b> any other clear indication of correct response e.g. tick, underlined etc
	(b)		decreases (1) reflect (1) increases (1)	3	more than one response for each marking point = 0 marks <b>accept</b> any other clear indication of correct response e.g. linking line
	(c)		infrared (1)	1	<b>accept</b> any other clear indication of correct response e.g. tick, underlined etc.
			<b>Total</b>	<b>5</b>	

2	(a)		<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px; text-align: center; line-height: 30px;">M</div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px; text-align: center; line-height: 30px;">V</div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px; text-align: center; line-height: 30px;">UV</div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px; text-align: center; line-height: 30px;">X</div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> </div> <div style="text-align: right; margin-top: 5px;">(1)</div>	1	<b>ignore</b> other responses in the 3 remaining boxes UV must appear only once more than one response = 0 marks <b>accept</b> other clear responses in the UV box eg. tick
	(b)		Bess (1)	1	more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. tick, linking line etc
	(c)		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">intensity</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">frequency</div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">the rate at which photons are absorbed</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">the number of waves emitted per second</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">the rate at which energy is delivered by photons</div> <div style="border: 1px solid black; padding: 5px;">the number of photons emitted per second</div> </div> </div>	2	both lines correct for (2) one line correct for (1)  more than one line from a single box – deduct one mark

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Question			Expected Answers	Marks	Rationale
2	(d)		longitudinal transverse empty space air	2	all 4 correct = 2 marks 2 or 3 correct = 1 mark 1 or 0 correct = 0 marks
			<b>Total</b>	<b>6</b>	

3	(a)		wavelength (1)	1	more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. tick, linking line, underlined etc
	(b)		B (1)	1	more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. tick, linking line, underlined etc
	(c)		interference (1) in step (1) increases (1)	3	more than one response for a single marking point = 0 marks <b>accept</b> any other clear indication of correct response e.g. tick, underlined etc
			<b>Total</b>	<b>5</b>	

4	(a)	(i)	C (1)	1	more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. tick, underlined, ring or linking line to dotted line or diagram etc
		(ii)	B (1)	1	more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. tick, underlined etc
	(b)		<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center;"> <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> </div> <div style="margin: 0 10px;"> as an electrical impulse </div> <div style="text-align: center;"> (1) </div> </div>	1	more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. cross, shaded or linking line etc

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Question			Expected Answers	Marks	Rationale
4	(c)		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 10px;">C</div> <div style="border: 1px solid black; padding: 2px 10px;">B</div> <div style="border: 1px solid black; padding: 2px 10px;">A</div> <div style="border: 1px solid black; padding: 2px 10px;">D</div> </div>	2	B anywhere before A = 1 mark A anywhere before D = 1 mark
	(d)		a receptor (1) an effector (1)	2	more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. linking line
			<b>Total</b>	<b>7</b>	

5			<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">remembering the three times table</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">a baby grasping his mother's finger</div> <div style="border: 1px solid black; padding: 5px;">putting on a coat when cold</div> </div> <div style="width: 45%;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">simple reflex</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">learning by experience</div> <div style="border: 1px solid black; padding: 5px;">learning by repetition</div> </div> </div>	2	all three lines correct = 2 marks two or one line correct = 1 mark more than one line from a single box, deduct one mark
			<b>Total</b>	<b>2</b>	

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Question			Expected Answers	Marks	Rationale
6	(a)		<p>Edward's short term memory has been damaged. <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>Remembering his school friends is a long term memory. <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	2	<p>more than two responses, deduct 1 mark</p> <p><b>accept</b> any other clear indication of correct response e.g. crosses, shading, linking lines etc</p>
	(b)		<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>cerebral cortex <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>		
Total				3	

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Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
7	(a)		6 g (1)	1	more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. tick, underlined etc
	(b)		Elizabeth (1)	1	more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. tick, linking line etc
	(c)		25 % (1)	1	more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. tick, underlined etc
			<b>Total</b>	<b>3</b>	

8	(a)		carbon dioxide (1) sodium chloride (1)	2	phonetically correct answers = 2 marks <b>not</b> sodium chlorine or carbon oxygen
	(b)		<div style="display: flex; align-items: center; justify-content: center; gap: 5px;"> <div style="border: 1px solid black; padding: 2px 5px;">E</div> <div style="border: 1px solid black; padding: 2px 5px;">B</div> <div style="border: 1px solid black; padding: 2px 5px;">A</div> <div style="border: 1px solid black; padding: 2px 5px;">C</div> <div style="border: 1px solid black; padding: 2px 5px;">D</div> <div style="border: 1px solid black; padding: 2px 5px;">F</div> </div>	2	A anywhere before C C anywhere before D D anywhere before F  all stages correct = 2 marks 2 or 3 stages correct = 1 mark 1 or 0 stages correct = 0 marks
	(c)	i	A and E (1)	1	more than two responses = 0 marks any order
		ii	C and D (1)	1	more than two responses = 0 marks any order
			<b>Total</b>	<b>6</b>	

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Question			Expected Answers	Marks	Rationale												
9	(a)		<table><tr><th>chemical used up</th><th>chemical produced</th><th>catalyst</th></tr><tr><td>nitrogen hydrogen</td><td>ammonia</td><td>iron</td></tr></table>	chemical used up	chemical produced	catalyst	nitrogen hydrogen	ammonia	iron	2	<p>all 3 boxes correct = 2 marks 2 boxes correct = 1 mark 1 or 0 boxes correct = 0 marks <b>or</b></p> <p><b>accept</b> iron in all 3 = 1 mark</p> <table><tr><th>chemical used up</th><th>chemical produced</th><th>catalyst</th></tr><tr><td>nitrogen hydrogen iron</td><td>ammonia iron</td><td>iron</td></tr></table>	chemical used up	chemical produced	catalyst	nitrogen hydrogen iron	ammonia iron	iron
chemical used up	chemical produced	catalyst															
nitrogen hydrogen	ammonia	iron															
chemical used up	chemical produced	catalyst															
nitrogen hydrogen iron	ammonia iron	iron															
	(b)		change in pressure (1)	1	<p>more than one response = 0 marks <b>accept</b> any other clear indication of correct response e.g. tick, underlined etc</p>												
	(c)		<div><div>use a lower pressure</div><div>re-cycle unreacted gases</div><div>less waste to dispose of</div><div>less acid rain is made</div><div>vessels don't have to be as strong</div><div>less damage to the ozone layer</div><div>less space is needed for the factory</div></div>	2	<p>both lines correct = 2 marks one line correct = 1 mark more than one line from a single box, deduct one mark</p>												
			Total	5													

## A217/02 Modules B6, C6, P6 Higher

Question			Expected Answers	Marks	Rationale
1	(a)		<div> <div></div> <div>M</div> <div></div> <div>V</div> <div>UV</div> <div>X</div> <div></div> </div> <p>(1)</p>	1	<p><b>ignore</b> other responses in the 3 remaining boxes UV must appear only once more than one response = 0 marks <b>accept</b> other clear responses in the UV box eg. tick</p>
	(b)		Bess (1)	1	
	(c)		<pre> graph LR     I[intensity] --- W[the number of waves emitted per second]     I --- E[the rate at which energy is delivered by photons]     F[frequency] --- W     F --- E     W --- A[the rate at which photons are absorbed]     E --- P[the number of photons emitted per second]           </pre>	2	<p>correct pattern = 2 marks one mistake = 1 mark</p> <p>a mistake is:</p> <ul style="list-style-type: none"> <li>• a missing line</li> <li>• a line in the wrong place</li> <li>• an extra line</li> </ul>
			<b>Total</b>	<b>4</b>	



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Question			Expected Answers	Marks	Rationale				
2	(a)		wavelengths (1)	1	allow frequencies				
	(b)		diffraction (1)	1					
	(c)		<table border="1"><tr><td>B</td><td>C</td><td>A</td><td>E</td></tr></table>	B	C	A	E	3	starts with B = 1 mark ends with E for = 1 mark second and third C then A = 1 mark
B	C	A	E						
			Total	5					

3	(a)			<table><tr><th>statement</th><th>true or false</th></tr><tr><td>dish increases the intensity</td><td>true</td></tr><tr><td>signals strongly absorbed</td><td>false</td></tr><tr><td>the dish removes noise</td><td>false</td></tr><tr><td>dish is made of metal</td><td>true</td></tr></table>	statement	true or false	dish increases the intensity	true	signals strongly absorbed	false	the dish removes noise	false	dish is made of metal	true	2	<p>all four correct = 2 marks three or two correct = 1 mark <b>allow</b> T and F, but not ticks, crosses or gaps</p>
				statement	true or false											
				dish increases the intensity	true											
				signals strongly absorbed	false											
				the dish removes noise	false											
				dish is made of metal	true											

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Question			Expected Answers	Marks	Rationale
	(b)		Andrew (1)	1	
	(c)		<div>radio</div> <div>their photons are easily diffracted in the glass</div> <div>sound</div> <div>their photons travel faster than the others through the glass</div> <div>infrared</div> <div>waves are used in optical fibres</div> <div>their photons don't carry enough energy to damage the glass</div> <div>uv</div> <div>their photons travel a long way through the glass before being absorbed</div>	2	<p>correct pattern = 2 marks one mistake = 1 mark</p> <p>a mistake is:</p> <ul style="list-style-type: none"> <li>• a missing line</li> <li>• a line in the wrong place</li> <li>• an extra line</li> </ul>
			<b>Total</b>	<b>5</b>	

A217/02

Mark Scheme

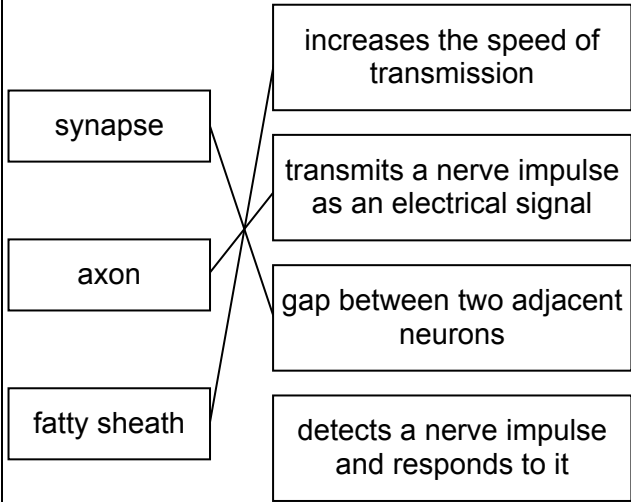
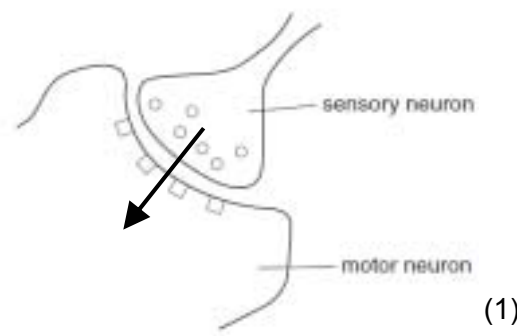
January 2009

Question			Expected Answers	Marks	Rationale																				
4	(a)		<table><tr><th>structures</th><th>only CNS</th><th>only PNS</th><th>both CNS and PNS</th></tr><tr><td>brain</td><td>✓</td><td></td><td></td></tr><tr><td>motor neuron</td><td></td><td>✓</td><td></td></tr><tr><td>sensory neuron</td><td></td><td></td><td>✓</td></tr><tr><td>spinal cord</td><td>✓</td><td></td><td></td></tr></table>	structures	only CNS	only PNS	both CNS and PNS	brain	✓			motor neuron		✓		sensory neuron			✓	spinal cord	✓			2	all four rows correct (2) any two or three rows correct (1)  a correct row has only one tick in the correct place  accept any unambiguous response
structures	only CNS	only PNS	both CNS and PNS																						
brain	✓																								
motor neuron		✓																							
sensory neuron			✓																						
spinal cord	✓																								
	(b)		<table><tr><td>C</td><td>B</td><td>A</td><td>D</td></tr></table>	C	B	A	D	2	B anywhere before A = 1 mark A anywhere before D = 1 mark																
C	B	A	D																						
			Total	4																					

A217/02

Mark Scheme

January 2009

Question		Expected Answers	Marks	Rationale
5	(a)		3	<p>correct pattern for (3) one mistake for (2) two mistakes for (1)</p> <p>a mistake is:</p> <ul style="list-style-type: none"> <li>• a missing line</li> <li>• a line in the wrong place</li> <li>• an extra line</li> </ul>
	(b)		1	<b>accept</b> an arrow (anywhere) pointing from top to bottom and right to left

A217/02

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
5	(c)		<p>Ecstasy blocks the sites where serotonin is removed.</p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>The serotonin concentration increases, which enhances mood.</p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	2	<p>correct pattern = 2 marks one mistake for = 1 mark</p> <p>a mistake is:</p> <ul style="list-style-type: none"> <li>• a missing tick</li> <li>• a tick in the wrong place</li> <li>• an extra tick</li> </ul>
			<b>Total</b>	<b>6</b>	

A217/02

Mark Scheme

January 2009

Question		Expected Answers	Marks	Rationale
	(b)	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">cerebral cortex</div> <div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)  <input type="checkbox"/> </div> </div>	1	correct pattern = 1 mark
	(c)	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">keeping hold of a hot plate</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">simple</div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">producing saliva when a bell rings</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">modified</div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">a baby grasping his mother's finger</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">conditioned</div> </div>	2	correct pattern = 2 marks one or two mistakes = 1 mark  a mistake is: <ul style="list-style-type: none"> <li>a missing line</li> <li>a line in the wrong place</li> <li>an extra line</li> </ul>
6	(a)	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">There is a pattern in the notes that he can recognise</div> <div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)  <input type="checkbox"/> </div> </div> <div style="display: flex; align-items: center; justify-content: center; margin-top: 20px;"> <div style="margin-right: 10px;">Repeating the same action makes new pathways in the brain</div> <div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/>  <input checked="" type="checkbox"/> (1) </div> </div>	2	correct pattern = 2 marks one mistake = 1 mark  a mistake is: <ul style="list-style-type: none"> <li>a missing tick</li> <li>a tick in the wrong place</li> <li>an extra tick</li> </ul>
		<b>Total</b>	<b>5</b>	

A217/02

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
7	(a)		change in pressure (1)	1	
	(b)		<div> <div>use a lower pressure</div> <div>re-cycle unreacted gases</div> <div>less waste to dispose of</div> <div>less acid rain is made</div> <div>vessels don't have to be as strong</div> <div>less damage to the ozone layer</div> <div>less space is needed for the factory</div> </div>	2	<p>correct pattern = 2 marks one mistake = 1 mark</p> <p>a mistake is:</p> <ul style="list-style-type: none"> <li>• a missing line</li> <li>• a line in the wrong place</li> <li>• an extra line</li> </ul>
			<b>Total</b>	<b>3</b>	

A217/02

Mark Scheme

January 2009

Question			Expected Answers	Marks	Rationale
8	(a)		2 NaHCO <sub>3</sub> 2 H <sub>2</sub> O 2 CO <sub>2</sub>	2	first one correct= 1 mark last two correct= 1 mark
	(b)		0.2 (g) (1)	1	
	(c)		D (1) F (1)	2	any order
	(d)		less than 95 % (1)	1	
	(e)		84 (g) (1)	1	
	(f)	(i)	0.035 (1)	1	
		(ii)	7 (1)	1	
		(iii)	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">the collision frequency between acid and the solid is less</div> <div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> </div> <div style="margin-left: 10px;">(1)</div> </div>	1	correct pattern = 1 mark
			<b>Total</b>	<b>10</b>	



# Grade Thresholds

**General Certificate of Secondary Education**  
**Additional Science A (Specification Code J631)**  
**January 2009 Examination Series**

## Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
<b>A215/01</b>	Raw	42	N/A	N/A	N/A	27	23	20	17	14	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
<b>A215/02</b>	Raw	42	30	26	21	17	13	11	N/A	N/A	N/A
	UMS	50	45	40	35	30	25	23	N/A	N/A	N/A
<b>A216/01</b>	Raw	42	N/A	N/A	N/A	26	22	19	16	13	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
<b>A216/02</b>	Raw	42	34	30	25	21	16	13	N/A	N/A	N/A
	UMS	50	45	40	35	30	25	23	N/A	N/A	N/A
<b>A217/01</b>	Raw	42	N/A	N/A	N/A	25	21	17	13	9	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
<b>A217/02</b>	Raw	42	34	30	25	20	15	12	N/A	N/A	N/A
	UMS	50	45	40	35	30	25	23	N/A	N/A	N/A

## Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
<b>J631</b>	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
<b>J631</b>	13.6	36.4	45.5	72.7	90.9	100.0	100.0	100.0	100.0	22

For a description of how UMS marks are calculated see:

[http://www.ocr.org.uk/learners/ums\\_results.html](http://www.ocr.org.uk/learners/ums_results.html)

Statistics are correct at the time of publication.

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