OXFORD
INTERNATIONAL
AQA EXAMINATIONS

# INTERNATIONAL AS LEVEL BIOLOGY (9610)

## BL01 Unit 1 The Diversity of Living Organisms Report on the examination

June 2022

# REPORT ON EXAMINATION: INTERNATIONAL AS LEVEL BIOLOGY 9610 UNIT 1 BL01 JUNE 2022

Good answers were seen to all questions with students showing evidence of understanding of the specification content, and of preparation using past papers and mark schemes.

Students seemed very confident with content and questions about biological molecules, gas exchange, and required practical 3. Areas of the specification that caused more difficulty included interpreting and explaining oxygen-haemoglobin dissociation curves, and interpreting data relating to intraspecific variation

Students are reminded to read instructions carefully especially when completing diagrams, tables, or giving answers to a specified number of significant figures. They should also read the stem of the question carefully, especially the information provided in the 10-mark comprehension question.

## QUESTION 01

This question was about carbohydrates, including starch, cellulose and inulin.

01.1 Only 50% of students gained this first mark on the paper with most incorrect answers lacking the idea of 'many'. The specification covers disaccharides and dipeptides, so students should know that these are not polymers as they only have two monomers joined together. The specification clearly states that polysaccharides are formed from **many** monosaccharides joined by condensation, and polypeptides are formed by the condensation of **many** amino acids.

01.2 This question was well answered with about one-third of students gaining both marks. The most common similarity was both are formed from glucose, and the most common difference was starch is formed from alpha-glucose whereas cellulose is formed from beta-glucose. Some of the students who did not gain the second mark did not write about both starch and cellulose. Students who gained no marks tended to focus on the locations or functions of the polysaccharides rather than their structures.

01.3 Students' knowledge of the reagents and colour changes was very good with almost two-thirds gaining both marks. Some students confused biochemical tests and referred to the emulsion or biuret tests. Although 'iodine' was allowed, the specification does refer to iodine/potassium iodide solution when testing for starch.

01.4 The specification states that, when provided with molecular structures, students should be able to demonstrate how the carbohydrates may be broken down by hydrolysis. This seemed to be an unfamiliar concept and only about one-fifth of students gained both marks for this question. Just over one-fifth of students did not attempt this question; this could be because the question did not have answer lines but required the completion of **Figure 4**.

01.5 This was a well-answered application question with almost two-thirds of students gaining the mark. The most common answers were 'compact' or 'insoluble'.

## QUESTION 02

This question was about the structure and properties of lipids.

02.1 Students showed good knowledge of triglyceride structure and the majority gained at least one mark. To gain the first point, students had to clearly state that the double bond was between two carbon atoms. Some students lost the second mark because they went on to incorrectly state that the three fatty acids were attached to an incorrect molecule eg glycogen.

02.2 About one-third of students gained both marks for this question, generally for the answers 'small' and 'non-polar'. Some of the students who gained one mark did so because they gave incorrect alternatives of the second marking point.

02.3 This was a well-answered question and over two-thirds of students gained both marks. Many of the students who scored 0 mixed up the terms 'hydrophilic' and 'hydrophobic'.

## QUESTION 03

This question was about surface area to volume ratio, and its effect on water loss and gas exchange in insects.

03.1 Just under half of students gained both marks for completing the table. The practical handbook states that data should be written in tables to the same number of significant figures, but many of those gaining 1 mark gave a surface area to volume ratio of 3 rather than 3.0

03.2 Over two-thirds of students correctly described the relationship between size and surface area to volume ratio and gained the mark. Most of the answers that scored zero did not describe a relationship eg they just stated that insects are small so they have a large surface area to volume ratio.

03.3 Although students were often familiar with the features that reduce water loss, many of those who were awarded no marks did not **explain** them. The command word 'explain' requires reasons why these features reduce water loss, so answers that just named them did not gain any marks. A common incorrect response was spiracles opening and closing so less evaporation of water. If this had been a link between spiracles closing resulting in less evaporation then the mark would have been awarded.

03.4 Features that increase the rate of gas exchange were generally well explained, and students most commonly identified the hair-like structures covering the gills as providing a large surface area.

03.5 There were some good answers to this question with students making clear links between an increased oxygen supply, aerobic respiration and the muscle contraction needed to catch prey. Many of the students who gained one mark did so for recognising that there would be more oxygen, but did not make a link to the survival of the nymph.

## QUESTION 04

The question was about the human circulatory system, oxygen uptake, and the oxygen dissociation curves of a penguin and a goose.

04.1 This question required the identification of the hepatic portal vein and the aorta from a diagram of the human circulatory system. Less than 10% of students gained both marks, and most of those gaining1 mark did so for identifying the aorta. Although the specification states that names are required of vessels entering and leaving the heart and liver, this seemed unfamiliar to most students.

04.2 Only about 10% of students were awarded both marks for describing the path of an oxygen molecule through the alveolar epithelium and the capillary endothelium. Many students described the entire pathway through the breathing system rather than focusing on the movement from an alveolus into the blood stream.

04.3 The majority of students gained at least one mark for finding the difference in $P_{50}$ from **Figure 7**. Many of the students who scored 1 mark were awarded it for a correct difference from incorrect readings from the graph. Students are reminded to look carefully at scales and read values accurately.

04.4 Many students gained the first marking point for stating that penguin haemoglobin had a higher affinity for oxygen, but this had to be a comparative statement and there was no mark for just 'high affinity'. Some students seemed to find this concept difficult, and it was common to see answers getting the statement the wrong way round (a curve to the left means lower affinity for oxygen). The next most common marking point was the third one for using the information provided and stating the advantage to the penguin. The second marking point was not seen very often, and so only a very small percentage of students gained all three marks for this question.

04.5 There were some good answers to this question where students made a clear link between the increase in carbon dioxide concentration and the effect on the affinity of haemoglobin for oxygen. However, almost half of students did not gain any marks for this question even though the specification requires knowledge of the effect of carbon dioxide on the transport of oxygen by haemoglobin.

## QUESTION 05

This question was about required practical 3, use of chromatography to investigate the pigments present in leaves.

05.1 Almost two-thirds of students gained both marks for this question with 'wear goggles' the most common answer, and many giving the answer 'wear gloves' which was accepted. A lot of answers referred to the high temperature of the boiling tube which was concerning for two reasons: a boiling tube is a piece of equipment not a reference to its temperature, and also this required practical does not involve heating the (potentially flammable) solvent.

05.2 This question assessed students' understanding of some of the steps in required practical 3. Many of the students who were not awarded the second point just stated that this step was important so that the pigment did not dissolve in the solvent. The pigment has to dissolve to move up the paper but should not be in a position to be covered by the solvent at the start. A common error for the third point was to focus on the use of pencil to mark the solvent front and say this was important because pencil will not dissolve in the solvent unlike pen; this would apply when drawing the origin, but not the solvent front.

05.3 Although around one-quarter of students gained full marks for this question, many lost the first marking point for either giving their measurements in cm when the question told them to measure the distance in mm, or for including units in the body of the table. The guidance in the practical handbook states that tables should have clear headings with units indicated using a forward slash (solidus) before the unit, and that the body of the table should not contain units.

05.4 This was very well-answered with almost 90% of students correctly identifying the pigment from the Rf value.

05.5 This was a well-answered question with almost two-thirds of students gaining the mark. Students scoring zero tended to give answers that were too vague eg identifying that the problem was an overlap in the ranges for two pigments, but not specifying which pigments.

05.6 Only about one-quarter of students gained the mark for suggesting either using a different solvent or using two-way chromatography. Many students just suggested that the investigation should be repeated, or the distance measured again.

05.7 This question was included as uncertainties are explained in detail in the practical handbook, and it is stated that students are expected to develop an understanding of uncertainties in measurements through their practical work. The handbook gives a detailed example of uncertainty when measuring length and concludes with the statement that the measurement will have an uncertainty of ±1 division. As uncertainties are not identified as a mathematical requirement in the biology specification but are

included in the chemistry specification, it was decided that this gave some students an unfair advantage and so all students were awarded the mark for this question.

## QUESTION 06

This question was about DNA replication and polypeptide synthesis, including the roles of enzymes and splicing.

06.1 Three-quarters of students scored 2 or 3 marks for completing **Table 6**. Many of the answers scoring 2 marks had one tick in each row and students should be reminded to read the question carefully as they were told that each enzyme could have more than one function.

06.2 A common answer scoring 0 marks was 95% indicating that students did not realise that it is exons that code for amino acid sequence. Many students scoring 1 mark correctly worked out the answer but did not give it to 2 significant figures.

06.3 This question was intended to apply the knowledge that base triplets code for amino acids and required dividing the combined length of the exons (2880 bp) by 3, but only one-third of students gained the mark. The mark scheme included answers of 959 and 958 for students who removed stop and/or start codons from the number of amino acids, but these answers were rarely seen.

06.4 Many students showed good knowledge of splicing and intron removal with almost half receiving both marks for concise answers. Many of the 1-mark answers were either due to students mixing up exons and introns, or not naming/describing the process of splicing.

## QUESTION 07

This question was about investigating intraspecific variation and interpreting data including mean and standard deviation.

07.1 Almost four-fifths of students gained this mark for stating that random sampling reduced bias.

07.2 Students need to be aware of the correct terminology to use when answering questions of this type. Many vague answers were seen that did not gain the mark eg to collect accurate results, or to collect reliable results. The aim of a large sample size is not to **eliminate** chance or **remove** anomalous results, but it will reduce the effect of these.

07.3 Students were expected to use information from **Table 7** to answer this question and were provided with values for standard deviation. Students should understand mean and standard deviation as measures of variation within a sample.

07.4 It was apparent that many students did not know what a large standard deviation tells us about the data used to calculate a mean. Only about one-quarter of students gained the mark for this question.

07.5 Just under one-third of students gained the mark for this question with many not understanding what a ratio greater than one meant.

07.6 ‘Mutation’ was a common incorrect answer to this question, even though the question states that the leaves are from the same ivy plant. Most students who gained the mark specified ‘light intensity’ as the environmental factor that could contribute to variation in leaf size.

## QUESTION 08

This question involved reading a passage on enzymes before answering questions about induced fit and inhibition.

08.1 Most students correctly stated that the model was 'induced fit', but almost one-third of students gave incorrect answers. The most common incorrect answers were 'enzyme-substrate complex' or 'lock and key'. The answer of 'induced fit' was underlined in the mark scheme to indicate that incorrect spelling eg 'introduce fit' or just 'induced' were not accepted.

08.2 For this question, students were referred to lines 7 – 9 of the passage stating that the binding of a substrate to an enzyme changes the structure of an enzyme. Many of the students who scored no marks for this question did not apply their knowledge of induced fit to answer the question.

08.3 Many answers scored no marks for this question (just over 50%). These students did not realise this was a question about enzyme inhibition, despite the guidance given in the passage. A common incorrect answer referred to a condensation reaction occurring between ethanol and methanol. Another common incorrect answer was ethanol neutralising methanol. Around 10% of students gave good answers making clear links between ethanol structure, its effects on ADH and the resulting decrease in toxic product formation.

## QUESTION 09

This question was about the classification of primates and techniques used to clarify taxonomic relationships.

09.1 Most students understood that they needed to give the two-part name using information from the table. Answers were generally presented correctly with an upper-case letter for genus and a lower-case letter for the species. Some students incorrectly gave the family name, or just the genus.

09.2 A well-answered question with over two-thirds of students gaining the mark for a simple one-word answer. The most common incorrect responses were 'class' and 'order'.

09.3 This was another well-answered question for just naming the largest taxon, but many incorrect answers of 'kingdom' were seen.

09.4 Many students correctly interpreted the table and identified the two most closely related primates, but many then lost the second marking point for not giving a comparative statement. Only about one-third of students gained both marks. A small number of students completely misinterpreted the table and thought that the numbers 1 – 7 referred to the primates.

09.5 Over half of the students showed a good understanding of the method and identified the volume of serum as a control variable. 'Amount' was accepted, but 'volume' is the preferred term. Incorrect answers tended to refer to the concentration of antibodies, or focused on aspects of the human blood sample eg blood type. The alternative answers 'temperature' and 'time' were only seen occasionally.

09.6 This was a well-answered question with two-thirds of students correctly interpreting the data in the table. Incorrect answers tended not to link the percentage precipitation of the chimpanzee and gorilla eg stating that chimpanzee and gorilla had high percentage precipitation without saying they were the same, or that both were 95%

# GET HELP AND SUPPORT

Visit our website for information, guidance, support and resources at **oxfordaqaexams.org.uk**

# FAIR ASSESSMENT PROMISE

In line with OxfordAQA's Fair Assessment promise, the assessment design, marking and awarding of this examination focused on performance in the subject, rather than English language ability.

**OXFORD INTERNATIONAL AQA EXAMINATIONS**
GREAT CLARENDON STREET, OXFORD, OX2 6DP
UNITED KINGDOM

info@oxfordaqaexams.org.uk
oxfordaqaexams.org.uk