

Question Number	Answer	Mark
1(a)(i)	C ;	(1)

Question Number	Answer	Mark
1(a)(ii)	A ;	(1)

Question Number	Answer	Mark
1(a)(iii)	D ;	(1)

Question Number	Answer	Mark
1(b)(i)	<ol style="list-style-type: none"><li>1. reference to graph ;</li><li>2. line (graph) / eq ;</li><li>3. {Y / vertical} and {X / horizontal} axes correctly described. e.g. mass versus time / rate versus temperature ;</li><li>4. idea of using same scale for axes (for both plants) ;</li><li>5. idea of plotting each {temperature / species (plant)} separately ;</li></ol>	(3)

Question Number	Answer	Mark
1(b)(ii)	<ol style="list-style-type: none"> <li>1. idea of controlling a variable ;</li> <li>2. reference to {optimum / suitable / eq} temperature (for germination) ;</li> <li>3. idea of using {viable / live / eq} seedlings OR making sure that seeds {germinate / eq} ;</li> <li>4. reference to validity of the investigation ;</li> </ol>	(2)

Question Number	Answer	Mark
1(b)(iii)	<ol style="list-style-type: none"> <li>1. sea plantain / <i>Plantago maritima</i> / <i>Plantago</i> ;</li> </ol> <p>Any three from:</p> <ol style="list-style-type: none"> <li>2. idea of different latitudes have different (mean) temperatures ;</li> <li>3. {sea plantain / <i>Plantago maritima</i> / <i>Plantago</i>} grows {better / eq} at all (three) temperatures / eq ;</li> <li>4. {bog sedge / <i>Kobresia simpliciuscula</i> / <i>Kobresia</i>} does not grow very well at {lower temperatures / 10°C and 14°C} / eq ;</li> <li>5. credit appropriate comparative manipulated figures ;</li> </ol>	(4)

Question 2 & 3: N/A

Question Number	Answer	Mark
4(a)	<ol style="list-style-type: none"> <li>1. fibrous - long / linear / straight (chains), globular - compact / spherical / eq ;</li> <li>2. globular are folded and fibrous are not / eq ;</li> <li>3. globular are soluble and fibrous are not / eq ;</li> <li>4. fibrous -involved in {structural / eq} and globular are not ;</li> <li>5. globular - involved in {catalysis / metabolism / eq} and fibrous are not ;</li> </ol>	(2)

Question Number	Answer	Mark
4(b)(i)	C ;	(1)

Question Number	Answer	Mark
4(b)(ii)	<p>Any two from:</p> <ol style="list-style-type: none"> <li>1. physical damage / eq ;</li> <li>2. immersion in water / eq ;</li> <li>3. (external) temperature / eq ;</li> <li>4. burning / eq ;</li> <li>5. electrocution / eq ;</li> <li>6. reference to {clothing / eq} ;</li> <li>7. wind / air movements / eq ;</li> </ol>	(2)

Question Number	Answer	Mark
4(c)	<ol style="list-style-type: none"><li>1. reference to not {all / both / eq} muscles {contract / relax / reach (full) rigor / eq} at same {time / rate / eq} ;</li><li>2. idea of jaw muscle contracting before leg muscle / eq ;</li><li>3. idea of jaw muscle reaches {full contraction / rigor} before leg muscle / eq ;</li><li>4. jaw starts contraction {0.5 / 0.8 / 0.9} hours before leg OR jaw reaches (full) rigor 2.5 hours before leg ;</li><li>5. reference to {full contraction / rigor} in muscle does not last very long ;</li><li>6. idea of leg is still contracting while jaw is relaxing / eq ;</li></ol>	(4)

Question Number	Answer	Mark
5(a)(i)	<ol style="list-style-type: none"> <li>1. {competition / eq} for nutrients ;</li> <li>2. {competition / eq} for space ;</li> <li>3. {secretion / eq} {chemicals / substances / lysozyme / eq} OR affects {pH / eq} ;</li> <li>4. {stimulation / eq} of (skin) immune system / eq ;</li> </ol>	(2)

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

Question Number	Answer	Mark
5(b)	<ol style="list-style-type: none"> <li>1. idea that influenza may allow development of other diseases e.g. opportunistic infections ;</li> <li>2. antibiotics will {kill / inhibit growth of / eq} bacteria ;</li> </ol>	(2)

Question Number	Answer	Mark
5(c)(i)	<p>correct answer 37.2 / 37.17 / 37 (%) gains 2 marks</p> <ol style="list-style-type: none"> <li>1. <math>(226 - 142) / 84</math> ;</li> <li>2. <math>\div 226</math> to give 37.2 / 37.17 / 37 (%) ;</li> </ol>	(2)

Question Number	Answer	Mark
5(c)(ii)	<ol style="list-style-type: none"><li>1. yes ;</li><li>2. idea that if current rate continues / eq ;</li><li>3. idea of achieving lower than the target / eq;</li><li>4. credit use of supporting figures ;</li></ol>	(3)

Question Number	Answer	Mark
5(c)(iii)	<ol style="list-style-type: none"><li>1. reference to some bacteria {can resist / are resistant to} antibiotics ;</li><li>2. idea of {resistance being genetic / can be passed on} ;</li><li>3. reference to MRSA / other named example ;</li></ol>	(2)

Question Number	Answer	Mark
6(a)(i)	C ;	(1)

Question Number	Answer	Mark
6(a)(ii)	D;	(1)

Question Number	Answer	Mark
6(a)(iii)	D ;	(1)

Question Number	Answer	Mark
6(b)(i)	<ol style="list-style-type: none"> <li>1. humans more closely related to chimp (than to orang utan and gorilla) / eq ;</li> <li>2. reference to humans and chimps more closely related to orang utan than gorilla ;</li> <li>3. reference to similarity of sequence indicates closeness of ancestral relationship / eq ;</li> <li>4. human and chimp sequence identical / eq ;</li> <li>5. orang utan has one difference, gorilla has two differences / eq ;</li> <li>6. reference to {number 19 for orang utan / number 9 and 19 for gorilla} different ;</li> </ol>	(4)

Question Number	Answer	Mark
6(b)(ii)	<ol style="list-style-type: none"> <li>1. reference to similarity (of DNA) indicates closeness of relationship ;</li> <li>2. because genes are sections of DNA / eq ;</li> <li>3. genes are the codes for protein / eq ;</li> </ol>	(2)

Question Number	Answer	Mark
6(b)(iii)	<ol style="list-style-type: none"> <li>1. reference to source of DNA sample, e.g. blood, saliva, semen ;</li> <li>2. reference to small samples of DNA can be amplified by PCR ;</li> <li>3. reference to use of (restriction / eq) enzymes to {break / eq} DNA ;</li> <li>4. reference to use of {electro potential / potential difference / eq} ;</li> <li>5. reference to {treatment / staining / eq} ;</li> <li>6. show up as {bands / bars / eq} ;</li> <li>7. reference to the {number of bands / eq} that match indicates similarity of the DNA ;</li> </ol>	(3)

Question Number	Answer	Mark
7(a)(i)	<ol style="list-style-type: none"> <li>drawing mark - recognisable {granum / grana} with clear stacks (of thylakoids / eq) shown / eq;</li> <li>label mark - {granum / grana / thylakoids} labelled / eq ;</li> </ol>	(2)

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7(a)(ii)	<table border="1"> <thead> <tr> <th>Statement</th> <th>True</th> <th>False</th> </tr> </thead> <tbody> <tr> <td>Electrons in chlorophyll are excited as light energy is absorbed</td> <td>✓</td> <td></td> </tr> <tr> <td>The energy absorbed by chlorophyll is used to generate ADP and NADP</td> <td></td> <td>✓</td> </tr> </tbody> </table> <p>1 mark each correct row ; ;</p>	Statement	True	False	Electrons in chlorophyll are excited as light energy is absorbed	✓		The energy absorbed by chlorophyll is used to generate ADP and NADP		✓	(2)
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Question Number	Answer	Mark
7(a)(iii)	<ol style="list-style-type: none"> <li>reference to energy from light ;</li> <li>reference to photolysis ;</li> <li>of water ;</li> </ol>	(2)

Question Number	Answer	Mark																
7(b)(i)	<table border="1"> <thead> <tr> <th>Position on shore</th> <th><i>Ulva lactuca</i></th> <th><i>Schizymenia dubyi</i></th> </tr> </thead> <tbody> <tr> <td>Top of the shore</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>Middle of the shore</td> <td></td> <td></td> </tr> <tr> <td>Lower down the shore</td> <td></td> <td></td> </tr> <tr> <td>All regions</td> <td></td> <td style="text-align: center;">✓</td> </tr> </tbody> </table>	Position on shore	<i>Ulva lactuca</i>	<i>Schizymenia dubyi</i>	Top of the shore	✓		Middle of the shore			Lower down the shore			All regions		✓		
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7(b)(ii)	<p>general points:</p> <ol style="list-style-type: none"> <li>1. idea of (rate of) growth is linked to (rate of) photosynthesis ;</li> <li>2. idea of top of the shore is shallower water where most wavelengths are available / lower shore is deeper water where only green (and blue) available ;</li> <li>3. idea that red weeds {reflect / do not absorb} red light OR green weeds {reflect / do not absorb} green light ;</li> </ol> <p><i>Ulva lactuca</i> / green seaweed:</p> <ol style="list-style-type: none"> <li>4. high(est) rates in {red / blue} light / eq / {very low / lowest} in green light ;</li> <li>5. would grow well if {all / (blue and) red} light available ;</li> </ol> <p><i>Schizymenia dubyi</i> / red seaweed:</p> <ol style="list-style-type: none"> <li>6. high(est) rate in green light / eq ;</li> <li>7. can grow where only green light available / any light available / eq ;</li> </ol>	(4)

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8(a)	<table border="1"> <thead> <tr> <th>Statement</th> <th>True</th> <th>False</th> </tr> </thead> <tbody> <tr> <td>HIV infects b-lymphocytes in the human immune system</td> <td></td> <td>✓</td> </tr> <tr> <td>The genetic material in HIV is a form of RNA</td> <td>✓</td> <td></td> </tr> <tr> <td>The enzyme, reverse transcriptase, is used by HIV</td> <td>✓</td> <td></td> </tr> </tbody> </table> <p>1 mark each correct row ;;;</p>	Statement	True	False	HIV infects b-lymphocytes in the human immune system		✓	The genetic material in HIV is a form of RNA	✓		The enzyme, reverse transcriptase, is used by HIV	✓		(3)
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8(b)(i)	<ol style="list-style-type: none"> <li>1. change in the {nucleotides / bases} / eq ;</li> <li>2. in {RNA / DNA} / eq ;</li> <li>3. which leads to change in the {sequence / eq} of amino acids in (primary structure of) a {polypeptide / protein} / eq ;</li> </ol>	(2)

Question Number	Answer	Mark
8(b)(ii)	<ol style="list-style-type: none"> <li>1. idea that HIV has {many / variety of / new / eq} {strains / types / antigens / protein coats / eq} (in infected person) ;</li> <li>2. some strains {are / become} resistant to {an individual / a specific / a particular / eq} drug / eq ;</li> <li>3. these would survive if (only one drug used) / eq ;</li> <li>4. {mixture of drugs / eq } has more chance of getting rid of {all / more} (strains / types / eq) / eq ;</li> <li>5. reference to drugs used together because of mutation ;</li> <li>6. reference to rapid rate of mutation ;</li> <li>7. reference to rapid rate of {multiplication / eq} of virus ;</li> </ol>	(4)

Question number 0	Answer	Mark
9 (a)* QWC	<p>(QWC - Spelling of technical terms (<i>shown in italics</i>) must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> <li>1. idea that energy obtained from ATP ;</li> <li>2. idea that ATP already in muscle cells e.g. ATP store ;</li> <li>3. ATP from {<i>glycolysis</i>/ substrate level <i>phosphorylation</i>/ eq} ;</li> <li>4. idea that <i>glycolysis</i> produces ATP {rapidly / eq} ;</li> <li>5. idea that some {<i>aerobic respiration</i> / eq} due to some oxygen present ;</li> <li>6. <i>glycolysis</i> occurs in <i>cytoplasm</i> / eq ;</li> <li>7. idea of need to recycle NAD<sup>+</sup> ;</li> <li>8. idea that <i>pyruvate</i> is converted to <i>lactate</i> ;</li> <li>9. reference to <i>anaerobic respiration</i> ;</li> <li>10. idea of <i>lactate</i> tolerance ;</li> <li>11. reference to fast <i>twitch</i> {muscle / fibres} ;</li> <li>12. reference to {<i>creatine phosphate</i> / eq} ;</li> </ol>	(6)

Question number	Answer	Mark
9 (b)(i)	<ol style="list-style-type: none"> <li>1. (lactate build up) causes {drop in pH / more acidic / increase H<sup>+</sup> /eq} ;</li> <li>2. idea of this affects enzyme {activity / shape / eq} ;</li> <li>3. this slows down {glycolysis / ATP production / anaerobic respiration / eq} ;</li> <li>4. reference to muscle contractions being affected ;</li> </ol>	(2)

Question number	Answer	Mark
9 (b)(ii)	<ol style="list-style-type: none"><li>1. reference to lactate in the blood / eq ;</li><li>2. {transported to / broken down in / eq} liver ;</li><li>3. lactate is {converted to pyruvate / eq} ;</li><li>4. this involves {oxidation / production of reduced NAD / eq} ;</li><li>5. pyruvate is then {oxidised / eq} ;</li><li>6. reference to Krebs cycle ;</li><li>7. {this requires extra oxygen / reference oxygen debt} / eq ;</li><li>8. idea that carbon dioxide and water are produced ;</li></ol>	(4)

Question number	Answer	Mark
10 (a) (i)	<p>Any one from:</p> <ol style="list-style-type: none"> <li>1. reduces {volume / pressure of gas} / eq ;</li> <li>2. allows {measurement of oxygen used / movement of liquid / eq} ;</li> </ol>	(1)

Question number	Answer	Mark
10 (a) (ii)	<ol style="list-style-type: none"> <li>1. returning the coloured liquid back to zero / eq ;</li> <li>2. idea of calibration ;</li> <li>3. repetition / eq ;</li> </ol>	(2)

Question number	Answer	Mark
10 (b)* QWC	<p>(QWC - Spelling of technical terms (<i>shown in italics</i>) must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> <li>1. reference to constant temperature ;</li> <li>2. use of water bath / eq ;</li> <li>3. reference to {suitable / stated / fixed time / eq} ;</li> <li>4. Reference to measuring {volume / distance} ;</li> <li>5. description of how to obtain volume ;</li> <li>6. calculation of rate described / eq ;</li> <li>7. reference to replicates ;</li> <li>8. description of control e.g. no woodlice ;</li> <li>9. idea of welfare of animals important ;</li> <li>10. reference to {mass / eq} of woodlice ;</li> </ol>	(6)