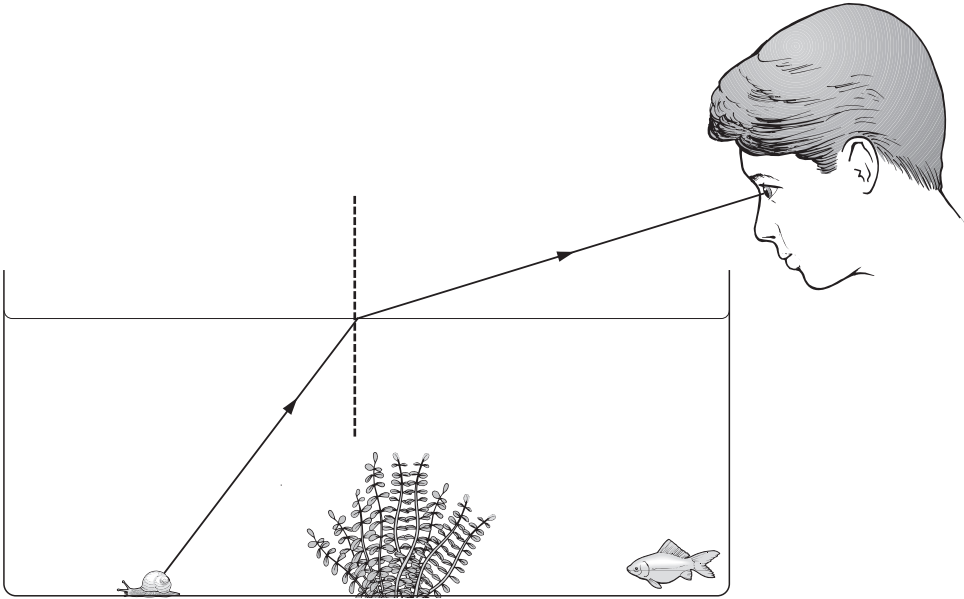


Tier 3–6 5–7	Q No 8 1	Part	Mark	Answer	Accept	Additional guidance
		a i 1/2m 4/3j	1	* A and C  their amplitudes are the same	accept 'the waves are the same height' accept 'they are equally tall'	letters may be in either order <b>both</b> the letter and the correct explanation are required for the mark 'the height of the waves' is insufficient 'they are big <b>or</b> tall' is insufficient 'taller waves are louder' is insufficient <i>do not accept</i> 'they are equally long'
		a ii 1/2m 4/3k	1	* B and C  their frequencies are the same	accept 'the waves are the same distance apart'  accept 'the wave lengths are the same' accept 'there are the same number of waves'	letters may be in either order <b>both</b> the letter and the correct explanation are required for the mark 'the distance apart of the waves' is insufficient 'the less spaced out the waves, the higher the pitch' is insufficient 'they are the same length <b>or</b> thickness <b>or</b> width' is insufficient
		a iii 1/2m 4/3k	1	* its pitch becomes higher	accept 'the frequency gets higher'	'it gets higher' is insufficient 'it becomes high' is insufficient
		b 1/2j	1	* any number between 4.5 and 7.5 hours (inclusive)		
		c 4/3g	1	any <b>one</b> from * it vibrates with a greater amplitude * it has larger vibrations	accept 'it moves more' accept 'burst ear drum'	'it vibrates harder' and 'it vibrates more' are insufficient responses <i>do not accept</i> 'it vibrates faster'
		<b>Total</b>	<b>5</b>			

Tier 3–6 5–7	Q No 9 2									
Part	Mark	Answer	Accept	Additional guidance						
<b>a</b> 1/2i	1	* <table border="1"> <tr> <td>2</td> <td>20</td> </tr> <tr> <td>3</td> <td>45 or 46</td> </tr> <tr> <td>4</td> <td>80</td> </tr> </table>	2	20	3	45 or 46	4	80		all three answers are required for the mark
2	20									
3	45 or 46									
4	80									
<b>b</b> 1/2l	1	<p>any <b>one</b> from</p> <p>* the height for 4 cm is 4 times the height for 2 cm</p> <p>* the graph is a curve</p> <p>* the height for 2 cm is not twice the height for 1 cm</p> <p>* the height should have been 40 cm when he pressed it down 4 cm</p>	<p>accept 'for 2 cm it went 20 cm but for 4 cm it went 80 cm'</p> <p>accept 'if I double the distance it goes four times as high'</p> <p>accept 'the graph is not a straight line'</p> <p>accept 'if it goes from 2 to 3 cm, the height more than doubles'</p> <p>accept appropriate arguments for other values</p>	<p>a mark may be awarded for other correct figures</p> <p>'when she doubled the distance it did not double the height' is insufficient</p>						
<b>c i</b> 4/5e	1	* some some		both answers are required for the mark						
<b>c ii</b> 4/5e	1	* most least		both answers are required for the mark answers must be in the correct order						
<b>c iii</b> 4/5e	1	* least least		both answers are required for the mark						
<b>Total</b>	<b>5</b>									

Tier 3–6 5–7	Q No 10 3			
Part	Mark	Answer	Accept	Additional guidance
a 4/3c	1	* a straight line from the snail to the surface and from the surface to the fish		the line must reach the fish within the tolerance shown below the ray must be continuous ignore an incident ray towards the snail ignore rays refracted at the surface
	1	* the angle of incidence should be approximately equal to the angle of reflection		the line must reach the surface of the water within the tolerance shown below
	1	* arrow pointing towards the fish <b>or</b> away from the snail	accept a single arrow in the correct direction on either the incident <b>or</b> the reflected ray	if two arrows are drawn, they must both be in the correct direction

Tier 3–6 5–7	Q No 10 3			
Part	Mark	Answer	Accept	Additional guidance
<p><b>b i</b> 4/3d</p>	<p>1</p> <p>1</p>	<p>* a ray from the snail to Andrew's eye bending at the surface</p> <p>* an arrow pointing towards Andrew on any part of the ray</p>		<p>both parts of the ray must be straight and must slope upwards and to the right the ray must be continuous ignore any incident rays drawn towards the snail the ray must bend further away from the normal at the surface as it goes from water to air</p> <p>if two arrows are drawn, they must both be in the correct direction</p>
<p><b>b ii</b> 4/3d</p>	<p>1</p>	<p>* refraction</p>		
<p><b>Total</b></p>	<p><b>6</b></p>			

Tier 3–6 5–7	Q No 11 4	Part	Mark	Answer	Accept	Additional guidance				
		a i 3/3d	1	* It is neutral ✓		if more than one box is ticked, award no mark				
		a ii 3/3d	1	* any number less than 7						
		a iii 3/3f	1	any <b>one</b> from * they are alkaline <b>or</b> an alkali  * they react with the acid	accept 'a soluble base' accept 'it has a pH above 7'	specific pH values such as 'its pH is 8.5' are insufficient				
		b 1/2i 3/3d	3	* <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>copper sulphate</td></tr></table>  * <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>citric acid</td></tr></table>  * <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>indigestion tablet</td></tr></table> * <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>sugar</td></tr></table>	copper sulphate	citric acid	indigestion tablet	sugar	accept 'copper sulfate' accept 'the sulphate' for 'copper sulphate'  accept 'acid' for 'citric acid'  accept 'tablet' for 'indigestion tablet'	if <b>all four</b> answers are correct, award three marks if <b>two or three</b> answers are correct, award two marks if <b>one</b> answer is correct, award one mark
copper sulphate										
citric acid										
indigestion tablet										
sugar										
		<b>Total</b>	<b>6</b>							

Tier 3–6 5–7	Q No 12 5	Part	Mark	Answer	Accept	Additional guidance
		<b>a i</b> 3/2f	1	* metamorphic		
		<b>a ii</b> 3/2f	1	* igneous		
		<b>b</b> 3/2e	1	* when magma cools more quickly the crystals are smaller	accept the converse accept 'in magma which cools faster the crystals are small'	answers must include a comparison <i>do not accept</i> 'crystals are bigger when the rock cools slowly'
		<b>c i</b> 3/1c	1	* oxygen		'O <sub>2</sub> ' is insufficient
		<b>c ii</b> 3/1f	1	* aluminium oxide	accept 'aluminium trioxide'	
		<b>c iii</b> 3/1f 3/1c	1	* 5		
		<b>d i</b> 3/3c	1	any <b>one</b> from * at the bottom * below copper		'less reactive' is insufficient
		<b>d ii</b> 3/1f	1	* zinc chloride	accept 'ZnCl <sub>2</sub> '	answers can be in either order
		3/3a	1	* hydrogen	accept 'H <sub>2</sub> '	'H' is insufficient
		<b>Total</b>	<b>9</b>			

Tier 3–6 5–7	Q No 13 6	Part	Mark	Answer	Accept	Additional guidance
		<b>a</b> 1/2d	1	any <b>one</b> from * he used 100 cm <sup>3</sup> of each milk * he used the same volume	accept 'the same amount <b>or</b> mass'	<i>do not accept</i> 'he used the same milk'
		<b>b</b> 1/2k 2/2a	1	any <b>one</b> from * cows' milk has less carbohydrate * human milk <b>or</b> powdered milk has more carbohydrate * sugar is a carbohydrate	accept 'carbohydrates' accept 'they have more carbohydrate'  accept 'they have more than 5 (g)' accept 'they have 7.4 (g) and 7.2 (g)'	<i>do not accept</i> 'it has more vitamin C <b>or</b> iron'
		<b>c</b> 2/2a 2/2d	1	* for hard <b>or</b> strong bones <b>or</b> teeth	accept 'for (healthy) bones <b>or</b> teeth'	<i>do not accept</i> 'for strong nails'
		<b>d i</b> 1/2k	1	* baby-milk has more iron than cows' milk	accept 'baby-milk has more iron' accept 'cows' milk only has 0.05 mg'	<i>do not accept</i> 'baby-milk has more iron than cows' or human milk'
		<b>d ii</b> 2/2a	1	* to make blood <b>or</b> red blood cells	accept 'for blood' <b>or</b> 'for red cells' <b>or</b> 'for blood cells' accept 'for haemoglobin' <b>or</b> 'haemoglobin contains iron' accept 'to prevent anaemia' accept 'to replace iron lost in menstruation'	'to keep the blood flowing' is insufficient  'for energy' is insufficient

Tier 3–6 5–7	Q No 13 6	Part	Mark	Answer	Accept	Additional guidance
e 1/2i BS/2a	1			any <b>one</b> from * vitamin C is given in mg, protein is given in g  * mg are smaller than g * 1.1 g is equal to 1100 mg * 3.8 mg is equal to 0.0038 g * 1.1 g is greater than 3.8 mg	accept 'vitamin C is in mg' accept 'the units are different' accept 'one was measured in grams, the other in milligrams' accept 'g are bigger than mg'	accept '1.1 g of protein and 3.8 mg of vitamin C'
<b>Total</b>	<b>6</b>					












**[Blank page]**

Tier 3–6 5–7	Q No 14 7	Part	Mark	Answer	Accept	Additional guidance										
		<b>a</b> 2/1e	1	* leaf	accept 'stem' <b>or</b> 'stalk'											
		<b>b i</b> 2/1b	1	* it controls the cell <b>or</b> cell's activities	accept 'it tells the cell what to do' accept 'it contains <b>or</b> passes on (genetic) information <b>or</b> genes <b>or</b> DNA'	'it is the brain of the cell' is insufficient										
		<b>b ii</b> 2/1b	1	any <b>one</b> from * absorbs light <b>or</b> Sun's energy * photosynthesis	accept 'traps <b>or</b> catches light' accept 'it makes food <b>or</b> glucose <b>or</b> sugar <b>or</b> starch <b>or</b> carbohydrate'	<i>do not accept</i> 'it attracts light' 'it produces oxygen' is insufficient										
		<b>b iii</b> 2/1b	1	any <b>one</b> from * gives the cell its shape * supports the cell		'it protects the cell' is insufficient										
		<b>c</b> 2/1b	2	any <b>two</b> from * cell wall * vacuole * chloroplast	accept 'wall'											
		<b>d</b> 2/3a 2/3e 2/2j	2	* <table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th><i>photosynthesis</i></th> <th><i>respiration</i></th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td style="text-align: center;">✓</td> <td></td> </tr> </tbody> </table>	<i>photosynthesis</i>	<i>respiration</i>		✓	✓			✓	✓			if <b>all four</b> answers are correct, award two marks if <b>two or three</b> answers are correct, award one mark if more than one box is ticked in any row, do not credit that row
<i>photosynthesis</i>	<i>respiration</i>															
	✓															
✓																
	✓															
✓																
<b>Total</b>			<b>8</b>													

Tier 5–7	Q No 8			
Part	Mark	Answer	Accept	Additional guidance
<b>a</b> 4/1e 4/1f	1	* the core becomes magnetised	accept 'the disc becomes magnetised' accept 'there is a magnetic field' accept 'it becomes an (electro)magnet' accept 'the stronger the current the stronger the magnet'	<i>do not accept</i> 'the iron core becomes magnetic' <i>do not accept</i> 'the magnet gets stronger'
	1	any <b>one</b> from * the core attracts the iron disc  * there is more force on the iron disc	accept 'the disc is pulled down'  accept 'the magnet exerts a force on the disc'	'the disc moves down' is insufficient as it does not imply that a force is exerted 'there is a force on the disc' is insufficient as it does not refer to the origin of the force
<b>b</b> 3/2c 4/1c	1	any <b>one</b> from * it would melt * it would get too hot	accept 'it would fuse' accept 'it could catch fire' accept 'it would blow'	'the coil would break' is insufficient 'it would get hot' is insufficient
<b>c</b> 1/2k	2	* the greater the current, the greater the force <b>or</b> field  * the more turns, the greater the force <b>or</b> field	accept the converse  accept the converse accept 'the more turns, the more powerful <b>or</b> stronger the magnet' accept 'the electromagnet with 200 turns is stronger' accept 'doubling the turns more than doubles the force'	answers must refer to a pattern describing a continuous variable <i>do not accept</i> 'it becomes more magnetic'  answers must include a comparison 'the more turns, the more powerful it is' is insufficient  award one mark if the answer refers to a number of coils rather than number of turns
<b>Total</b>	<b>5</b>			

Tier 5–7	Q No 9			
Part	Mark	Answer	Accept	Additional guidance
<b>a i</b> 1/2d	1	* mass of salt dissolved in water	accept 'the mass <b>or</b> amount of salt'	'salt' is insufficient do <b>not</b> accept 'the type of salt used'
<b>a ii</b> 1/2d	1	* boiling point of salt solution	accept 'boiling point'	
<b>a iii</b> 1/2d	1	any <b>one</b> from * starting temperature of the water * temperature of the laboratory		'temperature' is insufficient
<b>b i</b> 1/2k 3/1a	1	* the boiling point with no salt <b>or</b> at the start was 100°C	accept 'the water's boiling point was 100°C' accept 'the boiling point of water is 100°C' accept 'it boiled at 100°C'	<b>answers must refer to the boiling point</b> '0 g of salt added' is insufficient 'the graph starts at 100°C' is insufficient
<b>b ii</b> 1/2j 1/2o	1	any <b>one</b> from * there is only one point above the line in Neera's graph  * there should be a similar number of points above and below the line	accept 'most points are below the line in Neera's graph'  accept 'Tom's goes near more points' or 'Tom's points are nearer to the line' accept 'Neera just joined the first and last points'	
<b>Total</b>	<b>5</b>			

Tier 5–7	Q No 10			
Part	Mark	Answer	Accept	Additional guidance
<b>a i</b> 3/1b	1	* (molecules) are far apart <b>or</b> not touching each other	accept 'only gases can be compressed' accept 'they are randomly arranged'	'the gas can be compressed' is insufficient as it is given in the question
<b>a ii</b> 1/2m 3/1g	1	* there is only one type of molecule <b>or</b> compound <b>or</b> substance	accept 'there is one type of particle'	<i>do not accept</i> 'there is only one type of atom <b>or</b> element'
<b>b</b> 1/2m 3/1b	1	any <b>one</b> from * the space <b>or</b> distance between the molecules <b>or</b> particles is smaller * the particles <b>or</b> they are closer together * more particles are touching the sides	accept 'the volume is less'  accept 'particles hit the sides more often'	accept 'atoms' for 'particles'  'the particles are hitting the sides' is insufficient  'if the gas is compressed the pressure rises' is insufficient

Tier 5–7	Q No 10									
Part	Mark	Answer	Accept	Additional guidance						
<b>c i</b> 3/1e	1	any <b>one</b> from * new <b>or</b> different compounds have formed  * there is more than one compound	accept 'they are now joined in threes' accept 'new combinations of particles <b>or</b> atoms' accept 'the compounds are different' accept 'there is no longer a pure substance'							
<b>c ii</b> 3/2a	1	any <b>one</b> from * the same number of atoms are present * nothing has been added to <b>or</b> lost	accept 'mass is conserved'	'the mass stays the same' is insufficient 'the same atoms are present' is insufficient 'nothing changed' is insufficient 'the amount of gas stays the same' is insufficient						
<b>c iii</b> 3/1f	1	* <table border="1"> <tbody> <tr> <td></td> <td>NO</td> </tr> <tr> <td></td> <td>N<sub>2</sub>O</td> </tr> <tr> <td></td> <td>NO<sub>2</sub></td> </tr> </tbody> </table>		NO		N <sub>2</sub> O		NO <sub>2</sub>	accept 'ON'  accept 'ON <sub>2</sub> '  accept 'O <sub>2</sub> N'	<b>all three</b> answers are required for the mark
	NO									
	N <sub>2</sub> O									
	NO <sub>2</sub>									
<b>c iv</b> 3/1f	1	* nitrogen oxide	accept 'nitrogen monoxide' accept 'nitric oxide'							
<b>Total</b>	<b>7</b>									

Tier 5–7	Q No 11			
Part	Mark	Answer	Accept	Additional guidance
<b>a</b> 1/2k	1	* the more cigarettes smoked, the greater the number <b>or</b> percentage that die	accept 'smoking 5 cigarettes a day is less harmful than smoking 20'	<b>one conclusion should relate to the number of cigarettes and the other to the effect of age</b>  statements that do not make a generalisation, such as 'nearly 1% of men aged 55–64 who smoke 20 cigarettes a day will die of heart disease' are insufficient
	1	* the risk increases with age <b>or</b> is greater in older men	accept statements such as '20 cigarettes a day is worse when you are 45–64 than under 45' accept the converse	
<b>b</b> 2/2l	3	any <b>three</b> from * it causes a blood clot * the arteries become narrower <b>or</b> blocked <b>or</b> less <b>or</b> no blood to heart (muscle) * less <b>or</b> no oxygen to the heart (muscle) * less <b>or</b> no food <b>or</b> glucose <b>or</b> nutrients <b>or</b> minerals to the heart (muscle) * less <b>or</b> no carbon dioxide <b>or</b> waste removed * may cause a heart attack * cells cannot respire (properly)	accept 'fat clogs the arteries'  accept, for one mark, 'the heart muscle needs oxygen <b>or</b> glucose to work properly' even though it does not include a comparison  accept 'it may raise the blood pressure'	'the heart muscle cannot work properly' is insufficient as it is given in the question

Tier 5–7	Q No 11			
Part	Mark	Answer	Accept	Additional guidance
c i 2/1c	1	* <i>mucus</i> traps bacteria <b>or</b> dust <b>or</b> particles		'cell produces mucus' is insufficient
	1	* <i>cilia</i> move the mucus (towards the throat)	accept 'cilia remove bacteria <b>or</b> dust <b>or</b> particles'	
c ii 2/2i	1	* it paralyses them <b>or</b> they stop moving	accept 'it clogs the cilia' accept 'they stick together'	<i>do not accept</i> 'it kills <b>or</b> burns cilia' 'damages <b>or</b> removes cilia' is insufficient
<b>Total</b>	<b>8</b>			



Tier 5–7	Q No 12			
Part	Mark	Answer	Accept	Additional guidance
<b>a i</b> 4/2e 4/2f	1 1	* 240 * Nm	accept '0.8 x 300' accept '24 000 Ncm' for two marks	<i>do not accept</i> 'mN' <i>do not accept</i> 'n' for 'N'
<b>a ii</b> 4/2f 4/2e	1	any <b>one</b> from * 150  * half the force needed at 0.8 m	accept $\frac{300}{2}$ or $\frac{240}{1.6}$	consequential marking applies  accept the numerical answer to <b>a i</b> ÷ 1.6 'half' is insufficient
<b>b</b> 4/2g	1 1	* 600 * N/m <sup>2</sup> or Pa	accept $\frac{120}{0.2}$ accept '0.06 N/cm <sup>2</sup> ' for two marks	
<b>Total</b>	<b>5</b>			

**[Blank page]**