

Biology B Advanced Subsidiary Paper 1 (8BI0/01)

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	C (RNA)		(1)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	D (starch)		(1)

Question Number	Answer	Additional Guidance	Mark
1(a)(iii)	D (unsaturated)		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
1(b)	higher % of carbon produces more CO ₂ and energy from respiration		(1)

Total for Question 1 = 4 marks

Question Number	Acceptable Answer	Additional Guidance	Mark
2(a)(i)	<ul style="list-style-type: none"> • difference in density between 4°C and 0°C (1) • calculate percentage change from 1000 (1) 	<u>Example of calculation</u> Decrease from 4°C to 0°C = 0.2 kg / m^{-3} $0.2 / 1000 = 0.02\%$ Correct answer gains full marks with no working shown	(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
2(a)(ii)	An explanation that makes reference to the following: <ul style="list-style-type: none"> • density decreases causing less dense water / ice to float (1) • insulates / protects aquatic organisms (1) 		(2)

Total for Question 2 = 4 marks

Question Number	Acceptable Answer	Additional Guidance	Mark
3(a) (i)	An explanation that makes reference to the following: <ul style="list-style-type: none"> nucleus is stained brown and therefore visible (1) starch grains would be stained blue-black and therefore visible (1) 		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
3(a) (ii)	An explanation that makes reference to the following: <ul style="list-style-type: none"> Gram positive bacteria retain the stain (1) because they have more peptidoglycan in their cell walls (1) 	Allow converse	(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
3(a)(iii)	A description that makes reference to the following: <ul style="list-style-type: none"> plant tissue placed flat on slide with stain / water / boiled and cooled water (1) coverslip held at an angle just touching the stain / water (1) once liquid touches coverslip it is lowered down gently (1) 		(3)

Question Number	Acceptable Answer	Additional Guidance	Mark
3(a)(iv)	air bubbles obscure view so detail cannot be seen easily		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
3(b)(i)	Correct Answer (1)	<u>Example of calculation</u> $4 \div 0.133 = 30$	(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
3(b)(ii)	An explanation that makes reference to the following: <ul style="list-style-type: none"> • sections cut from shoot tips and base of stem (1) • large number of xylem vessels measured from each section (1) • samples taken from same position (in vascular bundle) / mean of all xylem vessels calculated (per bundle) (1) 		(3)

Total for Question 3 = 12 marks

Question Number	Answer	Additional Guidance	Mark
4(a)(i)	A (NH ₂ and -COOH)		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
4(a)(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> thioglycolate breaks disulfide bonds (1) the second chemical reforms the disulfide bonds stopping the hair from becoming curly again (1) 		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
4(b)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> strong because it is made of (three) polypeptide chains held together by hydrogen bonds (1) flexible because of kinks in the protein chain (1) 		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
4(c)	An explanation that makes reference to the following: <ul style="list-style-type: none"> <li>• exercise increases muscle temperature to over 38 °C (1) <li>• therefore haemoglobin carries less oxygen (1) <li>• this oxygen lost is provided to exercising muscle tissue for respiration (1) 		(3)

Total for Question 4 = 8 marks

Question Number	Acceptable Answer	Additional Guidance	Mark
5(a) (i)	<ul style="list-style-type: none"> conversion of micrometres to millimetres (1) calculation of how much larger (1) 	<u>Example of calculation</u> 1 μm = 0.001 mm 5 μm = 0.005 mm 0.1 / 0.005 = 20	(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
5(a)(ii)	An explanation that makes reference to the following: <ul style="list-style-type: none"> the egg cell contains a large food store (1) for { energy / respiration / cell division } until implantation (1) 		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
5(b) (i)	An explanation that makes reference to the following: <ul style="list-style-type: none"> because independent assortment and crossing over take place (1) independent assortment gives different combinations of chromatids (1) crossing over gives different combination of alleles on a chromatid (1) 		(3)

Question Number	Acceptable Answer	Additional Guidance	Mark
5(b) (ii)	one		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
5(c)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none"> • DNAase 1 inhibits pollen tube growth and cytoplasmic streaming (1) • between { 0 and 5 mol dm⁻³ / low concentrations } DNAase 1 inhibits pollen tube growth but not cytoplasmic streaming (1) • because DNAase 1 binds to actin, actin is likely to be important for pollen tube growth (1) • cytoplasmic streaming is weakly inhibited so perhaps actin is involved in cytoplasmic streaming (1) 		(3)

Total for Question 5 = 11 marks

Question Number	Acceptable Answer	Additional Guidance	Mark
6(a)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • at metaphase the DNA must have doubled because it replicates before mitosis (1) • however DNA has replicated in some of the cells at interphase (1) 		(2)

Question Number	Answer	Additional Guidance	Mark
6(b)	C (8)		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
6(c)(i)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> • Similarity (1) <ul style="list-style-type: none"> - both contain many cells • Difference (1) <ul style="list-style-type: none"> - tissues have similar cell types whereas organs have a group of different tissues 		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
6(c)(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • 0.81 is a strong / high / good correlation (1) • the higher the rate of cell division, the greater the chance of cancer (1) 		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
6(c)(iii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • interphase is shorter because cells spend less time growing (1) • duration of mitosis and cytokinesis remain unchanged (1) 		(2)

Total for Question 6 = 9 marks

Question Number	Acceptable Answer	Additional Guidance	Mark
7(a)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • competitive because it is similar in shape to the substrate (1) • competitive because it fits precisely to the active site (1) 		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
7(b) (i)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • the total volume must remain 10 cm³ so that concentration of { milk protein / enzyme } is constant (1) • therefore replace 2cm³ of water with an additional 2cm³ of inhibitor in the inhibitor experiment beaker' (1) • replicates are made / mean calculated (1) 		(3)

Question Number	Acceptable Answer	Additional Guidance	Mark
7(b) (ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • both { milky / cloudy } at zero time because protein has not been broken down (1) • control is clear because protein has been broken down (1) • inhibitor experiment is { milky / cloudy } because inhibitor has slowed the reaction (1) 		(3)

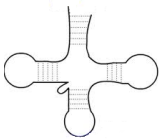
Total for Question 7 = 8 marks

Question Number	Answer	Additional Guidance	Mark
8(a)(i)	C (hydrogen)		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark										
8(a)(ii)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>T</td><td>A</td><td>C</td><td>C</td><td>G</td><td>G</td><td>T</td><td>T</td><td>A</td><td>G</td> </tr> </table>	T	A	C	C	G	G	T	T	A	G		(1)
T	A	C	C	G	G	T	T	A	G				

Question Number	Acceptable Answer	Additional Guidance	Mark
8(a)(iii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • bacteria grown in medium containing 'heavy' nitrogen for several generations so that DNA contains ^{15}N and both strands are 'heavy' (1) • when these bacteria are grown for one generation in medium containing ^{14}N, one strand is 'heavy' and the other one light or normal making the DNA medium density (1) • when bacteria are grown in ^{14}N, both strands are light or normal (1) 		(3)

Question Number	Acceptable Answer	Additional Guidance	Mark
8(b)(i)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> • 24% adenine means 24% thymine (1) • 100-48% means 52% cytosine and guanine therefore the percentage of cytosine is 26% (1) 		(2)

Question Number	Answer	Additional Guidance	Mark
8 (b)(ii)	<p>D</p> 		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
8 (c)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • only one base change needed to produce a different amino acid for tryptophan compared to other amino acids because there is only one triplet (1) • for example arginine has four triplets so a mutation has less effect (1) • only one base change needed to change tryptophan to STOP, producing much smaller protein (1) • loss of tryptophan will cause a change to the protein shape because the side chain is lost (1) 	Allow reference to other amino acids	(4)

Total for Question 5 = 12 marks

Question Number	Acceptable Answer	Additional Guidance	Mark
9(a) (i)	<ul style="list-style-type: none"> • correct reading from graph divided by estimated reported cases (1) • correct answer (1) 	<u>Example of calculation</u> $(7800 \div 20\,000) \times 100$ $= 39.0\%$ Correct answer gains full marks with no working shown	(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
9(a) (ii)	An analysis that makes reference to the following: <ul style="list-style-type: none"> • rate/percentage of increase in deaths from July to August is greater than the rate/percentage increase from December to January (1) • so spread of Ebola is {perhaps under control / being reduced} (1) 		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
9(a) (iii)	An explanation that makes reference to the following: <ul style="list-style-type: none"> • give percentages to show that the percentage of deaths is lowest in Sierra Leone and highest in Guinea (1) • therefore the control measures are more effective in Sierra Leone (1) 	Guinea = 66% Liberia = 45% Sierra Leone = 32% Allow converse	(2)

Question Number	Answer	Additional Guidance	Mark
9(b)	C (inhibition of replication)		(1)

Question Number	Indicative content	
9(c)	<p>Ethical</p> <ul style="list-style-type: none"> washing the dead bodies is a ritual or tradition education programme is needed since dead bodies are highly infectious foreign health workers are regarded with suspicion protective suits will make the foreign health workers even more frightening, increasing suspicion <p>Practical</p> <ul style="list-style-type: none"> health workers need protective suits health workers need a strict protocol for removing the protective suits without becoming infected burial sites should be out of bounds to relatives/villages effective decontamination of bodies and homes 	
Level	Marks	
0	0	No awardable content
1	1-2	<p>Demonstrates isolated elements of biological knowledge and understanding to the given context with generalised comments made.</p> <p>Vague statements related to consequences are made with limited linkage to a range of scientific ideas, processes, techniques and procedures.</p> <p>The discussion will contain basic information of an ethical dilemma or practical problem.</p>
2	3-4	<p>Demonstrates adequate knowledge and understanding by selecting and applying some relevant biological facts/concepts.</p> <p>Consequences are discussed which are occasionally supported through linkage to a range of scientific ideas, processes, techniques and procedures.</p> <p>The discussion will contain information of an ethical dilemma and a practical problem.</p>
3	5-6	<p>Demonstrates comprehensive knowledge and understanding by selecting and applying relevant knowledge of biological facts/concepts.</p> <p>Consequences are discussed which are supported throughout by sustained linkage to a range of scientific ideas, processes, techniques or procedures.</p> <p>The discussion will contain detailed information of at least two ethical dilemmas and two practical problems.</p>

Total for Question 9 = 12 marks