

Question Number	Answer	Additional Guidance	Mark
1(a)	<p>correct answer only gains both marks</p> <p>1. $2.2 - 7.6 = 24.6$;</p> <p>2. $(\div 32.2) \times 100 = 76.4 / 76.40$;</p>	<p>ACCEPT 7.6 \div 32.2</p> <p>100 - 23.6 = 76.4 / 76.40</p>	(2)

Question Number	Answer	Additional Guidance	Mark
1(b)	<p>1. idea of producing liquid extract of cabbage;</p> <p>2. description of titration ;</p> <p>3. reference to use of DCPIP ;</p> <p>4. correct colour change described ;</p> <p>5. compare volumes with standard e.g. reference to use of calibration curve / eq ;</p> <p>6. description of appropriate standardisation of extract e.g. mass of cabbage, volume of liquid added to cabbage ;</p>	<p>2. e.g. se volume of extract and find the volume of DCPIP needed or converse</p> <p>4. e.g. it oes colourless when extract added, add DCPIP until it goes blue</p>	(4)

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	1. cell membranes {damaged / permeable / eq} ; 2. vitamin C leaves the {cells / cabbage} (because it is water soluble) ; 3. vitamin C is destroyed by {boiling / enzyme / ascorbic acid oxidase} ;		(2)
1(c)(ii)	the { enzyme / ascorbic acid oxidase } would have been denatured (quicker when added to the boiling water) ;	ACCEPT for cold water: enzyme is more active as water is heated up or vitamin C leaks out as it heats up	(1)
1(d)	1. idea that stored sauerkraut still contains some vitamin C. 2. cabbage would {rot / decompose / eq} ;	ACCEPT sauerkraut does not rot	(1)

Question Number	Answer	Additional Guidance	Mark
2(a)	1. idea that enzyme activity decreases ; 2. credit calculated reduction e.g. 0.6, 2.7 , 3.3 ; 3. idea that an increase in temperature results in increase in kinetic energy ; 4. causing changes in bonds (in the enzyme) / eq ; 5. idea that enzyme is denaturing (above 40 °C) ; 6. idea that carbon fixation is reduced ;	5 ACCEPT fewer enzyme-substrate complexes NOT starts to denature	(5)

Question Number	Answer	Additional Guidance	Mark
2(b)	{RuBP / ribulose biphosphate} AND {carbon dioxide / CO ₂ } ;	ACCEPT Rubp / ribulose biphosphate NOT CO / CO ²	(1)

Question Number	Answer	Mark
2(c)(i)	D valid ;	(1)

Question Number	Answer	Mark
2(c)(ii)	C measuring the activity at 1°C intervals between 35°C and 45°C ;	(1)

Question Number	Answer	Additional Guidance	Mark
3 (a)	1. idea of formation of secondary or tertiary structure ; 2. idea of bonding between R groups ; 3. named bond e.g. ionic, disulfide, hydrogen ;	1. ACCEPT e.g. alpha helix, beta pleated sheet, globular structure ACCEPT folding (of primary structure) IGNORE 3D shape 2. ACCEPT hydrophilic R groups go to outside/ hydrophobic R groups go to inside / eq 3. DO NOT ACCEPT peptide	(3)

Question Number	Answer	Additional Guidance	Mark
3 (b) (i)	1. as the enzyme concentration increase the rate of reaction increases / eq ; 2. idea that enzyme lowers activation energy / provides alternative reaction pathway ; 3. idea that the higher concentration of enzyme means that more active sites are available ; 4. more chance of a collision between {enzyme / active site } and substrate ; 5. reference to {enzyme – substrate complex / specific interaction between enzyme active site and substrate } ; 6. idea that substrate is in excess / enzyme concentration is limiting factor ;	ACCEPT bacteria as substrate 1. ACCEPT enzyme increases rate of reaction	(3)

Question Number	Answer	Additional Guidance	Mark
3 (b) (ii)	there were {anomalies / sources of error / random error / measurement inconsistencies / lack of precision / lack of accuracy / eq} ;	ACCEPT example of random error e.g. volume IGNORE systematic error, outliers	(1)

Question Number	Answer	Additional Guidance	Mark
3 (c)	1. idea that this increased temperature changes the bonding in the enzyme ; 2. the active site is {denatured / changes shape} ; 3. the substrate no longer fits into the active site / the enzyme no longer {catalyses the reaction / lowers the activation energy / eq} ;	IGNORE enzyme is denatured ACCEPT bonds are broken 3. ACCEPT no enzyme substrate complex can form / eq	(2)

Question Number	Answer	Additional guidance	Mark
4(a)(i)	<ol style="list-style-type: none"> 1. the larger the diameter the less tensile strength / negative correlation / eq ; 2. greatest decrease 0.05-0.08 to 0.09-0.12 (mm) ; 3. idea of little change between 0.13-0.16 and 0.33- 0.36 (mm) / no difference between 0.21-0.24 and 0.29 -0.36 (mm) ; 4. slight increase 0.21-0.24 to 0.25-0.28 (mm) ; 5. appropriate manipulation of data ; 		(3)

Question Number	Answer	Additional guidance	Mark
4(a)(ii)	<ol style="list-style-type: none"> 1. {length / mass / eq} of fibre ; 2. age of fibre ; 3. source of fibre / eq ; 4. temperature ; 5. humidity ; 	<p>IGNORE discussion of retting or extraction method</p> <p>3. ACCEPT part of leaf fibre taken from, same leaf / same plant</p> <p>5. ACCEPT water content of fibre</p>	(3)

Question Number	Answer	Additional guidance	Mark
4(b)	<ol style="list-style-type: none"> 1. idea of renewable e.g. more sisal plants can be grown ; 2. resources can be made available for future generations / eq ; 	IGNORE biodegradable	(2)

Question Number	Answer	Additional guidance	Mark
4(c)	<ol style="list-style-type: none"> 1. idea of { thick walls / lignin } for strength ; 2. idea of lignin making fibres waterproof ; 3. flexible therefore do not break easily / eq ; 4. light because they are { hollow / not solid } / eq ; 	<ol style="list-style-type: none"> 1. ACCEPT tough 4. IGNORE dead 	(2)

Question Number	Answer	Mark
5(a (i))	D ;	(1)

Question Number	Answer	Mark
5(a (ii))	B ;	(1)

Question Number	Answer	Mark
5(a)(iii)	B ;	(1)

Question Number	Answer	Mark
5(a) (iv)	A ;	(1)

Question Number	Answer	Additional Guidance	Mark
5(b) (i)	<ol style="list-style-type: none"> 1. (total) cholesterol levels in people with mutation are not higher than people without mutation / eq ; 2. LDL (cholesterol) levels in people with mutation are not higher than people without mutation / eq ; 3. HDL (cholesterol) levels in people with mutation are not lower than people without mutation / eq ; 4. credit correct use of manipulated figures ; 	<p>1, 2, 3: ACCEPT converse, similar / little difference. Decreased/reduced is not equivalent to lower.</p> <p>1. IGNOR same</p> <p>2. IGNOR same</p> <p>3. CCEPT ref to HDL to LDL ratio higher in people with the mutation.</p> <p>4. m t be manipulated e.g. difference calculated and not just quoted (difference in LDL= 10, total cholesterol= 7) ACCEPT without units</p>	(2)

Question Number	Answer	Additional Guidance	Mark
5(b) (ii)	(plant) statin ;	IGNORE named drug, sterol, stanin	(1)

Question Number	Answer	Additional Guidance	Mark
5(b)(iii)	<ol style="list-style-type: none"> 1. muscle {inflammation / pain / eq} 2. liver {damage / failure / eq} 3. joint {aches / pains / eq} 4. nausea/ constipation / diarrhoea / indigestion / flatulence / loss of appetite / eq 5. kidney {damage /failure /eq} 6. cataracts / blurred vision 7. diabetes 8. allergies / skin inflammation / skin rash / eq 9. respiratory problems / persistent cough / nosebleeds / eq 10. headaches / dizziness / depression / insomnia / ringing in ears / fatigue / eq ; 	<p>NOT cancer or reduced vitamin absorption IGNORE affect ACCEPT problems as equivalent to damage etc</p> <ol style="list-style-type: none"> 2. CCEPT disease 4. CCEPT vomiting 5. CCEPT kidney disease 10. CCEPT mood swings 	(1)