

CHERRY HILL TUITION EDEXCEL (B) BIOLOGY A2 PAPER 18 MARK SCHEME

Question Number	Answer	Mark
1(a)	cross next to degree of muscle concentration ; cross next to signs of decomposition ;	(2)

Question Number	Answer	Mark
1(b)	<ol style="list-style-type: none"> <li>1. idea of SD {measures / shows} {spread / range / eq} of data ;</li> <li>2. Idea of most readings are within <math>\{\pm 1 \times \text{SD} / \pm 2 \times \text{SD}\}</math> e.g. approx 60% readings within <math>(\pm) 1 \times \text{SD} /</math> approx 90% readings within <math>(\pm) 2 \times \text{SD}</math> ;</li> <li>3. idea that as length of time increases, SD increase / eq ;</li> <li>4. idea of more variability (in temperature) as time increases / eq ;</li> <li>5. comment on change in reliability of time of death with time / eq ;</li> <li>6. estimate (of time of death) can only be within a {4 / 5 / 6 / 7} hour period ;</li> <li>7. use of manipulated data ;</li> </ol>	max (4)

Question Number	Answer	Mark
1(c)	<p><b>three from the following:</b></p> <p>{(body) mass/ BMI / weight / eq}                      {(subcutaneous) fat /eq}                      surface area,                      {ambient / eq } temperature                      immersion in water                      age (of person at death)                      skin colour                      thickness of hair                      gender                      clothing                      blood loss                      humidity                      air movement                      {core / body} temperature at time of death ;;;</p>	(3)

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Question Number	Answer	Mark
2(a)	<ol style="list-style-type: none"> <li>1. idea of reflection ;</li> <li>2. reference. to {incorrect / eq } {wavelength / colour / frequency} ;</li> <li>3. idea of {not hitting the {chloroplast / chlorophyll}} / it is transmitted ;</li> <li>4. idea of light being in excess e.g. at max. photosynthesis so more light can be used ;</li> </ol>	max (2)

Question Number	Answer	Mark
2(b)(i)	{joules / energy} per {square metre / metre squared / (unit) area} per {year / unit time} ;	(1)

Question Number	Answer	Mark
2(b)(ii)	<p>Award 2 marks for correct answer (84.8 / 84.84)</p> <ol style="list-style-type: none"> <li>1. correct subtraction (24.4 - 3.7 / 20.7) ;</li> <li>2. correct multiplication by 100 ÷ 24.4 ;</li> </ol> <p>[consequential errors apply]</p>	(2)

Question Number	Answer	Mark
2(b)(iii)	B ;	(1)

Question Number	Answer	Mark
2(c) [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 {<i>thylakoids / thylakoid</i> (membranes)} ;</li> <li>2. in {<i>granum / grana</i>} ;</li> <li>3. (light energy) raises energy level of <i>electrons</i> / {<i>chlorophyll / electrons</i>}excited / eq ;</li> <li>4. <i>electrons</i> released from {<i>chlorophyll</i> /photosystem / eq} / eq ;</li> <li>5. reference to <i>electron</i> {carrier / eq} ;</li> <li>6. reference to series of {redox / oxidation &amp; reduction / eq} reactions ;</li> <li>7. reference to energy level of <i>electrons</i> {falls / eq} ;</li> <li>8. reference to {synthesise ATP from ADP +P / phosphorylate ADP} ;</li> <li>9. reference to <i>photophosphorylation</i> ;</li> <li>10. reference to ATP {<i>synthetase / synthase / ase</i>} ;</li> <li>11. reference to {<i>chemiosmosis</i> / eq} ;</li> <li>12. idea of <i>electrons</i> from {<i>photolysis</i> / eq} used to replace those lost ;</li> <li>13. reference to involvement of {accessory pigments / named example} ;</li> </ol>	<p>max (6)</p>

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

Question Number	Answer	Mark
3(a)(ii)	C ;	(1)

Question Number	Answer	Mark
3(b)(i)	temperature ;	(1)

Question Number	Answer	Mark
3(b)(ii)	<ol style="list-style-type: none"> <li>1. rate of growth increases as temperature increases {between 13°C and 22°C / up to 22°C} ;</li> <li>2. rate of growth decreases {between 22°C and 25°C / above 22°C} ;</li> <li>3. use of manipulated data to support above e.g. increases by {0.7 (a.u.) / 4.5 times}, decreases by 0.1 (a.u.) ;</li> <li>4. reference to enzymes involved (in growth) ;</li> <li>5. molecules {move about more / have more kinetic energy}, as temperature increases ;</li> <li>6. (therefore) {enzyme and substrate (molecules) collide more / rate of enzyme-substrate complexes formation increases} as temperature increases ;</li> <li>7. correct reference to denaturation of some {enzyme / protein / eq} (molecules) ;</li> <li>8. (therefore) rate of {growth / reactions} decreases as fewer enzyme molecules available ;</li> </ol>	max (4)

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Question Number	Answer	Mark
3(b)(iii)	<ol style="list-style-type: none"> <li>1. idea that (each temperature) has same light intensity ;</li> <li>2. correct reference to must be above {threshold / compensation point} ;</li> <li>3. (below which) no net photosynthesis takes place / eq ;</li> <li>4. reference to {so light is not limiting factor / so temperature is the limiting factor};</li> <li>5. photosynthesis produces {material / eq} needed for growth / eq ;</li> </ol>	max (3)

Question Number	Answer	Mark
3(b)(iv)	<ol style="list-style-type: none"> <li>1. {wavelength / colour / frequency} of light ;</li> <li>2. CO<sub>2</sub> concentration / eq ;</li> <li>3. pH / eq (of solution) ;</li> <li>4. reference to {mineral / eq} ;</li> </ol>	max (2)

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

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

Question Number	Answer	Mark
4(b)(i)	<p>D = antigens / (glyco)proteins ;</p> <p>E = B {lymphocytes / cells} / plasma cells ;</p> <p>F = antibodies / immunoglobulins ;</p> <p>G = macrophage / phagocyte / eq ;</p> <p>H = enzymes / lysozyme ;</p>	(5)

Question Number	Answer	Mark
4(b)(ii)	<ol style="list-style-type: none"><li>1. reference to protein nature of {antigens / antibodies} ;</li><li>2. antigens are specific (to each bacteria) / eq ;</li><li>3. antibodies need to be {complementary / specific} (to the antigen) ;</li><li>4. idea that {binding / eq} can take place ;</li><li>5. (some bacteria) have {different / changed} antigens / eq ;</li><li>6. idea that this is a primary infection ;</li><li>7. reference to {mucus / slime} {coat /capsule} (of bacterial cells) ;</li><li>8. idea that some bacteria are inside body cells ;</li><li>9. idea of antibodies already present e.g. from passive immunity or breast feeding ;</li></ol>	<b>max (3)</b>

Question Number	Answer	Mark																				
5(a)	<table border="1"> <thead> <tr> <th>Description</th> <th>DNA only</th> <th>RNA only</th> <th>Both DNA and RNA</th> </tr> </thead> <tbody> <tr> <td>Polymer formed from a single strand of nucleotides</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>Pentose present in the nucleotides</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>Adenine, cytosine, guanine and thymine present</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>Nucleotides linked by phosphodiester bonds</td> <td></td> <td></td> <td>✓</td> </tr> </tbody> </table> <p>all rows correct 2 marks two or three rows correct 1 mark</p>	Description	DNA only	RNA only	Both DNA and RNA	Polymer formed from a single strand of nucleotides		✓		Pentose present in the nucleotides			✓	Adenine, cytosine, guanine and thymine present	✓			Nucleotides linked by phosphodiester bonds			✓	(2)
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Question Number	Answer	Mark
5(b)(i)	<ol style="list-style-type: none"> <li>1. DNA strands {separate / unzip / eq} ;</li> <li>2. idea that one DNA {strand / eq} used as template (to form mRNA) / eq ;</li> <li>3. from free nucleotides / eq ;</li> <li>4. reference to complementary base pairing ;</li> <li>5. reference to hydrogen bonding ;</li> <li>6. correct reference to {RNA-polymerase / DNA helicase} ;</li> <li>7. credit correct sequence of bases on {mRNA / DNA} ;</li> </ol>	max (3)



Question Number	Answer	Mark
5(b)(ii)	<ol style="list-style-type: none"> <li>1. reference to specific amino acid attachment to tRNA ;</li> <li>2. idea that anticodon (on tRNA) {attaches / binds / lines up / eq} to the {codon / triplet} on mRNA ;</li> <li>3. example quoted using the information in the diagram e.g. tRNA with alanine has CGA anticodon which binds to GCU on mRNA ;</li> <li>4. idea that two tRNA held in ribosome (at any one time) ;</li> <li>5. reference to formation of peptide {bonds / links} (between adjacent amino acids) ;</li> <li>6. reference to peptidyl transferase ;</li> </ol>	max (3)

Question Number	Answer	Mark
5(c)	<ol style="list-style-type: none"> <li>1. <u>stop codon</u> ;</li> <li>2. used to end the {sequencing / further attachment of tRNA / eq} ;</li> <li>3. release of the {polypeptide / ribosome} /eq ;</li> </ol>	max (2)

Question 6) N/A

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Question Number	Answer	Mark
7(a)	<ol style="list-style-type: none"> <li>1. reference to {carbon / organic / eq} compounds in plant material ;</li> <li>2. idea that digestion provides respiratory substrates ;</li> <li>3. carbon dioxide released (from respiration) ;</li> <li>4. (this carbon dioxide is) available for photosynthesis ;</li> <li>5. reference to woodlice {eaten / decompose} ;</li> </ol>	max (3)

Question Number	Answer	Mark
7(b)(i)	A ;	(1)

Question Number	Answer	Mark
7(b)(ii)	<ol style="list-style-type: none"> <li>1. {wavelength / colour / frequency} of light ;</li> <li>2. light intensity / shading ;</li> <li>3. temperature ;</li> <li>4. moisture content of {air / substratum / eq} / humidity ;</li> <li>5. {pH / chemical composition / eq} of {substratum / eq} ;</li> <li>6. air currents / wind / eq ;</li> <li>7. texture of substratum / eq ;</li> <li>8. reference to {oxygen / carbon / methane} ;</li> </ol>	max (2)

Question Number	Answer	Mark						
7(c)(i)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>8</td> <td>3</td> </tr> <tr> <td>9</td> <td>1</td> </tr> <tr> <td>10</td> <td>1</td> </tr> </tbody> </table> <p>All three answers correct to 1 significant figure ;</p>	8	3	9	1	10	1	(1)
8	3							
9	1							
10	1							

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Question Number	Answer	Mark
7(c)(ii)	<ol style="list-style-type: none"> <li>1. woodlice move about / eq ;</li> <li>2. (therefore) difficult to count / eq ;</li> <li>3. some might be {counted more than once / missed out} / eq ;</li> </ol>	<p><b>max</b> <b>(2)</b></p>

Question Number	Answer	Mark
7(c)(iii)	<ol style="list-style-type: none"> <li>1. for results to be (scientifically) valid ;</li> <li>2. only one factor needs to be varied / eq ;</li> <li>3. other factors need to be kept constant / eq ;</li> <li>4. reference to {many / biotic / eq} factors (in a garden) ;</li> <li>5. (these factors are) {difficult to control / eq} ;</li> <li>6. reference to difficult to set test factor values ;</li> </ol>	<p><b>max</b> <b>(3)</b></p>

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8(a)	<table border="1"> <thead> <tr> <th>Description</th> <th>Name of structure</th> <th>P, E or B</th> </tr> </thead> <tbody> <tr> <td>Enclosed by outer smooth membrane inner membrane folded forming cristae</td> <td>Mitochondrion / mitochondria</td> <td>E / eukaryotic</td> </tr> <tr> <td>Long strand-like structure extending out from the cell Used for locomotion</td> <td>Flagellum / flagella</td> <td>B / both</td> </tr> <tr> <td>Small, circular loop of double-stranded DNA</td> <td>plasmid</td> <td>P / prokaryotic</td> </tr> </tbody> </table>	Description	Name of structure	P, E or B	Enclosed by outer smooth membrane inner membrane folded forming cristae	Mitochondrion / mitochondria	E / eukaryotic	Long strand-like structure extending out from the cell Used for locomotion	Flagellum / flagella	B / both	Small, circular loop of double-stranded DNA	plasmid	P / prokaryotic	(3)
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1 mark for any two correct cells ;;;														

Question Number	Answer	Mark
8(b)(i)	bactericidal ;	(1)

Question Number	Answer	Mark
8(b)(ii)	<ol style="list-style-type: none"> <li>1. cell wall {weaker /cannot form properly / eq} ;</li> <li>2. {cell / cell wall} bursts (easily) / eq ;</li> <li>3. during division /eq ;</li> </ol>	max (2)

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Question Number	Answer	Mark
8(b)(iii)	<ol style="list-style-type: none"> <li>1. reference to antibiotic acting as selective pressure ;</li> <li>2. reference to some bacteria resistant (to antibiotic) ;</li> <li>3. idea that resistant bacteria survive and {reproduce / pass on resistance / pass on gene / eq};</li> <li>4. idea that antibiotic no longer effective ;</li> <li>5. reference to some infections cannot be treated with antibiotics ;</li> </ol>	<p>max (2)</p>

Question Number	Answer	Mark
8(c)	<ol style="list-style-type: none"><li>1. idea of bacteria distributed evenly / description of technique e.g. lawn spreading ;</li><li>2. description of method used to apply different antibiotics at known positions e.g. multidisks, wells in agar ;</li><li>3. reference to control of antibiotic concentration ;</li><li>4. reference to {sterile / aseptic} technique ;</li><li>5. reference to incubation at a suitable temperature ;</li><li>6. description of how effect is assessed e.g. measure {clear area / inhibition zone / eq} ;</li><li>7. reference to replication (with same bacterium) ;</li><li>8. reference to repetition with different bacteria ;</li></ol>	max (4)