

OXFORD

INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL AS **BIOLOGY (9610)**

BL01

Unit 1 The Diversity of Living Organisms

Mark scheme

June 2022

Version: 1.0 Final



Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

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Question	Marking guidance	Mark	Comments
01.1	(Molecule) made up of many (identical/similar) molecules/monomers/subunits;	1	Not necessary to refer to similarity with monomers

Question	Marking guidance	Mark	Comments
01.2	<p>Similarities:</p> <p>Both formed from monosaccharide/glucose or Both contain (1, 4) glycosidic bonds or both contain (intramolecular) hydrogen bonds within the structure;</p> <p>Differences:</p> <p>Starch α-glucose and cellulose β-glucose or Starch coiled (chain) and cellulose straight chain or Starch (amylopectin) branched and cellulose unbranched or Starch no H-bonds between chains and cellulose H-bonds between chains;</p>	2	<p>Reject reference to cellulose containing 1, 6</p> <p>Reference to both starch and cellulose needed.</p>

Question	Marking guidance	Mark	Comments									
01.3	One mark for each correct row;;	2	Allow one mark for both correct reagents									
	Carbohydrate		Reagent	Positive test result								
	Reducing sugars		Benedict's (solution)	Orange or orange-brown or red or brick red								
	Starch		Iodine (in potassium iodide) solution	Blue-black								
			<table border="1"> <thead> <tr> <th>Carbohydrate</th> <th>Reagent</th> <th>Positive test result</th> </tr> </thead> <tbody> <tr> <td>Reducing sugars</td> <td></td> <td>Allow green or yellow</td> </tr> <tr> <td>Starch</td> <td>Allow Iodine</td> <td>Allow black or dark blue</td> </tr> </tbody> </table>	Carbohydrate	Reagent	Positive test result	Reducing sugars		Allow green or yellow	Starch	Allow Iodine	Allow black or dark blue
Carbohydrate	Reagent	Positive test result										
Reducing sugars		Allow green or yellow										
Starch	Allow Iodine	Allow black or dark blue										

Question	Marking guidance	Mark	Comments
01.4	One mark for each correctly drawn OH group;;	2	

Question	Marking guidance	Mark	Comments
01.5	Insoluble or Compact or Can be easily/quickly hydrolysed (to monosaccharides or fructose);	1	Accept coiled or helical or globular Accept branched Ignore many monomers/fructose

MARK SCHEME – INTERNATIONAL AS BIOLOGY – BL01 – JUNE 2022

Question	Marking guidance	Mark	Comments
02.1	(A) (Unsaturated because) double bond between C and C; (Triglyceride because) three fatty acids (attached to glycerol);	2	No mark for correct letter Do not accept just 'double bond' If B is chosen, then max 1 mark for three fatty acids

Question	Marking guidance	Mark	Comments
02.2	Small; Lipid soluble or non-polar or high hydrocarbon content or hydrophobic;	2	Allow uncharged Ignore not soluble in water

Question	Marking guidance	Mark	Comments
02.3	(Phosphate) 'head' is hydrophilic or attracts water or interacts with water or is polar; (Hydrocarbon) 'tail' is hydrophobic or repels water or is non-polar;	2	

Question	Marking guidance	Mark	Comments
03.1	<u>3.0</u> ; <u>1.9</u> ;	2	

Question	Marking guidance	Mark	Comments
03.2	As size increases, surface area to volume ratio decreases;	1	Accept converse Accept inverse relationship

Question	Marking guidance	Mark	Comments
03.3	Spiracles can close so less water diffuses out or so less evaporation (of water); Hairs around spiracles trap water (vapour) so water potential gradient is reduced; Waterproof covering so less evaporation (of water);	2 max	Accept moisture for water vapour Accept waxy layer so less evaporation (of water)

MARK SCHEME – INTERNATIONAL AS BIOLOGY – BL01 – JUNE 2022

Question	Marking guidance	Mark	Comments
03.4	1. Covered in 'hairs' or branched tracheoles or many tracheoles; 2. (So) large surface area; OR 3. Thin or flattened shape; 4. (So) short diffusion distance; OR 5. Many tracheoles or branched tracheoles; 6. (So) maintains concentration gradient;	2 max	Mark in pairs 1 and 2 or 3 and 4 or 5 and 6 Accept descriptions of 'hairs' e.g. projections

Question	Marking guidance	Mark	Comments
03.5	More/enough oxygen (to cells or tissues or muscles); More (aerobic) respiration for <u>muscle</u> (action) or more energy release for <u>muscle</u> (action to catch prey);	2	One comparative term needed for full marks

Question	Marking guidance	Mark	Comments
04.1	<p>P Hepatic portal vein;</p> <p>Q Aorta;</p>	2	

Question	Marking guidance	Mark	Comments
04.2	<p>1. (Through) alveolar epithelium or alveolar epithelial cell(s);</p> <p>2. (Then through) capillary endothelium or capillary endothelial cell(s):</p>	2	<p>2. Accept walls of the capillary</p> <p>2. Allow capillary epithelium</p>

Question	Marking guidance	Mark	Comments
04.3	2.1 kPa;;	2	<p>Allow 1 mark for both partial pressures from graph: 6.3 and 4.2</p> <p>Allow 1 mark for correct difference from incorrect readings from graph</p> <p>Ignore plus or minus</p>

Question	Marking guidance	Mark	Comments
04.4	<p>1. (Penguin haemoglobin has) higher <u>affinity</u> for oxygen;</p> <p>2. (So) only unloads when pO_2 in tissues is low;</p> <p>3. (To help to conserve the oxygen) so that it can stay under water for longer (without breathing);</p>	3	1. Must be a comparative statement

Question	Marking guidance	Mark	Comments
04.5	1. (Respiration) increases carbon dioxide concentration or (respiration) decreases pH; 2. Decreased affinity of haemoglobin for oxygen;	2	2. Accept description of decreased affinity for oxygen

Question	Marking guidance	Mark	Comments
05.1	Any two from: Wear eye protection; Avoid inhaling vapour or ensure room is well ventilated or use a fume cupboard; No (naked) flames;	2 max	Allow wear gloves Ignore wear lab coat Ignore heat

Question	Marking guidance	Mark	Comments
05.2	(Crushes leaves) to extract the pigment; (Pigment spot above solvent so) pigment spot is not 'washed off' the paper or the solute moves up the paper (with the solvent); (Marks position of solvent front so) position (of the solvent front) is recorded before the (chromatography) paper dries;	3	

Question	Marking guidance	Mark	Comments															
05.3	<p>Suitable column headings and unit in column heading only;</p> <p>All measurements for distance correct;;</p> <p>All R_f values correct;</p> <table border="1"> <thead> <tr> <th>Colour of pigment spot</th> <th>Distance moved / mm</th> <th>R_f</th> </tr> </thead> <tbody> <tr> <td>Bright yellow</td> <td>96</td> <td>0.96</td> </tr> <tr> <td>Blue-green</td> <td>28</td> <td>0.28</td> </tr> <tr> <td>Green</td> <td>22</td> <td>0.22</td> </tr> <tr> <td>Pale yellow</td> <td>7</td> <td>0.07</td> </tr> </tbody> </table>	Colour of pigment spot	Distance moved / mm	R _f	Bright yellow	96	0.96	Blue-green	28	0.28	Green	22	0.22	Pale yellow	7	0.07	4	<p>Unit for distance only, reject unit for R_f</p> <p>All measurements correct for 2 marks: 7±1, 22±1, 28±1, 96±1</p> <p>Award one mark for 3 correct measurements</p> <p>Measurements for distance (in mm) divided by 100:</p> <p>Allow ecf for R_f values correctly calculated from incorrect measurements</p>
Colour of pigment spot	Distance moved / mm	R _f																
Bright yellow	96	0.96																
Blue-green	28	0.28																
Green	22	0.22																
Pale yellow	7	0.07																

Question	Marking guidance	Mark	Comments
05.4	Carotene;	1	Allow ecf for incorrectly calculated R _f from 05.3

Question	Marking guidance	Mark	Comments
05.5	<p>Could be either chlorophyll a or chlorophyll b</p> <p>or ranges for chlorophyll a and chlorophyll b overlap;</p>	1	

MARK SCHEME – INTERNATIONAL AS BIOLOGY – BL01 – JUNE 2022

Question	Marking guidance	Mark	Comments
05.6	Use a different solvent or use two-way chromatography;	1	Allow repeat to check if the R _f value is anomalous Ignore run for a longer time Ignore colour

Question	Marking guidance	Mark	Comments
05.7	This question has been discounted due to the fact that the identification and determination of uncertainties in measurements is not listed under the mathematical requirements of the <i>specification</i> .	1	All candidates were awarded 1 mark for this item.

MARK SCHEME – INTERNATIONAL AS BIOLOGY – BL01 – JUNE 2022

Question	Marking guidance	Mark	Comments	
06.1	One mark for each correct row;;;	3		
				✓
	✓			✓
				✓

Question	Marking guidance	Mark	Comments
06.2	5.3 (%);;	2	Award 1 mark for correct working $[(288 \times 10) \div 54\,000] \times 100$ Award 1 mark for incorrect conversion from standard form or not multiplying by 100 e.g. 0.053 or 53 Award 1 mark for correct answer not given to 2sf

Question	Marking guidance	Mark	Comments
06.3	960 or 959 or 958;	1	

Question	Marking guidance	Mark	Comments
06.4	Pre-mRNA undergoes splicing (to form mRNA); Introns/non-coding regions removed or only exons left in mRNA;	2	Accept description of splicing with exons joined together to form mRNA

Question	Marking guidance	Mark	Comments
07.1	To reduce bias or to collect valid data or to get a representative sample (of the population);	1	

Question	Marking guidance	Mark	Comments
07.2	To reduce the effect of chance or to collect representative data or to calculate a more valid mean or to reduce the effect of anomalies or to collect enough data for a statistical test;	1	Reject to eliminate chance Accept to calculate a more reliable mean Reject to remove anomalies

Question	Marking guidance	Mark	Comments
07.3	Any two from: Standard deviations are large; Standard deviations overlap between samples from each area; No statistical test has been carried out; Variation could have occurred by chance; Length of leaves not measured;	2 max	Allow large variation in size

Question	Marking guidance	Mark	Comments
07.4	(Larger SD means) larger spread of data (around the mean);	1	Accept converse. Accept alternative wording.

Question	Marking guidance	Mark	Comments
07.5	Petiole length is (usually) greater than leaf width;	1	Must be a comparative statement

Question	Marking guidance	Mark	Comments
07.6	Environmental (variation);	1	Accept named environmental cause e.g. light intensity Reject genetic variation

MARK SCHEME – INTERNATIONAL AS BIOLOGY – BL01 – JUNE 2022

Question	Marking guidance	Mark	Comments
08.1	<u>Induced fit</u> ;	1	

Question	Marking guidance	Mark	Comments
08.2	(Binding of substrate) changes shape of <u>active site</u> ; (Active site) becomes complementary to substrate;	2	Accept description of becoming complementary e.g. fit Allow description of method of binding to form enzyme-substrate complex e.g. hydrogen/ionic bonding

Question	Marking guidance	Mark	Comments
08.3	1. (Ethanol is a competitive inhibitor and) fits into/binds to the active site or (Ethanol is a non-competitive inhibitor and) binds away from the active site; 2. (Competitive inhibitor) blocks the active site or (Non-competitive inhibitor) changes the shape of the active site; 3. (So) methanol cannot bind and toxic products not formed;	3	

Question	Marking guidance	Mark	Comments
09.1	<i>Hylobates muelleri</i> ;	1	

Question	Marking guidance	Mark	Comments
09.2	Family;	1	

Question	Marking guidance	Mark	Comments
09.3	Domain;	1	Accept <i>Eukarya</i> or Eukaryotes

Question	Marking guidance	Mark	Comments
09.4	Gibbon and orangutan (most closely related); Most similarities in amino acid sequence;	2	Accept converse Must be comparative

Question	Marking guidance	Mark	Comments
09.5	(Same) volume of serum/blood (from rabbit or from primate) or temperature or time;	1	Accept amount for volume

Question	Marking guidance	Mark	Comments
09.6	Chimpanzee and gorilla most closely related because same precipitation or because both 95% precipitation;	1	