

**Physics A**  
**Twenty First Century Science**

General Certificate of Secondary Education **J635**

**Mark Schemes for the Units**

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**January 2008**

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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 (1) at the end of that marking point.
- 4 Abbreviations, annotations and conventions used in the detailed Mark Scheme:

/	=	alternative and acceptable answers for the same marking point
<b>(1)</b>	=	separates marking points
<b>not</b>	=	answers which are not worthy of credit
<b>reject</b>	=	answers which are not worthy of credit
<b>ignore</b>	=	statements which are irrelevant
<b>allow</b>	=	answers that can be accepted
( )	=	words which are not essential to gain credit
<u>    </u>	=	underlined words must be present in answer to score a mark
ecf	=	error carried forward
AW / owtte	=	alternative wording
ora	=	or reverse argument

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 Annotations: the following annotations are available on SCORIS.

- ✓ = correct response
- ✗ = incorrect response
- bod = benefit of the doubt
- nbod = benefit of the doubt **not** given
- ECF = error carried forward
- ^ = information omitted
- I = ignore
- R = reject

6 If a candidate alters his/her response, examiners should accept the alteration.

7 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.

8 Marking method for tick boxes:

If there is a set of boxes, some of which should be ticked and others left empty, then you need to judge the entire set of boxes.

E.g. If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out). For a two-mark question, the rationale would be:

All boxes are indicated scores 0 marks.

All boxes blank scores 0 marks.

All four boxes correct scores 2 marks.

Three boxes correct scores 1 mark.

Two boxes correct scores 1 mark.

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

## A331/01 Modules P1, P2, P3 Foundation Tier

Question		Expected Answers	Marks	Rationale
1	a	<input type="text" value="(asteroid)"/> <input type="text" value="Moon"/> <input type="text" value="Earth"/> <input type="text" value="Sun"/> Moon before Earth (1) Earth before Sun (1)	2	<b>Accept</b> phonetically correct spelling of words.
	b	Earth is younger than the Universe <input type="checkbox"/> (1) Earth orbits the Sun once a year <input checked="" type="checkbox"/> (1)	2	<b>2 marks</b> for both 2 <sup>nd</sup> and 4 <sup>th</sup> box correct and no other ticks. <b>1 Mark</b> for 2 <sup>nd</sup> or 4 <sup>th</sup> box correct and <u>at least</u> 3 blanks. (note if 3 boxes ticked including the 2 correct boxes, <b>1 mark</b> scored.)
<b>Total</b>			<b>4</b>	

Question		Expected Answers	Marks	Rationale
2	a		2	3 links correct <b>2 marks</b> . 2 or 1 links correct <b>1 mark</b> . <b>Accept</b> any correct matching of boxes as links.
	b	secondary (1) long (1) wind (1) low (1)	4	Any clear correct choice of words in correct order is accepted. <b>Accept</b> phonetically correct spelling of words.
<b>Total</b>			<b>6</b>	

Question		Expected Answers	Marks	Rationale			
3	a	a packet of energy (1)	1	Any clear correct choice is allowed.			
	b	ultraviolet X-rays gamma rays	2	3 or 2 correctly identified <b>2marks</b> . 1 correctly identified <b>1 mark</b> . <b>-1 mark</b> for each mark in first 4 boxes. Minimum mark = 0.			
	c	it can warm them up <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)	✓			1	
✓							
<b>Total</b>			<b>4</b>				

Question		Expected Answers	Marks	Rationale			
4	a	microwaves (1)	1	Any clear correct choice is allowed.			
	b	increases the risk of ear cancer <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)		✓		1	
✓							
	c	i Tom (1) Roger (1)	2	Answers in either order allowed.			
		ii David (1) Roger (1)	2	Answers in either order allowed.			
		iii benefit outweighs the risk <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)		✓		1	
✓							
<b>Total</b>			<b>7</b>				



Question			Expected Answers	Marks	Rationale			
5	a	i	20 mSv (1)	1	Any clear indication of correct choice allowed.			
		ii	14 mSv (1)	1	Any clear indication of correct choice allowed.			
	b	i	worth the small risk <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)		✓		1	
✓								
		ii	get well paid <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)	✓			1	
✓								
	c		badge to monitor radiation using shielding <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td>✓</td></tr></table>		✓	✓	1	Allow <b>1 mark</b> for a tick in any correct box and no other.
✓								
✓								
<b>Total</b>				<b>5</b>				

Question			Expected Answers	Marks	Rationale				
6	a		light pollution is interfering <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)		✓			1	
✓									
	b		takes time for light to reach us <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)			✓		1	
✓									
	c	i	distance light travels in one year <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)	✓			1		
✓									
		ii	more (1)	1					
<b>Total</b>				<b>4</b>					

Question		Expected Answers	Marks	Rationale
7	a	photosynthesis (1)	1	Any clear indication of correct choice allowed.
	b	B and D (1)	1	<b>both</b> correct, any order for 1 mark.
	c	E (1)	1	<b>Allow</b> 'factories'.
	d	i	1	
		taken out again by plants and oceans <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
		ii	2	
		more factories now than in the past <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> forests have been burnt down <input checked="" type="checkbox"/> (1) <input type="checkbox"/>		<b>2 marks</b> for both top and 4 <sup>th</sup> box correct and no other ticks. <b>1 Mark</b> for top box <b>or</b> 4 <sup>th</sup> box correct and <u>at least</u> 3 blanks. (note if 3 boxes ticked including the 2 correct boxes, <b>1 mark</b> scored.)
<b>Total</b>			<b>6</b>	

Question		Expected Answers	Marks	Rationale
8	a	<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <input type="text"/>  <input type="text" value="scientists"/>  <input type="text"/> </div> <div> <input type="text" value="give their opinion"/>  <input type="text"/>  <input type="text"/> </div> </div>	1	If more than one link made then <b>0 marks</b> . Any clear indication of correct link is allowed.
	b	outlines appear to fit like a jigsaw <input type="checkbox"/> fossils in Africa match South America <input type="checkbox"/> <div style="display: flex; align-items: center; margin-left: 10px;"> <input type="checkbox" value="D"/> (1)  <input type="checkbox" value="D"/> (1)  <input type="checkbox"/> </div>	2	See guidance for examiners point 8 with 'D' used in place of ticks. <b>Accept</b> any clear indicator of correct choice.
	c	outsider to their group <input type="checkbox"/> (1) did not know how continents moved <input type="checkbox"/> (1) <div style="display: flex; align-items: center; margin-left: 10px;"> <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> </div>	2	See guidance for examiners point 8. <b>Accept</b> any clear indicator of correct choice.
	d	land is pushed upwards <input checked="" type="checkbox"/> (1) <div style="display: flex; align-items: center; margin-left: 10px;"> <input type="checkbox"/>  <input type="checkbox"/> </div>	1	
<b>Total</b>			<b>6</b>	
<b>Section total</b>			<b>42</b>	

## A331/02 Modules P1, P2, P3 Higher Tier

Question		Expected Answers	Marks	Rationale												
1	a	<table border="1"> <tr> <td>photosynthesis</td> <td>C</td> <td></td> </tr> <tr> <td>respiration</td> <td>B</td> <td>D</td> </tr> <tr> <td>combustion</td> <td>E</td> <td></td> </tr> <tr> <td>dissolving</td> <td>A</td> <td></td> </tr> </table>	photosynthesis	C		respiration	B	D	combustion	E		dissolving	A		3	All correct <b>3 marks</b> 3 or 4 correct <b>2 marks</b> 1 or 2 correct <b>1 mark</b> B & D may be in either order
photosynthesis	C															
respiration	B	D														
combustion	E															
dissolving	A															
	b	i	<p>taken out again by plants and oceans <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	1	No extra ticks allowed.											
		ii	<p>more factories now than in the past <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>forests have been burnt down <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	2	<b>2 marks</b> for both top box and fourth box correct and no other ticks. <b>1 mark</b> for top box <b>or</b> fourth box correct and <u>at least</u> three blanks. (Note: if three boxes ticked including the two correct boxes <b>1 mark</b> scored). <b>Accept</b> any clear indication of correct choice											
	c	<p>increased risk of flooding <input type="checkbox"/></p> <p><input checked="" type="checkbox"/></p> <p>more difficult to grow crops <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p>	1	Note only <b>1 mark</b> for <b>both</b> correct												
	d	<p>water vapour <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>methane <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	2	<b>2 marks</b> for both second box and bottom box correct and no other ticks. <b>1 mark</b> for second box <b>or</b> bottom box correct and <u>at least</u> three blanks. (Note: if three boxes ticked including the two correct boxes <b>1 mark</b> scored). <b>Accept</b> any clear indication of correct choice												
<b>Total</b>			<b>9</b>													

Question		Expected Answers	Marks	Rationale					
2	a	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 80px; height: 20px; margin-right: 10px;"></div> <div style="border: 1px solid black; padding: 2px 5px;">give their opinion</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; padding: 2px 5px;">scientists</div> <div style="margin-left: 10px;"> <div style="border: 1px solid black; width: 120px; height: 20px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 120px; height: 20px;"></div> </div> </div>	1	If more than one link made, <b>0 marks</b> . <b>Accept</b> any clear indication of correct link .					
	b	outlines appear to fit like a jigsaw fossils in Africa match South America <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <table border="1" style="border-collapse: collapse;"> <tr><td style="width: 30px; height: 20px;"></td></tr> <tr><td style="text-align: center;">D</td></tr> <tr><td style="text-align: center;">D</td></tr> <tr><td style="width: 30px; height: 20px;"></td></tr> </table> </div> <div style="display: inline-block; vertical-align: middle; margin-left: 5px;">           (1) (1)         </div>		D	D		2	See guidance for examiners point 8, with D in place of ticks. <b>Accept</b> any clear indication of correct choice.	
D									
D									
	c	outsider to their group  did not know how continents moved <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> <table border="1" style="border-collapse: collapse;"> <tr><td style="width: 30px; height: 20px; text-align: center;">✓</td></tr> <tr><td style="width: 30px; height: 20px;"></td></tr> <tr><td style="width: 30px; height: 20px; text-align: center;">✓</td></tr> <tr><td style="width: 30px; height: 20px;"></td></tr> </table> </div> <div style="display: inline-block; vertical-align: middle; margin-left: 5px;">           (1) (1)         </div>	✓		✓		2	See guidance for examiners point 8. <b>Accept</b> any clear indication of correct choice.	
✓									
✓									
	d	<table border="1" style="border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 30px; text-align: center;">(C)</td> <td style="width: 30px; text-align: center;">B</td> <td style="width: 30px; text-align: center;">D</td> <td style="width: 30px; text-align: center;">A</td> <td style="width: 30px; text-align: center;">E</td> </tr> </table> B before D (1) D before A (1) A before E (1)	(C)	B	D	A	E	3	
(C)	B	D	A	E					
<b>Total</b>			<b>8</b>						

Question			Expected Answers	Marks	Rationale				
3	a	i	14 mSv (1)	1	<b>Accept</b> any clear indication of correct choice.				
		ii	0.06 % (1)	1	<b>Accept</b> any clear indication of correct choice.				
	b	i	risk is reduced to a reasonable level <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> </table> (1)			✓		1	No extra ticks allowed.
✓									
		ii	20 (1)	1	<b>Accept</b> any clear indication of correct choice.				
		iii	risk would still be very low <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table> (1)		✓			2	<b>2 marks</b> for both second box and fourth box correct and no other ticks. <b>1 mark</b> for second box <b>or</b> fourth box correct and <u>at least</u> three blanks. (Note: if three boxes ticked including the two correct boxes <b>1 mark</b> scored). <b>Accept</b> any clear indication of correct choice
✓									
		owners continually measure dose <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table> (1)		✓					
✓									
<b>Total</b>				<b>6</b>					

Question		Expected Answers	Marks	Rationale									
4	a	light pollution is interfering <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)		✓			1	No extra ticks allowed.					
✓													
	b	takes time for light to reach us <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)		✓		1	No extra ticks allowed.						
✓													
	c	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>galaxies that are closer</td> <td rowspan="4" style="text-align: center; vertical-align: middle;"> </td> <td>.....move at double the speed</td> </tr> <tr> <td>galaxies that are twice as far away</td> <td>....move more slowly</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	galaxies that are closer		.....move at double the speed	galaxies that are twice as far away	....move more slowly					2	<b>1 mark</b> for each correct line from a left hand box. If more than one line drawn from the left hand box <b>0 mark</b> for that box.
galaxies that are closer		.....move at double the speed											
galaxies that are twice as far away		....move more slowly											
<b>Total</b>			<b>4</b>										
5	a	microwaves (1)	1	<b>Accept</b> microwave radiation <b>Accept</b> phonetic spelling.									
	b	mobile phone usage → increases;(1) increases → ear cancer; (1)	2	<b>Mark left hand link and right hand link separately</b> One mark for each correct link. For each side, if more than one link made, <b>0 marks</b> . <b>Accept</b> any clear indication of correct link .									
	c	i David (1)	1	<b>Accept</b> phonetic spelling.									
		ii benefit outweighs the risk <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)		✓			1	No extra ticks allowed.					
✓													
<b>Total</b>			<b>5</b>										

Question		Expected Answers	Marks	Rationale					
6	a	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>D</td> <td>C</td> <td>B</td> <td>E</td> <td>(A)</td> </tr> </table> D before C (1) C before B (1) B before E (1)	D	C	B	E	(A)	3	
	D	C	B	E	(A)				
b	chain (1)	1	<b>Accept</b> phonetic spelling.						
	c	need outweighs the risks <input checked="" type="checkbox"/> new employment opportunities <input checked="" type="checkbox"/>  greenhouse gasses <input checked="" type="checkbox"/>	2	The third box must be blank for any marks. <b>2 marks</b> for all three correct <b>1 mark</b> for any two of first, second or fourth box.					
<b>Total</b>			<b>6</b>						

Question		Expected Answers	Marks	Rationale
7	a	nucleus (1)	1	<b>Accept</b> phonetic spelling. Do not <b>accept</b> 'nuclear' or 'neutron'.
	b	protons (1)	1	<b>Accept</b> phonetic spelling <b>Accept</b> proton Do not accept protons with any thing else.
	c	same number of particles in its core <input type="checkbox"/> true still be of the same element <input type="checkbox"/> false will have gained energy <input type="checkbox"/> false same number of neutrons in its core <input type="checkbox"/> false	2	<b>2 marks</b> for 4 correct <b>1 mark</b> for 2 or 3 correct <b>Accept</b> 'T' for 'true' and 'F' for 'false' Ticks and crosses gain no marks.
<b>Total</b>			<b>4</b>	

<b>Section total</b>			<b>42</b>	
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## A332/01 Modules P4, P5, P6 Foundation Tier

Question			Expected Answers	Marks	Rationale
1	a		part of the graph	4	
		standing still	C (1)		
		walking	D (1)		
		buying the newspaper	C (1)		
		negative velocity	D (1)		
	b	120 (1)	1		
<b>Total</b>			<b>5</b>		

Question			Expected Answers	Marks	Rationale
2			distance (1) potential (1) kinetic (1) weight (1)	4	Accept phonetic spelling
<b>Total</b>			<b>4</b>		

Question			Expected Answers	Marks	Rationale
3	a	i	F (1)	1	
	a	ii	B (1) L (1)	2	Either order
	b		B (1)	1	
<b>Total</b>			<b>4</b>		

Question		Expected Answers	Marks	Rationale
4		power supply = A (1) switch = B (1) lamp = E (1) variable resistor = F (1)	4	<b>allow</b> symbols if drawn correctly
		<b>Total</b>	<b>4</b>	

Question		Expected Answers	Marks	Rationale
5	a	a negative charge (1)	1	Clear identification of phrase (from list)
	b	a continuous loop (1)	1	Clear identification of phrase (from list)
	c	a flow of charge (1)	1	Clear identification of phrase (from list)
	d	a repulsive force (1)	1	Clear identification of phrase (from list)
		<b>Total</b>	<b>4</b>	

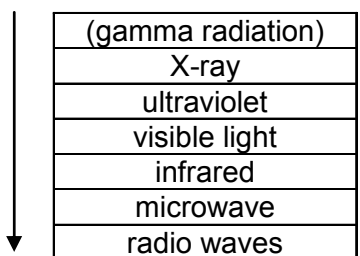
Question		Expected Answers	Marks	Rationale
6	a	R (1)	1	
	b	voltage (1)	1	
		<b>Total</b>	<b>2</b>	

Question		Expected Answers	Marks	Rationale
7	a		3	Mark lines from left hand box 1 mark for each correct line If two or more lines from left hand box, no mark
	b	induction (1)	1	
<b>Total</b>			<b>4</b>	

Question			Expected Answers	Marks	Rationale
8	a	i	B (1)	1	
		ii	D (1)	1	
	b		Z (1)	1	
	c			2	one mark name to wave one mark wave to description
<b>Total</b>			<b>5</b>		

Question		Expected Answers	Marks	Rationale
9			3	4 correct (3) 2 or 3 correct (2) 1 correct (1)
		<b>Total</b>	<b>3</b>	

Question		Expected Answers	Marks	Rationale
10	a	C (1)	1	
	b	B (1)	1	
	c	A (1)	1	
		<b>Total</b>	<b>3</b>	

Question		Expected Answers	Marks	Rationale
11	a		3	<p>X-ray above ultraviolet            Ultraviolet above visible            Visible above infrared            Infrared above microwave            Microwave above radio waves</p> <p>5 correct (3)            3 or 4 correct (2)            1 or 2 correct (1)</p> <p>accept phonetic spelling            accept uv for ultraviolet            accept ir for infrared            accept <math>\mu</math>wave for microwave            accept radio for radio waves            accept initial letters for each</p>
	b	gamma (1)	1	<p>Accept phonetic spelling            Accept 'cosmic rays'</p>
<b>Total</b>			<b>4</b>	
<b>Section total</b>			<b>42</b>	

## A332/02 Modules P4, P5, P6 Higher Tier

Question			Expected Answers	Marks	Rationale	Marks
1	a	i	F (1)	1		1
		ii	B (1) L (1)	2	Either order	2
	b		B (1)	1		1
			<b>Total</b>	<b>4</b>		

Question			Expected Answers	Marks	Rationale	Marks
2	a	i	25 J (1)	1	Any clear indication of correct answer is allowed.	1
		ii	$\text{velocity} = \sqrt{\frac{2 \times \text{energy}}{\text{mass}}}$ <div style="display: inline-block; vertical-align: middle;"> <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> </div> (1)	1		1
		iii	air resistance increases <div style="display: inline-block; vertical-align: middle;"> <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> </div> (1)	1		1
	b		B (1)	1	Allow correct choice if marked on the diagram above.	1
			<b>Total</b>	<b>4</b>		

Question		Expected Answers	Marks	Rationale	Marks					
3	a	<table border="1"> <tr><td>true or false</td></tr> <tr><td>F(false)</td></tr> <tr><td>T(true)</td></tr> <tr><td>F(false)</td></tr> <tr><td>T(true)</td></tr> </table>	true or false	F(false)	T(true)	F(false)	T(true)	2	4 correct (2) 2 or 3 correct (1) Accept ticks for 'true' and crosses for 'false'.	2
true or false										
F(false)										
T(true)										
F(false)										
T(true)										
	b	mass of a single exhaust particle <input checked="" type="checkbox"/> (1) number of exhaust particles <input checked="" type="checkbox"/> (1) velocity of exhaust particle <input checked="" type="checkbox"/> (1)	3	Mark each tick independently up to three ticks. If more than three ticks, <b>-1 mark</b> for each additional tick in the wrong place.	3					
<b>Total</b>			<b>5</b>							

Question		Expected Answers	Marks	Rationale	Marks
4	a		3	Mark lines from left hand boxes 1 mark for each correct line If two or more lines from a left hand box, no mark.	3
	b	induction (1)	1	Any clear indication of correct answer is allowed.	1
<b>Total</b>			<b>4</b>		

Question		Expected Answers	Marks	Rationale	Marks
5	a	<p>it is easier to generate a.c. <input type="checkbox"/> (1)</p> <p>distributed more efficiently <input checked="" type="checkbox"/> (1)</p>	2	<p><b>2 marks</b> for both 2<sup>nd</sup> and 4<sup>th</sup> box correct and no other ticks.  <b>1 Mark</b> for 2<sup>nd</sup> or 4<sup>th</sup> box correct and <u>at least</u> 3 blanks.            (note if 3 boxes ticked including the 2 correct boxes, <b>1 mark</b> scored.)</p>	2
	b	230V (1)			
<b>Total</b>			<b>3</b>		

Question		Expected Answers	Marks	Rationale	Marks
6	a	6 (1)	1	Accept '2x3'.	1
	b	5Ω (1)	1	Any clear indication of correct answer is allowed.	1
	c	<p>add the voltage across resistors <input type="checkbox"/> (1)</p> <p>multiply the current by resistance <input checked="" type="checkbox"/> (1)</p>	2	<p><b>2 marks</b> for both 2<sup>nd</sup> and 4<sup>th</sup> box correct and no other ticks.  <b>1 Mark</b> for 2<sup>nd</sup> or 4<sup>th</sup> box correct and <u>at least</u> 3 blanks.            (note if 3 boxes ticked including the 2 correct boxes, <b>1 mark</b> scored.)</p>	2
		<b>Total</b>			

Question		Expected Answers	Marks	Rationale	Marks
7	a	B (1)	1		1
	b	A (1)	1		1
	c	E (1)	1		1
	d	B (1)	1		1
	e	C (1)	1		1
<b>Total</b>			<b>5</b>		



Question		Expected Answers	Marks	Rationale	Marks
8	a		3	x-ray above UV (or ultraviolet) UV (or ultraviolet) above visible light Visible light above IR (or Infrared) IR (or Infrared) above microwave Microwave above radio waves  Phonetically correct spelling allowed. Allow first letter used in place of names. Allow $\mu$ in place of 'micro'. Allow 'light' or 'visible' for 'visible light'	3
	b	gamma (1)	1	Accept cosmic rays. Phonetically correct spelling allowed.	1
<b>Total</b>			<b>4</b>		

Question		Expected Answers	Marks	Rationale	Marks
9			4	Mark each side independently. left hand side: one mark per correct link right hand side: one mark per correct link Any additional lines from a box will cancel the mark for the correct line. Allow <b>1 additional Mark</b> for link shown by dashed line on the right, provided no more than <b>2 marks in total</b> for the right side.	4
<b>Total</b>			<b>4</b>		

Question		Expected Answers	Marks	Rationale	Marks
10		C (1)	1		1
		B (1)	1		1
		A (1)	1		1
		E (1)	1		1
		B (1)	1		1
		<b>Total</b>	<b>5</b>		
		<b>Section total</b>	<b>42</b>		

# Grade Thresholds

General Certificate of Secondary Education  
Physics A (Specification Code J635)  
January 2008 Examination Series

## Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
A331/01	Raw	42	N/A	N/A	N/A	29	24	19	15	11	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A331/02	Raw	42	36	32	27	23	17	14	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A332/01	Raw	42	N/A	N/A	N/A	27	24	21	18	15	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A332/02	Raw	42	35	29	23	18	13	10	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0

## 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>J635</b>	300	270	240	210	180	150	120	90	60	0

**No candidates were entered for aggregation this series. First aggregation opportunity is in June 2008.**

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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