

Question number	Answer	Mark
1(b)	An answer that combines the following points of application of knowledge and understanding to provide a logical description: <ul style="list-style-type: none"> <li>genetic variation means that some plants will be tolerant of drought conditions and these can be selected (1)</li> <li>cross-pollinate these plants and grow the seeds under drought conditions (1)</li> <li>select offspring and repeat over several generations (1)</li> </ul>	(3)

Question number	Answer	Additional guidance	Mark
2(a)(i)	<ul style="list-style-type: none"> <li>radius 10 mm <math>\pm</math> 1 mm (1)</li> <li>area = <math>\pi r^2</math> (1)</li> <li>area 314 (mm<sup>2</sup>) (1)</li> </ul> <p>answer must be to 3 significant figures</p>	<p>if radius outside range but area calculated max 2 marks</p> <p>award full marks for correct numerical answer without working</p>	(3)

Question number	Answer	Additional guidance	Mark
2(a)(ii)	An explanation that combines identification via a judgement (1 mark) to reach a conclusion via justification/reasoning (1 mark): <ul style="list-style-type: none"> <li>antiseptic 1 has a larger zone of inhibition (1)</li> <li>so more of <i>Streptococcus pyogenes</i> have been killed (1)</li> </ul>	ecf from (a)(i)	(2)

Question number	Answer	Additional guidance	Mark
2(a)(iii)	<ul style="list-style-type: none"> <li>to provide optimal growth conditions</li> </ul>	<i>S. pyogenes</i> grow at body temperature	(1)

Question number	Answer	Mark
<b>2(b)</b>	An explanation that combines identification – understanding (1 mark) and reasoning/justification – understanding (1 mark): <ul style="list-style-type: none"> <li>the Bunsen burner flame kills all microorganisms on the loop (1)</li> <li>so only the desired bacteria are transferred to the loop/no unwanted microorganisms spread on the agar plate (1)</li> </ul>	<b>(2)</b>

Question number	Answer	Additional guidance	Mark
<b>3(a)</b>	<ul style="list-style-type: none"> <li>830 mm = 0.83 m (1)</li> <li>0.83/0.99 = 0.8383... = 0.84 to two d.p. (1)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>0.99 m = 990 mm (1)</li> <li>830/990 = 0.8383... = 0.84 to two d.p. (1)</li> <li>Answer must be given to 2 decimal places</li> </ul>	award full marks for correct numerical answer without working	<b>(2)</b>

Question number	Answer	Mark
<b>3(b)(i)</b>	B	<b>(1)</b>

Question number	Answer	Mark
<b>3(b)(ii)</b>	Any two of the following points: <ul style="list-style-type: none"> <li>similar BMI (1)</li> <li>same gender profile (1)</li> <li>similar amount (and type) of exercise (1)</li> </ul>	<b>(2)</b>

Question number	Answer	Mark
<b>3(b)(iii)</b>	An answer that combines the following points to provide a plan: <ul style="list-style-type: none"> <li>weigh the 40 obese people (1)</li> <li>half follow the new diet and half keep their normal diet (1)</li> <li>after a fixed time period re-weigh the 40 people (1)</li> </ul>	<b>(3)</b>

Question number	Answer	Mark
2(a)	A	(1)

Question number	Answer	Mark
2(b)(i)	2009 bar plotted at 4800 and 2010 bar plotted at 4100	(1)

Question number	Answer	Additional guidance	Mark
2(b)(ii)	An answer that combines points of interpretation/evaluation to provide a logical description: <ul style="list-style-type: none"> <li>overall trend increases until 2009 (1)</li> <li>decrease in the number of cases in 2010/correct manipulation of the data (1)</li> </ul>	e.g. in 2010 it decreased by 700 cases (1)	(2)

Question number	Answer	Mark
2(b)(iii)	An explanation that combines identification – understanding (1 mark) and reasoning/justification – understanding (1 mark): <ul style="list-style-type: none"> <li>Chlamydia and Gonorrhoea are STI infections spread by the same mechanism (1)</li> <li>individuals aren't using a barrier contraception method (1)</li> </ul>	(2)

Question number	Answer	Mark
2(c)	An explanation that combines identification – knowledge (1 mark) and reasoning/justification – understanding (1 mark): <ul style="list-style-type: none"> <li>HIV destroys {white blood cells/cells of the immune system} (1)</li> <li>therefore a reduced immune response makes the individual more susceptible to other communicable diseases (1)</li> </ul>	(2)

Question number	Answer	Mark
3(a)	<ul style="list-style-type: none"> <li>Benedict's (1)</li> <li>brick red (1)</li> </ul> <p>Answers must be in the correct order</p>	(2)

Question number	Answer	Mark
3(b)(i)	A	(1)

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(i)</b>	(direct) contact (with fungus) / touch / through the skin /surfaces		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(ii)</b>	antifungal	fungicide / antibiotics/ <i>nystatin / terbinafine / itraconazole</i>	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6 (b)(i)</b>	<b>C</b> antibiotic C		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6 (b)(ii)</b>	An explanation including 3 of the following points: <ul style="list-style-type: none"> <li>• lysozymes / enzymes (1)</li> <li>• found in tears (1)</li> <li>• hydrochloric acid (1)</li> <li>• in the stomach (1)</li> <li>• (chemical defence) destroy bacteria / pathogens (1)</li> </ul>	accept lungs/saliva for tears  stomach acid (1)  accept viruses for pathogens  Ignore references to mucus	<b>(3)</b>

Question Number	Indicative Content	Mark
<b>QWC</b>	<p><b>*6(c)</b> An explanation of how MRSA has increased since 1993 also using the evaluation of data from the graph</p> <ul style="list-style-type: none"> <li>• the number of patients suffering from MRSA has increased / more cases of MRSA</li> <li>• by over 366 000 since 1993</li> <li>• data quoted from the graph</li> <li>• ref to poor hygiene in hospitals</li> <li>• MRSA is a bacterium that is resistant to antibiotics</li> <li>• individual bacteria show variation</li> <li>• when a bacterial infection is treated with antibiotics those bacteria with low resistance are destroyed first</li> <li>• the more resistant bacteria survive</li> <li>• if a patient stops taking the antibiotics then the resistant bacteria will live to reproduce</li> <li>• the new bacteria will also be resistant to antibiotics</li> <li>• these bacteria will not be able to be treated with antibiotics so the number of cases continue to rise</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• a limited description of the graph only or the increase in bacteria only</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• a simple description of the graph with a limited explanation of how bacteria continued to increase</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed explanation (with data) using the graph of the emergence of resistant bacteria which then reproduce, linked to antibiotic treatment</li> <li>• most of the steps are identified and are in a logical order</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(i)</b>	an increase in cases until <b>October</b> and then a decrease (in the number of cases) (1)	accept an increase in cases till <b>November</b> when it decreases	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(ii)</b>	1320 (1) 1320 - 168 = 1152	<b>2 marks for correct answer</b>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)</b>	exponential (growth)	log / logarithmic (growth)	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)</b>	<b>A suggestion including two of the following</b>  not everyone has been immunised (1)  immigration introduces people who are not immunised (1)  immunisation not fully effective (1)  immunity can decrease with age (1)	accept no herd immunity    accept bacteria mutates (making immunisation ineffective)  accept immunity requires boosters/loss of memory lymphocytes	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(d)</b>	<p><b>A description including the following</b></p> <p>(immunisation) introduces an antigen/(immunisation) causes an immune response (1)</p> <p>(B) lymphocytes (1)</p> <p>production of antibodies (1)</p> <p>(the production of) <u>memory lymphocytes</u> (1)</p>	<p>accept immune system recognises an antigen (in the immunisation)</p> <p>ignore white blood cells</p>	<b>(3)</b>

Total for Question 2 = 9 marks