



**Pearson**  
**Edexcel**

**Mark Scheme (Results)**

**Summer 2023**

**Pearson Edexcel International GCSE**  
**In Biology (4BI1) Paper 1BR**

Question Number	Answer	Mark
<b>1(a)(i)</b>	<p><b>The only correct answer is B (protein synthesis)</b></p> <p><i>A is incorrect as chloroplasts perform photosynthesis</i></p> <p><i>C is incorrect as mitochondria perform respiration</i></p> <p><i>D is incorrect as vacuoles store cell sap</i></p>	<b>1</b>

Question Number	Answer	Mark
<b>1(a)(ii)</b>	<p><b>The only correct answer is B</b></p> <p><i>A is incorrect as animal cells do not have cell walls</i></p> <p><i>C is incorrect as eukaryotic cells have cytoplasm</i></p> <p><i>D is incorrect as animal cells do not have cell walls</i></p>	<b>1</b>

Question Number	Answer	Additional Guidance	Mark
<b>1(a)(iii)</b>	<p>An explanation that makes reference to three of the following.</p> <ul style="list-style-type: none"> <li>• <i>Lactobacillus</i> / they, have cell walls / red blood cells do not have a cell wall / eq (1)</li> <li>• water enters (cells) / eq (1)</li> <li>• by osmosis (1)</li> <li>• (because) water potential inside the cells is low(er) / eq (1)</li> </ul>	<p><b>Ignore</b> refs to water not entering <i>Lactobacillus</i></p> <p><b>Allow</b> from a high concentration (of water) to a low concentration (of water) / from a dilute to a concentrated solution / eq</p>	<b>3</b>

Question Number	Answer		Mark
<b>1(b)</b>	<p>A description that makes reference to three of the following.</p> <ul style="list-style-type: none"> <li>• respiration / fermentation / ferment (1)</li> <li>• lactose (1)</li> <li>• lactic acid / lactate, produced (1)</li> <li>• (protein) clots / milk thickens / milk coagulates / goes solid / eq (1)</li> </ul>	<p><b>Ignore</b> aerobic / anaerobic</p> <p><b>Allow</b> milk becomes acid(ic) / low pH occurs</p> <p><b>Allow</b> protein denatures</p>	<b>3</b>

(Total for Question 1 = 8 marks)

Question Number	Answer	Mark
<b>2(a)</b>	<p>A description that makes reference to two of the following.</p> <ul style="list-style-type: none"> <li>• <u>peristalsis</u> (1)</li> <li>• muscle <u>contraction</u> (1)</li> <li>• along oesophagus (1)</li> </ul>	<b>2</b>

Question Number	Answer		Mark
<b>2(b)(i)</b>	<p>An answer that makes reference to one of the following.</p> <ul style="list-style-type: none"> <li>• fibre (1)</li> <li>• water (1)</li> <li>• other <u>named</u> vitamin / mineral (1)</li> </ul>	<p>e.g. vitamin A / iron</p> <p><b>Ignore</b> vitamin C and calcium</p>	<b>1</b>

Question Number	Answer		Mark
<b>2(b)(ii)</b>	<p>An answer that makes reference to the following.</p> <ul style="list-style-type: none"> <li>(vitamin C) scurvy / skin does not heal / blood vessels are weak / cartilage is weak / wounds do not heal / eq (1)</li> <li>(calcium) rickets / weak bones / osteoporosis / eq (1)</li> </ul>	<p><b>Allow</b> vitamin C needed for healthy skin / cartilage / connective tissue / eq</p> <p><b>Allow</b> calcium needed for strong teeth / bones / eq</p>	<b>2</b>

Question Number	Answer		Mark
<b>2(b)(iii)</b>	<ul style="list-style-type: none"> <li>RDA = 230 (g) (2)</li> </ul>	<p><b>One mark</b> for 227.2727 <b>OR</b> 227 <b>OR</b> 2.3 <b>OR</b> other answer to correct decimal places with correct rounding</p>	<b>2</b>

Question Number	Answer	Additional guidance	Mark
<b>2(b)(iv)</b>	<p>A description that makes reference to three of the following.</p> <ul style="list-style-type: none"> <li>protease / peptidase (1)</li> <li>pepsin (in stomach) (1)</li> <li>(digestion) in small intestine / duodenum / stomach / (protease) released by pancreas / stomach (1)</li> <li>(produces) amino acids / (di)peptides (1)</li> </ul>	<p><b>Allow</b> trypsin (in duodenum / from pancreas)</p> <p><b>Ignore</b> <u>absorbed</u> in small intestine</p>	<b>3</b>

(Total for Question 2 = 10 marks)

Question Number	Answer	Mark
<b>3(a)(i)</b>	<p><b>The only correct answer is C (3)</b></p> <p><i>A is incorrect as there are more than 1 secondary consumers</i></p> <p><i>B is incorrect as there are more than 2 secondary consumers</i></p> <p><i>D is incorrect as there are fewer than 4 secondary consumers</i></p>	<b>1</b>

Question Number	Answer	Mark
<b>3 (a)(ii)</b>	<p><b>The only correct answer is B (ecosystem)</b></p> <p><i>A is incorrect as the community does not include the environment</i></p> <p><i>C is incorrect as the habitat does not include the organisms</i></p> <p><i>D is incorrect as population is the number of one species</i></p>	<b>1</b>

Question Number	Answer	Additional guidance	Mark
<b>3 (a)(iii)</b>	<p>An explanation that makes reference to three of the following.</p> <ul style="list-style-type: none"> <li>• shorter food chain to oak tree / one species between fox and oak tree / eq (1)</li> </ul> <p><b>AND two</b> from (energy lost from)</p> <ul style="list-style-type: none"> <li>• excretion / urine / eq (1)</li> <li>• inedible parts / parts not eaten / eq (1)</li> <li>• indigestible parts / faeces / egestion / eq (1)</li> <li>• death / decomposition / decay / some organisms not eaten / eq (1)</li> <li>• respiration / heat loss / eq (1)</li> <li>• movement /eq (1)</li> </ul>	<p><b>Allow</b> converse for grass <b>Allow</b> fox is a secondary consumer from oak tree / tertiary consumer from grass / eq <b>Allow</b> fewer / 3, levels in oak tree food chain / eq <b>Allow</b> only rabbit / squirrel between tree and fox / eq</p> <p><b>Do not award</b> two marks for excrete faeces</p>	<b>3</b>

Question Number	Answer		Mark
<b>3 (b)(i)</b>	<p>An answer that makes reference to the following.</p> <ul style="list-style-type: none"> <li>• avoid bias / make sample representative / more accurate (result) / makes (survey) fair / eq (1)</li> </ul>	<p><b>Allow</b> fair test / valid <b>Ignore</b> reliable</p>	<b>1</b>

Question Number	Answer	Additional guidance	Mark
<b>3 (b)(ii)</b>	<p>An explanation that makes reference to two of the following.</p> <ul style="list-style-type: none"> <li>• grid area / eq (1)</li> <li>• repeats / more quadrats / eq (1)</li> <li>• identify anomalies / calculate mean / average / to see if they are similar / eq (1)</li> </ul>	<b>Ignore</b> larger quadrat	<b>2</b>

Question Number	Answer	Additional guidance	Mark
<b>3 (b)(iii)</b>	<ul style="list-style-type: none"> <li>• 2925 (3)</li> </ul>	<p><b>Correct answer gains all three marks</b></p> <p><b>two marks</b> for 4500</p> <p><b>If answer incorrect then up to max 2 of:</b></p> <p><b>one mark</b> for 4000 <b>or</b> 50 x 80</p> <p><b>one mark</b> for 500 <b>or</b> (20 x 50) / 2</p> <p><b>one mark</b> for 0.65 x <b>OR</b> 65/100 x</p>	<b>3</b>

(Total for Question 3 = 11 marks)

Question Number	Answer	Mark
<b>4 (a)(i)</b>	<p><b>The only correct answer is B (chitin)</b></p> <p><i>A is incorrect as fungal cell walls do not contain cellulose</i></p> <p><i>C is incorrect as fungal cell walls do not contain glycogen</i></p> <p><i>D is incorrect as fungal cell walls do not contain starch</i></p>	<b>1</b>

Question Number	Answer	Mark
<b>4 (a)(ii)</b>	<p><b>The only correct answer is A (ethanol and carbon dioxide)</b></p> <p><i>B is incorrect as yeast anaerobic respiration also produces carbon dioxide</i></p> <p><i>C is incorrect as yeast anaerobic respiration does not produce lactic acid</i></p> <p><i>D is incorrect as yeast anaerobic respiration does not produce lactic acid</i></p>	<b>1</b>

Question Number	Answer	Additional guidance	Mark
<b>4 (b)(i)</b>	<p>An answer that makes reference to the following.</p> <ul style="list-style-type: none"> <li>stops oxygen getting in / prevents <u>aerobic</u> respiration / eq (1)</li> </ul>	<b>Ignore</b> ensures anaerobic respiration	<b>1</b>

Question Number	Answer	Mark
<b>4 (b)(ii)</b>	<p>A description that makes reference to the following.</p> <ul style="list-style-type: none"> <li>water bath (1)</li> <li>(monitor with) thermometer / (use of) thermostat / eq (1)</li> </ul>	<b>2</b>

Question Number	Answer	Additional guidance	Mark
<b>4 (b)(iii)</b>	<ul style="list-style-type: none"> <li>• 4 (2)</li> </ul>	<p><b>one mark</b> for 32 <b>OR</b> <math>\div 8</math></p> <p><b>Correct answer gains both marks</b></p>	<b>2</b>

Question Number	Answer		Mark
<b>4 (b)(iv)</b>	<p>An explanation that makes reference to two of the following.</p> <ul style="list-style-type: none"> <li>• increases up to 16 (min) / 17 (min) / 18 (min) <u>and</u> then levels off / slows / (bubble production) stops / eq</li> <li>• (when bubbles increase / initially) glucose is not limiting / eq (1)</li> <li>• (levels off because) glucose runs out / is limiting / yeast is poisoned by ethanol / eq (1)</li> </ul>	<p><b>Allow</b> times between 16 and 18 for turning point</p> <p><b>Allow</b> constant rate (or respiration) until 16 /18 then (respiration) stops / levels off / slows</p> <p><b>Allow</b> glucose is not limiting when bubbles are increasing</p> <p><b>Allow</b> substrate for glucose throughout</p>	<b>2</b>

Question Number	Answer		Mark
<b>4 (b)(v)</b>	<p>An explanation that makes reference to three of the following.</p> <ul style="list-style-type: none"> <li>faster / more, respiration (1)</li> <li>(at 37 °C) more (kinetic) energy / faster (particle) movement / eq (1)</li> <li>more / faster, collisions / more E/S complexes / eq (1)</li> <li>at 37°C glucose runs out (sooner) / glucose starts to limit / eq (1)</li> </ul>	<b>Allow</b> 37°C / it, is (closer to) optimum	<b>3</b>

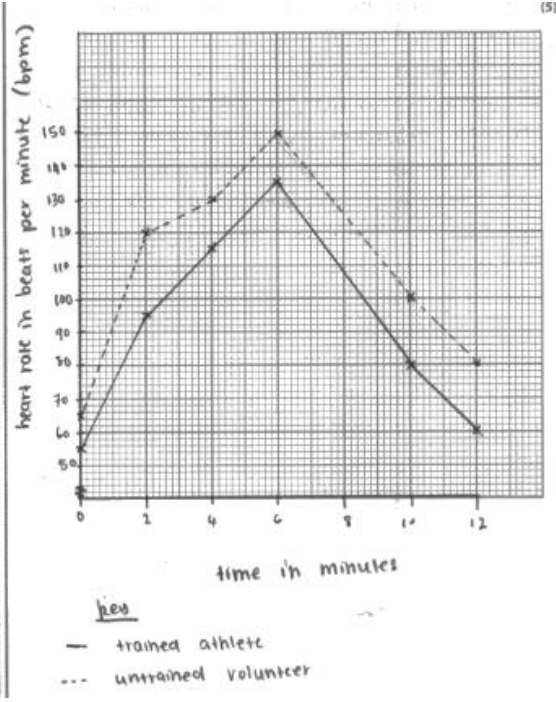
Question Number	Answer	Mark
<b>4 (b)(vi)</b>	<p>A description that makes reference to the following.</p> <ul style="list-style-type: none"> <li>collect <u>volume</u> (of gas) (1)</li> <li>using a measuring cylinder / syringe / burette / eq (1)</li> </ul>	<b>2</b>

(Total for Question 4 = 14 marks)

Question Number	Answer	Mark
<b>5 (a)(i)</b>	<p><b>The only correct answer is C</b></p> <p><i>A is incorrect as W is not the left atrium</i></p> <p><i>B is incorrect as W is not a ventricle</i></p> <p><i>D is incorrect as W is not a ventricle</i></p>	<b>1</b>

Question Number	Answer		Mark
<b>5 (a)(ii)</b>	<p>A description that makes reference to the following.</p> <ul style="list-style-type: none"> <li>• X / pulmonary artery, has lower oxygen / is deoxygenated / eq (1)</li> <li>• X / pulmonary artery has higher carbon dioxide / eq (1)</li> </ul>	<p><b>Allow</b> Y / aorta, has higher oxygen / is oxygenated</p> <p><b>Allow</b> Y / aorta, has lower carbon dioxide</p>	<b>2</b>

Question Number	Answer	Additional guidance	Mark
<b>5(b)(i)</b>	<ul style="list-style-type: none"> <li>• 89 (2)</li> </ul>	<p><b>Allow</b> any number of correct decimal places e.g. 89.0909, 89.1</p> <p><b>Allow</b> 90</p> <p><b>One mark</b> for 55 <b>OR</b> <b>One mark</b> for 75, 75.4, 75.38 etc.</p> <p><b>Correct answer gains both marks</b></p>	<b>2</b>

Question Number	Answer	Additional guidance	Mark																							
<p><b>5 (b)(ii)</b></p>	<p>An answer that makes reference to the following.</p> <p>S – linear scales for both axes and at least half grid (1)</p> <p>L – ruled, straight lines (1)</p> <p>A – both axes fully labelled (1)</p> <p>P – correct plots (1)</p> <p>K – key / eq (1)</p> 	<p>time must be on x axis</p> <p>Minimum label: heart rate / bpm <b>and</b> time / min</p> <p><b>Allow</b> plots if non-linear scales Plots +/- half square</p> <p>Bar chart: S, A, P, K (max 4) One data set plotted: S, L, A</p> <table border="1"> <thead> <tr> <th rowspan="2">Time in minutes</th> <th colspan="2">Heart rate in beats per minute (bpm)</th> </tr> <tr> <th>untrained volunteer</th> <th>trained athlete</th> </tr> </thead> <tbody> <tr> <td>0 (rest)</td> <td>65</td> <td>55</td> </tr> <tr> <td>2</td> <td>120</td> <td>95</td> </tr> <tr> <td>4</td> <td>130</td> <td>115</td> </tr> <tr> <td>6</td> <td>150</td> <td>135</td> </tr> <tr> <td>10</td> <td>100</td> <td>80</td> </tr> <tr> <td>12</td> <td>80</td> <td>60</td> </tr> </tbody> </table>	Time in minutes	Heart rate in beats per minute (bpm)		untrained volunteer	trained athlete	0 (rest)	65	55	2	120	95	4	130	115	6	150	135	10	100	80	12	80	60	<p><b>5</b></p>
Time in minutes	Heart rate in beats per minute (bpm)																									
	untrained volunteer	trained athlete																								
0 (rest)	65	55																								
2	120	95																								
4	130	115																								
6	150	135																								
10	100	80																								
12	80	60																								


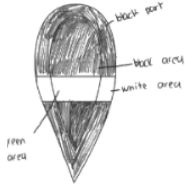

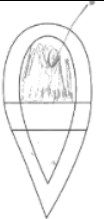

Question Number	Answer		Mark
<b>5 (b)(iii)</b>	<p>An explanation that makes reference to four of the following.</p> <ul style="list-style-type: none"> <li>• (trained athlete) has lower heart rate / heart rate returns to normal quicker / eq (1)</li> <li>• (trained athlete) has larger heart / larger stroke volume / pumps more blood / eq (1)</li> <li>• more / faster transport of, oxygen / glucose pumped / more removal of carbon dioxide / heat / eq (1)</li> <li>• (more) (aerobic) respiration / ATP production / energy / eq (1)</li> <li>• (more) muscle <u>contraction</u> (1)</li> <li>• less anaerobic respiration / lactic acid / less <u>oxygen debt</u> / eq (1)</li> </ul>	<p><b>Allow</b> converse for untrained</p> <p><b>Allow</b> stronger heart</p> <p><b>Allow</b> untrained has to pump faster to move same amount of blood / eq</p> <p><b>Allow</b> untrained has to pump faster to move same amount of oxygen / eq</p>	<b>4</b>

(Total for Question 5 = 14 marks)

Question Number	Answer	Mark
<b>6 (a)</b>	<p>An answer that makes reference to the following.</p> $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \text{ (2)}$ <p><b>one mark</b> if correct equation but incorrectly balanced</p>	<b>2</b>

Question Number	Answer		Mark
<b>6(b)(i)</b>	<p>An answer that makes reference to the following.</p> <ul style="list-style-type: none"> <li>• destarch the leaves / remove starch eq (1)</li> </ul>	<p><b>Allow</b> so no starch present (in leaves) / so starch is used up / starch respired</p>	<b>1</b>

Question Number	Answer		Mark
<b>6 (b)(ii)</b>	<p>An answer that makes reference to the following.</p> <ul style="list-style-type: none"> <li><b>both</b> green areas shaded <b>and</b> area with no green with no shading / eq (1)</li> <li>no shading in strip under paper / eq (1)</li> </ul>	<p><b>Allow</b> labelled areas if not shaded (black / orange / starch / no starch)</p> <p><b>No mp2 if rest of leaf is blank</b></p>	<b>2</b>

	<b>2 marks</b>
	<b>1 mark</b>
	<b>1 mark</b>
	<b>1 mark</b>
 Diagram 2	<b>0 marks</b>

Question Number	Answer		Mark
<b>6 (c)</b>	<p>An answer that makes reference to six of the following.</p> <ul style="list-style-type: none"> <li>• C – (plant ivy in) shaded and unshaded area / different exposure to light / eq (1)</li> <li>• O – same species / type / age / starting size of leaf / same plant / eq (1)</li> <li>• R – repeat with multiple leaves / repeat / eq (1)</li> <li>• M1 – measure length / width / height / surface area / eq (of leaves) (1)</li> <li>• M2 – grow ivy for same <u>stated</u> time (1)</li> <li>• S1 - temperature / pests / humidity / plant density / carbon dioxide / weather / time of year / wind / eq (1)</li> <li>• S2 – same water / minerals / soil / nutrients / fertiliser / pH / eq (1)</li> </ul>	<p><b>Allow</b> different light intensities / distances of lamp</p> <p><b>Allow</b> groups</p> <p><b>Ignore</b> size of leaves <b>Allow</b> measure size with a ruler / in mm / eq <b>Allow</b> volume</p> <p>Minimum time of one day</p>	<b>6</b>

(Total for Question 6 = 11 marks)

Question Number	Answer	Mark
<b>7 (a) (i)</b>	<p><b>The only correct answer is A</b></p> <p><i>B is incorrect as fertilisation does not occur in the ovary</i></p> <p><i>C is incorrect as fertilisation does not occur in the uterus</i></p> <p><i>D is incorrect as fertilisation does not occur in the vagina</i></p>	<b>1</b>

Question Number	Answer		Mark
<b>7(a)(ii)</b>	<p>A description that makes reference to the following.</p> <ul style="list-style-type: none"> <li>• (oestrogen) repairs / thickens lining / thickens wall / eq (1)</li> <li>• (progesterone) retains / maintains lining / vascularises endometrium / prevents menstruation / eq (1)</li> </ul>	<p><b>Allow</b> builds up lining</p> <p><b>Allow</b> fall in progesterone causes lining to shed / causes menstruation</p> <p><b>Allow</b> increase blood flow in lining</p>	<b>2</b>

Question Number	Answer	Additional guidance	Mark
<b>7(b)(i)</b>	<p>A description that makes reference to the following.</p> <ul style="list-style-type: none"> <li>• fusion of nuclei / fusion of egg and sperm / zygote (forms) / eq (1)</li> <li>• mitosis / <u>cell division</u> / (to form an embryo) / eq (1)</li> </ul>	<b>Reject</b> meiosis	<b>2</b>

Question Number	Answer	Additional guidance	Mark
7 (b) (ii)	<p>An answer that makes reference to five of the following.</p> <ul style="list-style-type: none"> <li>• number of (multiple births) has decreased / eq (1)</li> <li>• constant / steady / eq, decrease, (in multiple births) until 2007 / 2008 / 2009 / before recommendations / eq (1)</li> <li>• (steep) decrease / since 2007 / 2008 / 2009 / since recommendations / eq (1)</li> <li>• (so) less risk to health / multiple births increase health risks / eq (1)</li> <li>• (repeated IVF) is expensive / stressful / eq (1)</li> <li>• IVF success rate / fertility decreases with age / eq (1)</li> <li>• (older women have lower success rate) so better to use more than one embryo / eq (1)</li> <li>• no information on sample sizes / only one country / only UK data / eq (1)</li> <li>• reliable as data is for a long period of time / eq (1)</li> <li>• (could be affected by) other health issues / diet / genetics / sperm / eq (1)</li> </ul>	<p><b>Allow</b> age references for any ages of <math>\geq 37</math> for older women</p> <p>MP3 also gets MP1</p> <p><b>Allow</b> recommendations have made it safer / multiple births are dangerous</p> <p><b>Allow</b> older women have low(er) success rate / young(er) women have high success rate</p> <p><b>Allow</b> restricting number of embryos for younger women has less effect on success / eq</p> <p><b>Allow</b> cannot be generalised / needs to be researched in other countries / eq</p> <p><b>Allow</b> no information about health issues / eq</p>	5

(Total for Question 7 = 10 marks)

Question Number	Answer	Mark
<b>8(a)(i)</b>	<p><b>The only correct answer is C (Y)</b></p> <p><i>A is incorrect as T is combustion</i></p> <p><i>B is incorrect as X is consumption</i></p> <p><i>D is incorrect as Z is death</i></p>	<b>1</b>

Question Number	Answer	Mark
<b>8 (a)(ii)</b>	<ul style="list-style-type: none"> <li>• photosynthesis (1)</li> </ul>	<b>1</b>

Question Number	Answer	Additional guidance	Mark
<b>8 (b) (i)</b>	<ul style="list-style-type: none"> <li>• CFCs / water (vapour) / eq (1)</li> </ul>	<p><b>Allow</b> fluorinated gases e.g. hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulphur hexafluoride</p>	<b>1</b>



Question Number	Answer		Mark
<b>9(a)(i)</b>	<p>An answer that makes reference to the following.</p> <ul style="list-style-type: none"> <li>(transfer of) genes / alleles / DNA between different <u>species</u> (1)</li> </ul>	<p><b>Allow</b> (organism) with gene / allele / DNA from different <u>species</u></p> <p><b>Ignore</b> genetic modification alone</p> <p><b>Ignore</b> organism</p>	<b>1</b>

Question Number	Answer	Additional guidance	Mark
<b>9 (a)(ii)</b>	<p>An answer that makes reference to two of the following.</p> <ul style="list-style-type: none"> <li>(herbicides) kills / removes, weeds but not crops / eq (1)</li> <li>less competition / eq (1)</li> <li>so increased yield / more (crop) growth / eq (1)</li> <li>no need to remove weeds by hand / eq (1)</li> </ul>	<p><b>Allow</b> (herbicide) <u>only</u> affects / kills, weeds / unwanted plants</p>	<b>2</b>

Question Number	Answer	Additional guidance	Mark
<b>9 (b) (i)</b>	<ul style="list-style-type: none"> <li>RR, Rr, (rR) (1)</li> </ul>	<p><b>Reject</b> if rr included  <b>Allow</b> other letters but not two different letters  <b>Allow</b> 'homozygous dominant and heterozygous'</p>	<b>1</b>

Question Number	Answer		Mark
<b>9 (b)(ii)</b>	<p>An answer that makes reference to the following.</p> <ul style="list-style-type: none"> <li>parents as Rr and rr (1)</li> <li>gametes as R or r <b>and</b> r (or r) (1)</li> <li>genotypes and stated phenotypes of Rr and rr <b>AND</b> non-resistant and resistant (1)</li> </ul>	<p><b>Allow</b> other letters but not two different letters</p> <p><b>ECF</b> for one mark only for gametes</p> <p><b>Allow</b> all marks from Punnett square</p>	<b>3</b>

Question Number	Answer	Additional guidance	Mark
<b>9 (b)(iii)</b>	<ul style="list-style-type: none"> <li>0.5 / ½ / 50 % (1)</li> </ul>	<b>Allow</b> 2/4	<b>1</b>

Question Number	Answer		Mark
<b>9 (b)(iv)</b>	<p>An explanation that makes reference to four of the following.</p> <ul style="list-style-type: none"> <li>• mutation (produces resistance) / eq (1)</li> <li>• (produces) variation (1)</li> <li>• (weeds with gene) survive / eq (1)</li>   <li>• reproduce / pollinate / eq (1)</li> <li>• pass on the allele / gene / mutation / eq (1)</li> </ul>	<p><b>Allow</b> converse  <b>Allow</b> correct ref to selection pressure / selective advantage</p> <p><b>Allow</b> pass on allele to next generation for mp4 and mp5</p>	<b>4</b>

Question Number	Answer	Additional guidance	Mark
<b>9 (b)(v)</b>	<p>An explanation that makes reference to two of the following.</p> <ul style="list-style-type: none"> <li>• dominant alleles always expressed / expressed in heterozygotes <b>OR</b> recessive alleles only expressed when homozygous / not expressed in heterozygotes / eq (1)</li> <li>• if resistance is recessive, only homozygous (recessive) plants survive / no heterozygous plants survive / eq (1)</li> <li>• if resistance is dominant, heterozygous plants survive / eq (1)</li> <li>• (when resistance is dominant) if two heterozygotes breed, non-resistant weeds produced / some homozygous recessive plants produced / eq (1)</li> </ul>	<p><b>Allow</b> recessive alleles are not always shown (in phenotype)</p> <p><b>Allow</b> no plants with dominant alleles survive</p> <p><b>Allow</b> some plants carrying recessive alleles will survive / carriers survive</p> <p><b>Allow</b> carriers for heterozygotes</p> <p><b>Allow</b> both parents can pass on a recessive allele</p>	<b>2</b>

(Total for Question 9 = 14 marks)

Question Number	Answer	Mark
<b>10 (a)(i)</b>	<ul style="list-style-type: none"> <li>iris (1)</li> </ul>	<b>1</b>

Question Number	Answer		Mark
<b>10 (a)(ii)</b>	<p>A description that makes reference to three of the following.</p> <ul style="list-style-type: none"> <li>X / ciliary muscle, contracts (1)</li> <li>Y / suspensory ligaments go slack / loosen / eq (1)</li> <li>lens becomes thicker / more spherical / more convex / eq (1)</li> <li>so (lens) refracts light more / bends light more / eq (1)</li> </ul>	<p><b>Ignore</b> relax <b>Ignore</b> suspensory muscle</p> <p><b>Allow</b> fatter / more rounded / bulges</p>	<b>3</b>

Question Number	Answer		Mark
<b>10 (b)(i)</b>	<p>A description that makes reference to two of the following.</p> <ul style="list-style-type: none"> <li>less light can pass through / refraction affected / eq (1)</li> <li>to retina / fovea / rods / cones / photoreceptors (1)</li> <li>so fewer <u>impulses</u> (to brain) (1)</li> </ul>	<p><b>Allow</b> cannot focus well / bend light</p> <p><b>Allow</b> stops light getting into eye</p>	<b>2</b>

Question Number	Answer		Mark														
<b>10 (b)(ii)</b>	<p>An answer that makes reference to four of the following.</p> <ul style="list-style-type: none"> <li>• numbers increase as exposure to sunlight increases / eq (1)</li>   <li>• groups sizes are different / eq (1)</li>   <li>• credit calculation of proportions / percentages (1)</li>   <li>• the <u>proportion / percentage</u> of cases fluctuates / does not change (much) between 7 and 10 (hrs) / eq (1)</li>   <li>• <u>proportion / percentage</u>, rises after 10 (hrs) / 11 (hrs) / 12 (hrs) (1)</li>   <li>• the large number of people makes it reliable <b>OR</b> (less reliable as) only one country / no information on location / climate / eq (1)</li>   <li>• age / sex / health status / genetics / diet / clothing / sunglasses / could affect the results / eq (1)</li> </ul>	<p><b>Allow</b> more sunlight increases chance of cataracts  <b>Allow</b> percentage of cases increases</p> <p><b>Allow</b> number of people vary / increase</p> <table border="1"> <thead> <tr> <th>Sunlight</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>2.0</td> </tr> <tr> <td>8</td> <td>1.9</td> </tr> <tr> <td>9</td> <td>2.0</td> </tr> <tr> <td>10</td> <td>1.6</td> </tr> <tr> <td>11</td> <td>3.2</td> </tr> <tr> <td>12</td> <td>6.5</td> </tr> </tbody> </table> <p><b>Allow</b> no / little effect between 7 – 10 (hrs) / 10 (hrs) is lower than 7 / 8 / 9 (hrs)</p> <p><b>Allow</b> (proportion of) cases only increases after 10 / 11 (hrs)</p> <p><b>Allow</b> reliable / valid as it is a long survey / lasts 25 years  <b>Allow</b> other countries / regions should be investigated</p> <p><b>Allow</b> other correct, relevant factors</p>	Sunlight	Percentage	7	2.0	8	1.9	9	2.0	10	1.6	11	3.2	12	6.5	<p><b>4</b></p>
Sunlight	Percentage																
7	2.0																
8	1.9																
9	2.0																
10	1.6																
11	3.2																
12	6.5																

(Total for Question 10 = 10 marks)