

1	a	B ; D ; C ;	reject if an incorrect letter is also given	3
	b	(circular / longitudinal) muscles ; contract ; peristalsis ;		3
	c	peptidase ; <b>A</b> <i>trypsin / pepsin / protease</i> pasta / rice / etc / and glucose ; <b>R</b> maltose / monosaccharide	1 mark per row	2
2	a	15 ;	<b>A</b> 0.25 breaths/s	1
	b	C ;		1
3		sewage contains organic material ; acts as food for / broken down by bacteria ; bacteria rapidly reproduce / grow in numbers ; (bacteria) use <u>oxygen</u> for respiration / aerobic respiration ;	<b>R</b> <i>nitrites from sewage</i>  <b>R</b> bacteria grow bigger – since must include idea of number of bacteria increasing/multiply  <i>need to have reference to bacteria using oxygen</i>	4

		river becomes anaerobic / O <sub>2</sub> conc. Drops / BOD increases ;	<i>must be linked to the above point to get mark</i>	
<b>4</b>		B or C ; D ; E ;		<b>3</b>
<b>5</b>	<b>a</b>	diffusion ;		<b>1</b>
		epidermis is thin / one cell thick / short diffusion distance ; <b>A</b> ref to thin cuticle capillary/blood, near to, surface/epidermis ; gases dissolve in layer of water / mucus ;		<b>2</b>
<b>6</b>	<b>a</b>	smoking ; high blood pressure ; diabetes ; fatty / high cholesterol diet ; ( <i>diet alone not enough for the mark</i> ) stress ; lack of exercise ; high salt diet ;	<i>accept old age / age if qualified</i>  <i>accept genetic factors</i>	<b>3</b>

	<b>b</b>	<p><u>coronary</u> artery ;</p> <p>fat / cholesterol blocks / deposits / fatty plaque ;</p> <p>(inside) artery wall ;</p> <p>leads to atheroma ;</p> <p>arteriosclerosis / atherosclerosis ;</p> <p>AVP ;</p>		<b>3</b>
	<b>c</b>	<p>less / no, oxygen ;</p> <p>less / no, glucose ;</p> <p>to heart <u>muscles</u> cells supplied by coronary artery ;</p> <p>lower <u>rate</u> of respiration / <u>less</u> energy released / ATP ;</p> <p>less energy for contraction ;</p> <p>heart attack ;</p>	<b>R</b> energy created ( <i>negatively mark this point</i> )	<b>3</b>
<b>7</b>		<p>vena cava ;</p> <p>ventricle ;</p> <p>semi-lunar ; <b>A</b> pulmonary</p> <p>pulmonary ;</p>		<b>7</b>

		lung(s) ; muscle / cardiac / myocytes ; aorta ;		
<b>8</b>		phagocytes ; ingest / engulf ; R “eat” digest / breakdown / ref. enzymes ;  lymphocytes ; antibodies ; clump / stick / lyse / neutralise ;	max 2 marks for phagocytes and their function and max 2 for lymphocytes	<b>4</b>
<b>9</b>	<b>a</b>	fertilisers contain mineral ions / named mineral ; use of named example for example - ; <i>nitrate for amino acids or DNA or protein</i> <i>magnesium for chlorophyll</i> <i>phosphates for ATP or cell membranes</i> <i>potassium or iron for respiratory enzymes</i>		<b>2</b>

	<b>b (i)</b>	<p><i>Advantages:</i></p> <p>less crop destroyed / more crop growth / can direct control to a specific area unlike biological control agents ORA / no risk of biological control agent becoming a pest themselves (AW) ;</p> <p><i>Disadvantages:</i></p> <p>affects other organisms / bioaccumulation / disrupts food chain / pollutes environment / needs reapplication / resistance (<b>R</b> immunity) ;</p>		<b>2</b>
	<b>(ii)</b>	<p><u>biological control</u> ;</p> <p>living organism / predator that eats pests / named pests ;</p> <p>example - ladybirds eating aphids / moths eating prickly pear / parasitic fly on greenfly / whitefly larvae / AVP ;</p> <p>crop rotation ;</p> <p>description of crop rotation decreasing pest levels ;</p>		<b>2</b>
<b>10</b>	<b>a</b>	<p>show that the factor under test is responsible for the change observed / AW</p> <p>e.g. to show carbon dioxide is needed / to show plants can photosynthesize under the glass cover ;</p> <p>idea of plant to compare with ;</p>	<b>A so that only 1 variable is changed</b>	<b>1</b>

	<b>b</b>	to be sure that starch is produced only during the experiment / to ensure the results obtained were accurate ;		<b>1</b>
	<b>c</b>	<b>X</b> & plants have had no light for photosynthesis / have been destarched ; <b>X</b> & plant has had no carbon dioxide for <u>photosynthesis</u> ; <b>✓</b> & plant has had carbon dioxide / all factors, for <u>photosynthesis</u> ;	BOTH correct result of starch and reason is required for each mark	<b>3</b>
<b>11</b>	<b>a (i)</b>	suitable scale, uniform scale, uses >50% of graph paper ; axes labelled with units ; points plotted correctly ; line correctly drawn with a rule (point to point, not line of best fit, no extrapolation) ;	<i>deduct one mark if they have drawn both graphs as question asks for student 2 only</i>	<b>4</b>
	<b>(ii)</b>	decrease then increase ; <u>optimum</u> pH8 ( <b>R neutral</b> ) ; correct use of figures from graph (other than pH8) / use of 1 other figure & pH8 / use of 2 other figures ;		<b>2</b>
	<b>(iii)</b>	denaturing (at extremes / either ends); ( <b>R destroyed / damaged</b> ) ; active site changed shape ;		<b>2</b>

		substrate no longer fits active site ;		
	<b>b (i)</b>	enzyme concentration / volume ( <b>A amount</b> ) different ; older versus freshly prepared enzyme ; substrate different concentration / volume / type of substrate / protein / film ; different temperature ;	ignore points about method / different end points in film clearing / agitation	<b>2</b>
	<b>c (i)</b>	use same vol. / conc. / same no. of enzyme molecules / use same mass of protein / same film / same area / same thickness / same temperature / agitate same no of times ;		<b>1</b>
	<b>c (ii)</b>	repeat experiment (at least 3 times) ;		<b>1</b>
<b>12</b>	<b>a</b>	yellow ; purple ; red ;	<b>R no change</b> 3 correct = 2, 2 correct = 1, 1 correct = 0	<b>2</b>
	<b>b</b>	<b>A:</b> only respiring ; produces more CO <sub>2</sub> ; <b>B:</b> rate of photosynthesis greater than respiration ; more CO <sub>2</sub> being used up / net increase in CO <sub>2</sub> ;	<i>ignore all refs to oxygen</i>  <i>no mark if respiration is omitted in B</i>	<b>6</b>

		C: both photosynthesis and respiration occurring ; equal / almost equal <u>rates</u> ;		
<b>13</b>	<b>a (i)</b>	smoking / cigarettes / cigars ;		<b>1</b>
	<b>(ii)</b>	source: smoking / cigarettes / cigars <i>no mark for source alone</i>  Explanation:  % of smokers higher than in non-smokers / ora / accept actual figures ;  in both day and night groups ;  the difference between smokers and non-smokers is 3.4% ;	(any 2 points but source must be stated)	<b>2</b>
	<b>(iii)</b>	greater amount of traffic in the day / AW ;		<b>1</b>
	<b>b</b>	baby lower birth weight / smaller / foetus receives less oxygen / baby born addicted to nicotine / brain damaged ;		<b>1</b>
	<b>c</b>	tar / SO <sub>2</sub> / NO <sub>2</sub> / smoke ;  irritates airways ;		<b>4</b>



		tar: increases mucus production ; cilia paralysed ; mucus trapped / coughing to clear airways / bronchitis ;		
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