Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

January 2024

Pearson Edexcel International Advanced Subsidiary Level In Biology (WBI11)
Paper 01: Molecules, Diet, Transport and Health

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Introduction

We saw a wide range of responses from candidates, covering all the points that we had on our mark scheme. There appeared to be fewer blank responses this series with some really excellent responses from the more able candidates. The MCQs generated a range of responses as did the calculations. Improvements were seen in candidates' responses to the levels-based questions; candidates are clearly being taught how to approach these questions more logically so that all aspects of the question are covered in their responses.

Question 1

This was a relatively straightforward start for the majority of candidates. Most candidates knew that oxygen binds to haemoglobin when the partial pressure is high and that this binding is affected by the Bohr effect, although there were a range of spellings for this term. The commonest error was to name the part of the heart that pumps oxygenated blood as the aorta, presumably due to not reading the passage carefully enough.

Question 2

The nature of the genetic code has been tested in this style before and it was encouraging to see more candidates illustrating their answers with a specific example from the information that we had given them, than in previous series. Most candidates could explain what the phrases triplet code and degenerative code meant but the phrase non-overlapping code caused more problems. A common error was to use the term non-overlapping in the definition. We appreciated that it is quite a hard definition to express so allowed a number of possibilities.

Question 3

This question started with a batch of MCQs about cell transport mechanisms which did not cause candidates too many problems.

The last part to this question scored well by those candidates who dealt with the four solutions in turn and actually explained the mass change instead of simply describing it. There was the expected confusion between high and low water potentials, and hypertonic and hypotonic solutions. Candidates who explained their answers in terms of solute concentrations were in safer territory. Other frequent errors were to talk about the solutions moving into or out of the potatoes and differences in water concentrations.

Question 4

The first part of this question has been tested on more than one occasion before and was reasonably well answered, particularly by candidates from centres who had expressed the importance of emphasising that the charges on the atoms are very small. A common error was to refer to the oxygen and hydrogen atoms as molecules, but this did not prevent candidates access to one mark.

Part (ii) was novel and saw a range of responses as well as blank responses. Every possible place to draw a hydrogen bond imaginable was seen. Some candidates took the name of the bond literally and drew their bond between two hydrogens whereas others ignored the name of the bond and drew their line between two oxygen atoms. Several candidates did not read or follow the instructions and drew more than one bond, which would have been acceptable if all the bonds drawn were correct. There were others who made extra work for themselves by drawing in additional water molecules which again would have been acceptable if everything they had drawn had been correct.

Part (b) saw similar issues with extra water molecules drawn and random orientations of water molecules around the sodium ion. Careless drawings also lost some candidates marks as we really did not think that we could accept overlapping circles that represented covalent bonds.

Part (d) was much more high scoring, particularly by the candidates who wrote a description for each of the four chemicals in turn. Although the command word this time was describe, we saw several explanations which we tried to ignore if they were wrong where possible. The two commonest errors were to mis-read the 32°C turning point for chemical B and to describe the gradients of the lines in terms of rates; many candidates do not appreciate that the slope of a line can only be referred to as a rate if time is along the x axis.

Question 5

Naming another obesity indicator caused candidates more problems than we had anticipated. There were references to weight on it own, cholesterol levels, pinch tests, LDL : HDL ratios and a few weight to hip ratios.

A mixture of responses was seen to the two MCQs.

Part (b) was also not as high scoring as we had expected, possibly because candidates saw key words and thought the question was straightforward without really thinking about their answer. For a person to lose weight a change is needed so the numerous references to daily exercise and regular activity were not acceptable. References to changes in life style and diet were considered to be too vague.

The MCQ as the start of part (c) has been used before and was quite high-scoring. Part (ii) was answered quite well considering that candidates probably had not come across this idea before.

The first part to (d) was effectively asking candidates to define the term positive correlation, which we have asked before. However, the vast majority of candidates just repeated or reworded the question and wrote that there was more weight loss in people with more bacteria.

A range of responses were seen for the last part of this question with many candidates at least picking up the first mark, provided that their responses were not vague and simply referred to food or nutrients being used by the bacteria.

Question 6

Parts (a) and (b) were straightforward for candidates although we did see the expected confusion between which way round the parts of the phospholipids were facing. We did accept heads were facing outwards and the tails were facing inwards but ideally, we would have preferred candidates to clearly state that the heads were facing out from both sides of the membrane and that the tails were facing into the membrane.

Calculations involving diameters and radii always seem to cause candidates problems as they tend not to take care to halve or double their values as appropriate. This question was no exception. In addition, numerous candidates ignored our instruction to use three as their value for pi; this actually makes the calculation much more straightforward for candidates as they do not have to decide on ow many decimal places or significant figures to give their answer to.

A range of descriptions of a mRNA molecule were seen, including descriptions of transcription and translation. Marks were lost by some candidates who did not name the sugar specifically as a ribose or stated a letter for the name a base so could not be awarded mp 2. References were made to phosphodiester bonds without their position in the molecule being described. We reluctantly accepted the base letters for mp 4 but do feel that their names ought to be given at this level.

The last part to this question also saw a range of responses from those who just described what they saw to those who gave some very clear explanations. Several responses referred to the nanoparticle as being a cell but this was ignored where possible as we felt it wasn't detracting from the biology that we were trying to assess.

Question 7

Candidates are very familiar with the cystic fibrosis story and we saw some high-scoring responses to the first part of this question.

The percentage calculation was reasonably well done but still caused the less-able candidates issues.

Responses to (b)(ii) were disappointing as few candidates appreciated that their answer would have to be comparative so did not write about more screening and IVF taking place or more people selecting other options. A number of candidates do not seem to know the difference between an embryo and a baby, which is important when answering questions on this area of the specification.

We saw a wide range of responses to the levels-based question, with most candidates making good attempts and not leaving the question blank. As expected, the weaker candidates simply described the investigation, not giving justifications for their selected methods. There was also the usual confusion between terms such as valid, reliable and repeatable.

Question 8

It was clear from the drawings in part (a) that candidates know that the fatty acid side chain consists of carbon and hydrogen atoms only and that many knew that an unsaturated lipid had at least one carbon-carbon double bond and carbon atoms need four covalent bonds each. Some candidates tried to put the double bond between carbon 1 and carbon 2 and then had problems with the number of covalent bonds attached to the carbons; our mark scheme allowed a consequential error for this. There was the expected error of completing the diagram as a saturated lipid but again, we had a consequential error for this as well.

The calculations saw a range of responses. A number of candidates only calculated the difference in surface area in (i) and not the rate. The usual errors for ratio calculations were seen in (ii): either the ratio expressed the wrong way round as one to something or else the righthand value not cancelled down to a value of one. In (iii) there were candidates who did not attempt to convert mm^2 into μm^2 or else made conversion errors.

The command word in the second levels-based question was ‘deduce’ which requires candidates to draw conclusions, in this question, one for each of the three graphs shown. Although there were a number of candidates who did draw a conclusion for each graph, very few did this succinctly. Many candidates gave lengthy descriptions of the data and in amongst these were the conclusions. Candidates do find it difficult to make conclusions (generalisations) about data.

In the last question on the paper, candidates were asked to discuss some ethical issues surrounding the use of animals in investigations. Candidates came up with a range of valid issues but marks were limited as few gave three. The command word ‘discuss’ requires candidates to explore all aspects of a topic; most candidates focussed on the unethical aspects of using the animals as opposed to the ethical aspects.

Summary

A few suggestions for improving candidate performance are given below.

- Candidates should avoid repeating information in the stem of the question in their answers as this will not gain marks. This was particularly common in responses to 5(d)(i).
- Candidates need to take notice of the mark allocation for each item to help them decide if they have written enough points to be awarded that many marks. This would have helped candidates in 8(b)(v).
- Candidates should consider the questions asked in the early question parts as they are quite often trying to give a clue as to what is expected in the latter question parts. In question 6, parts (b) and (c)(ii) were building up for (c)(iii).
- Candidates should check the command word for each question before attempting their response. The meaning of each of our command words can be found in appendix 7 of the specification. Appreciating that the command word 'deduce' means give conclusions, would have helped many candidates with 8(b)(iv).
- Diagrams should be drawn carefully so as to be an accurate representation and labelled carefully where appropriate. Careful diagrams may have helped some candidates access the mark for 4(b).
- Candidates should be familiar with the maths skills outlined in appendix 6 of the specification; there will always be approximately 10% of the marks allocated to maths questions.

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