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)	• 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: • 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: • 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: • 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: • 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)	Example of calculation 4 ÷ 0.133 = 30	**(1)**

Question Number	Acceptable Answer	Additional Guidance	Mark
3(b)(ii)	An explanation that makes reference to the following: • 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)	An explanation that makes reference to the following: • 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)	An explanation that makes reference to the following: • 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: • exercise increases muscle temperature to over 38 ^{o}C (1) • therefore haemoglobin carries less oxygen (1) • 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)	• 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: • 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: • 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)	An explanation that makes reference to three of the following: • 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)	An explanation that makes reference to the following: • 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)	An answer that makes reference to the following: • **Similarity** (1) - both contain many cells • **Difference** (1) - tissues have similar cell types whereas organs have a group of different tissues		**(2)**

Question Number	Acceptable Answer	Additional Guidance	Mark
6(c)(ii)	An explanation that makes reference to the following: • 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)	An explanation that makes reference to the following: • 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)	An explanation that makes reference to the following: • 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)	An explanation that makes reference to the following: • the total volume must remain 10 cm^3 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)	An explanation that makes reference to the following: • 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)**

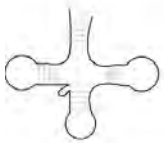
Total for Question 7 = 8 marks

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

Question Number	Acceptable Answer	Additional Guidance	Mark
8(a)(ii)	T A C C G G T T A G		**(1)**

Question Number	Acceptable Answer	Additional Guidance	Mark
8(a)(iii)	An explanation that makes reference to the following: • 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)	An answer that makes reference to the following: • 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)	D 		**(1)**

Question Number	Acceptable Answer	Additional Guidance	Mark
8 (c)	An explanation that makes reference to the following: • 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)	• correct reading from graph divided by estimated reported cases (1) • correct answer (1)	Example of calculation (7800 ÷ 20 000) × 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: • 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: • 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)	**Ethical** • 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 **Practical** • 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	Demonstrates isolated elements of biological knowledge and understanding to the given context with generalised comments made. Vague statements related to consequences are made with limited linkage to a range of scientific ideas, processes, techniques and procedures. **The discussion will contain basic information of an ethical dilemma or practical problem.**
2	3-4	Demonstrates adequate knowledge and understanding by selecting and applying some relevant biological facts/concepts. Consequences are discussed which are occasionally supported through linkage to a range of scientific ideas, processes, techniques and procedures. **The discussion will contain information of an ethical dilemma and a practical problem.**
3	5-6	Demonstrates comprehensive knowledge and understanding by selecting and applying relevant knowledge of biological facts/concepts. Consequences are discussed which are supported throughout by sustained linkage to a range of scientific ideas, processes, techniques or procedures. **The discussion will contain detailed information of at least two ethical dilemmas and two practical problems.**

Total for Question 9 = 12 marks