



Mark Scheme

Sample Assessment Material 2018

**Pearson Edexcel International GCSE
in Biology (4BI1) Paper 2B**

Question Number	Answer	Mark
1(a)	D UUAGGC	1

Question Number	Answer	Mark
1(b)	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • need to select plants with desired characteristics (1) • need to collect seeds and germinate (1) • offspring plants need to grow and flower (1) • need to select offspring with desired characteristics (1) • the process needs to be repeated over many generations (1) 	3

Question Number	Answer	Mark
1(c)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • increase growth / yield / quality (1) • prevent pathogens causing disease / infection (1) 	2

Question Number	Answer	Mark
1(d)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • zygote divides by mitosis (1) • body cells produced (1) • all cells genetically identical (1) • cells in testis/ovary divide by meiosis (1) • changed DNA contained in gametes / sperm / eggs (1) 	4

Question Number	Answer	Mark
1(e)	<ul style="list-style-type: none"> change in the sequence of bases in DNA 	1

Question Number	Answer	Mark
1(f)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> increased risk of disease / infection (1) lack of lymphocytes / phagocytes (1) lack of antibodies / phagocytosis (1) 	2

Question Number	Answer	Mark
1(g)	<ul style="list-style-type: none"> differentiate into any cell type 	1

Question Number	Answer	Mark
1(h)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> contain altered / new genes (1) chosen by parents (1) 	2

Total for Question 1 = 16 marks

Question Number	Answer	Mark
2(a)	A a cell membrane	1

Question Number	Answer	Additional guidance	Mark
2(b)	<ul style="list-style-type: none"> • Proportion remaining = 80 % / 0.8 (1) • Multiplication 300 000 000 x 0.8 = 240 000 000 (1) 	Award full marks for correct numerical answer without working	2

Question Number	Answer	Mark
2(c)	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • prevents protein synthesis (1) • prevents translation (1) • mRNA cannot attach (1) • tRNA cannot attach (1) • kills bacteria / prevents bacteria reproducing (1) 	3

Total for Question 2 = 6 marks

Question Number	Answer	Mark
3(a)	<p>An answer that makes reference to six of the following points:</p> <p>Three from:</p> <ul style="list-style-type: none"> • wood for building construction (1) • wood for manufacture of paper / furniture (1) • road construction (1) • farming crops / cattle (1) • grow other crops to produce useful products (1) • economic benefit (1) <p>Three from:</p> <ul style="list-style-type: none"> • global warming / greenhouse effect (1) • loss of trees increases carbon dioxide (1) • cattle release methane (1) • soil erosion (1) • flooding (1) • loss of species / extinction (1) 	6

Question Number	Answer	Additional guidance	Mark
3(b)	<p>Multiplication</p> <ul style="list-style-type: none"> • $40 \times 20,000 = 800\,000$ (1) <p>Multiplication</p> <ul style="list-style-type: none"> • $800\,000 \times 5 = 4\,000\,000$ (1) 	Award full marks for correct numerical answer without working	2

Total for Question 3 = 8 marks

Question Number	Answer	Mark
4(a)	<ul style="list-style-type: none"> • to move position of bubble (1) 	1

Question Number	Answer	Mark
4(b)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • wind moves water molecules away from leaf (1) • maintains concentration gradient (1) • more diffusion (1) 	2

Question Number	Answer	Mark
4(c)	<p>An answer that makes reference to one of the following points:</p> <ul style="list-style-type: none"> • light intensity (1) • temperature (1) 	1

Question Number	Answer	Mark
4(d)	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • trace outline on graph paper (1) • count the squares (1) • multiply by two (1) 	2

Total for Question 4 = 6 marks

Question Number	Answer	Mark																																																				
5(a)(i)	<table border="1"> <thead> <tr> <th rowspan="2">Country</th> <th colspan="4">Percentage of each blood group</th> <th rowspan="2">Zone</th> </tr> <tr> <th>A</th> <th>B</th> <th>AB</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>USA</td> <td>41</td> <td>10</td> <td>4</td> <td>45</td> <td>O</td> </tr> <tr> <td>Egypt</td> <td>35</td> <td>25</td> <td>8</td> <td>32</td> <td>A</td> </tr> <tr> <td>India</td> <td>24</td> <td>35</td> <td>8</td> <td>33</td> <td>B</td> </tr> <tr> <td>Indonesia</td> <td>26</td> <td>29</td> <td>8</td> <td>37</td> <td>O</td> </tr> <tr> <td>Japan</td> <td>38</td> <td>22</td> <td>9</td> <td>31</td> <td>A</td> </tr> <tr> <td>Mexico</td> <td>11</td> <td>4</td> <td>1</td> <td>84</td> <td>O</td> </tr> <tr> <td>Norway</td> <td>49</td> <td>8</td> <td>4</td> <td>39</td> <td>A</td> </tr> </tbody> </table>	Country	Percentage of each blood group				Zone	A	B	AB	O	USA	41	10	4	45	O	Egypt	35	25	8	32	A	India	24	35	8	33	B	Indonesia	26	29	8	37	O	Japan	38	22	9	31	A	Mexico	11	4	1	84	O	Norway	49	8	4	39	A	1
Country	Percentage of each blood group				Zone																																																	
	A	B	AB	O																																																		
USA	41	10	4	45	O																																																	
Egypt	35	25	8	32	A																																																	
India	24	35	8	33	B																																																	
Indonesia	26	29	8	37	O																																																	
Japan	38	22	9	31	A																																																	
Mexico	11	4	1	84	O																																																	
Norway	49	8	4	39	A																																																	

Question Number	Answer	Mark
5(a)(ii)	<p>An answer that makes reference to two the following points:</p> <ul style="list-style-type: none"> • no migration to and from countries (1) • no interbreeding (1) • different countries have different starting percentages (1) • selective advantage (in a specific country) (1) 	2

Question Number	Answer	Mark
5(b)(i)	<p>An answer that includes the following points:</p> <ul style="list-style-type: none"> • parent genotypes $I^A I^B$ and $I^O I^O$ and correct gamete genotypes I^A or I^B and I^O (1) • offspring genotypes (1) • 0.5 / 50% / $\frac{1}{2}$ (1) 	3

Question Number	Answer	Mark
5(b)(ii)	<ul style="list-style-type: none"> • 0.25 / 25% / $\frac{1}{4}$ 	1

Total for Question 5 = 7 marks

Question Number	Answer	Mark
6(a)(i)	A extracting the nucleus of a diploid body cell	1

Question Number	Answer	Mark
6(a)(ii)	B can be carried out at any time of year	1

Question Number	Answer	Mark
6(b)	<p>A description that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • maintain water quality (1) • aerating water (1) • remove faeces (1) • control quality of food / frequency of feeding (1) • separate different species / sizes (1) • use antibiotics / fungicide / biological control of parasites (1) • selective breeding (1) • genetic modification (1) • method to remove predators (1) 	4

Total for Question 6 = 6 marks

Question Number	Answer	Additional guidance	Mark
7(a)(i)	Multiplication <ul style="list-style-type: none"> • $6 \times 25 = 150$ (1) Multiplication <ul style="list-style-type: none"> • $150 \times 4.2 = 630$ (1) 	Award full marks for correct numerical answer without working	2

Question Number	Answer	Additional guidance	Mark
7(a)(ii)	<ul style="list-style-type: none"> • $630 \div 0.1 / 630 \times 10 = 6300$ J per g 	Award full marks for correct numerical answer without working	1

Question Number	Answer	Mark
7(a)(iii)	An explanation that makes reference to the following points: <ul style="list-style-type: none"> • different samples have different masses (1) • conversion to per g allows valid comparison (1) 	2

Question Number	Answer	Mark
7(b)	An answer that makes reference to six of the following points: <ul style="list-style-type: none"> • lid reduces heat loss / provides insulation (1) • use of oxygen means complete combustion (1) • using wire means no energy loss in transfer (1) • surrounding with water means more energy transferred to water (1) • use of stirrer means even temperature of water (1) • use of air means less heat loss / provides insulation (1) • metal container allows heat transfer to water (1) • thermometer has a precise scale (1) 	6

Total for Question 7 = 11 marks

Question Number	Answer	Mark
8(a)	An explanation that makes reference to the following points: <ul style="list-style-type: none"> • removal of waste products (1) • of metabolism / from cells (1) 	2

Question Number	Answer	Mark
8(b)	An explanation that makes reference to three of the following points: <ul style="list-style-type: none"> • glucose passes from blood into filtrate / from glomerulus into Bowman's capsule (1) • reabsorbed back into blood (1) • in proximal / first convoluted tubule (1) • against concentration gradient / by active transport (1) 	3

Question Number	Answer	Additional guidance	Mark
8(c)	An explanation that includes five of the following points: <ul style="list-style-type: none"> • increase in blood concentration (1) • osmoreceptors / hypothalamus (1) • pituitary gland secretes (more) ADH into the blood (1) • collecting duct (1) • increase in permeability of wall (1) • more water reabsorbed into blood (1) • urine has less volume / more concentrated (1) • blood concentration decreases (1) 		5

Total for Question 8 = 10 marks