



Examiners' Report Principal Examiner Feedback

Summer 2025

Pearson Edexcel International GCSE
in Biology (4WBI2) Unit 2B

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Overall paper comments

This was the first sitting of this paper and examiners were generally pleased with how candidates accessed the questions. There were many high-quality responses seen across all items in the paper with clear evidence that candidates knew the specification well and could apply their knowledge to the contexts provided. A range of mathematical skills were seen with some candidates demonstrating excellent mathematical ability while others struggled a little with skills such as use of standard form or application of mathematical skills in a problem-solving context. In many cases candidates engaged well with the command verbs for questions giving complete explanations where needed. However, in some cases candidates did not read the full stem of the question thoroughly and ended up repeating information they had already been given which meant that they missed out on marks.

Question 1

Module 2 Biology always starts with a series of comprehension style questions, and the passage sets the context for the questions. The topic of this passage was rainforest conservation methods including the use of seed banks and modern techniques such as micropropagation.

Q1(a)

Most candidates performed well on this question, with many providing high-quality answers. Many candidates managed to state that an ecosystem contained both biotic and abiotic factors but didn't complete their definition. Additionally, while candidates often attempted to describe the location or setting of an ecosystem, many used vague or non-scientific phrases such as "in an area" or "at a place" instead of the expected terms like "environment" or "habitat," which made these answers too vague for credit.

Q1(b)

Many candidates gave good answers when explaining the environmental effects of deforestation, frequently referring to global warming or climate change, increased soil erosion, and loss of habitats as key consequences. However, some students lost marks by providing two responses that essentially repeated the same marking point, most commonly by listing two effects related to climate change without introducing a separate, distinct idea for the second marking point.

Q1(c)

Most candidates performed well on this question, typically gaining at least 2 marks by correctly identifying the growth of the radicle or root and the plumule or shoot as stages of germination. These were the most frequently awarded marking points, with some students further developing their responses by discussing the involvement of enzymes and the breakdown of starch, although such details were less commonly seen and tended to only be found in the strongest responses.

Q1(d)

Overall, this question was answered well by most candidates, who were generally able to identify two greenhouse gases; however, some included incorrect responses such as sulphur dioxide, nitrogen dioxide, carbon, and hydrogen. Carbon monoxide was another common incorrect response.

Q1(e)

Many candidates were able to gain at least 2 marks on this question, usually for describing the formation of explants and placing them in a medium with growth hormones, however, some students lost marks by giving vague terms such as 'nutrients' and missing out the idea of hormones entirely. Ideas around callus formation were less well understood although most responses scoring at least one mark did understand that the plants needed to be transferred to compost or a glasshouse to continue growing at the end of the process.

Q1(f)

Some good responses were seen to this question many students successfully converting their calculation and gaining at least one marking point; however, a minority failed to express their final answer correctly in standard form, with some simply writing out '9 million' in words. In some cases candidates found it challenging to perform the initial percentage calculation and so could not access full marks.

Question 2

This question centred around the different transport systems in plants and included some questions which required candidates to demonstrate their understanding of practical skills.

Q2(a)

This multiple choice was designed to be accessible, and the vast majority of candidates were able to correctly identify the root as the structure where water enters the plant from the diagram provided in the question.

Q2(b)

This question was answered fairly well, but some candidates stated minerals, nitrates, glucose and magnesium as their answer instead of sucrose or amino acids.

Q2(c)

A lot of good answers were seen to this question about the structural differences between the xylem and the phloem, with many candidates correctly identifying features such as the xylem being hollow, having lignin, and lacking end walls between cells. However, some students gave generic or imprecise statements like "xylem is dead, phloem is alive," which did not focus on structural aspects, instead discussing function – this was also seen in responses where candidates identified direction of travel of substances in both plant tissues.

Q2(d)(i)

Most students responded with concentration of salt (solution), but some students again did not understand the question and responded with time taken for the red dye to reach the leaves in the celery stalk. Temperature was another response. Time taken as well as just salt solution without the word 'concentration'.

Q2(d)(ii)

Most candidates were able to gain at least two marks on this question, particularly for mentioning the need to ensure all beakers receive the same amount of sunlight and for using celery stalks of the same length or measuring each stalk used.

However, some students lost marks by selecting two factors under the same marking point, such as both light intensity and temperature, and a number simply listed the independent and dependent variables without addressing control variables, which did not gain credit.

Question 3

This question involved the structure of the heart and the effects of adrenaline on heart rate and on blood glucose levels.

Q3(a)(i)

There were many answers that named the structure, as well as stating the function – these responses gained full credit. However, in some cases candidates only named the structure and did not gain marks as they had not correctly interpreted the question.

As well as the expected correct answer of preventing backflow or to ensuring that blood flows in one direction examiners also saw some incorrect responses such as that the valve stops the mixing of deoxygenated and oxygenated blood.

Q3(b)(i)

Most candidates were able to draw the line of best fit to cover all four points. Most drew a straight line, although some extrapolated to zero (creating a bend) and lost the mark. Also seen were responses where the candidate had drawn a straight line from the bottom left corner but had missed the points, although these responses were relatively rare. Even with an incorrectly drawn line most candidates were still able to gain the mark on Q3(b)(ii)

Q3(b)(ii)

This question was very well answered by candidates with the vast majority able to give a correct answer within the stated range.

Q3(c)(i)

Many candidates were able to gain at least two marks on this question, particularly for noting that blood glucose levels increase and that glycogen is broken down into glucose; with the strongest answers also mentioning the liver. A common

misconception seen was that blood glucose would decrease because it was being used up in respiration.

Q3(c)(ii)

A lot of excellent answers were seen to this question on how the change in blood glucose level helps to prepare the body for action. Common correct answers that many candidates provided were “increased respiration” and “more energy produced”. Where candidates lost marks, it was usually through repetition of the phrase “for action” from the stem and so missing the idea of muscle contraction, or marks were lost for phrasing such as “energy used for respiration” which showed a lack of understanding of the process.

Question 4

This question was about reproduction in plants. Candidates needed to know about both sexual and asexual reproduction for this question.

Q4(a)(i)

This multiple-choice question asked candidates to identify the structure containing female sex cells from a labelled diagram, most candidates were able to correctly select the structure from the list.

Q4(a)(ii)

This was overall answered well with most learners correctly naming the anther. Other names of plant structures were common with ovule, stigma, style, pollen tube and ovary all seen.

Q4(a)(iii)

There were some very good answers were seen to this question, with most candidates able to gain both marks, commonly mentioning petals, smell, and nectar as features that attract pollinators.

Q4(a)(iv)

Most candidates were able to gain at least one mark on this question, often stating that the pollen tube grows from the stigma down the style, and many also correctly mentioned its role in allowing fertilisation or fusion of male and female gametes. A few candidates mistakenly said the pollen tube allows the pollen grain to enter the ovary or ovum instead of the ovule, which did not score resulting in some students being unable to fully access the question.

Q4(b)(i)

What was noteworthy here, was the difficulty that some students had with the correct spelling of mitosis. As is to be expected with this question there was some confusion between meiosis and mitosis seen in candidate responses.

Q4(b)(ii)

Most candidates were able to gain at least one mark on this question, frequently stating that asexual reproduction is faster and sometimes mentioning that only one parent is needed. Many candidates were able to gain a second and third mark, though fewer achieved the maximum four marks. Most responses failed to pair advantages and disadvantages as required by the mark scheme.

Question 5

This question was about response to stimuli. It required candidates to have knowledge of the nervous system and of the eye's role as a receptor.

Q5(a)

This multiple-choice question asked candidates to correctly name a labelled part of the reflex arc from a list of options. Most were able to correctly identify that structure Z was the sensory neurone.

Q5(b)

Most candidates were able to gain at least one mark on this question, often referring to neurotransmitters, with many achieving a second and third mark by explaining how neurotransmitters diffuse across the synapse and some correctly describing their binding to receptors on the postsynaptic neurone; however, a common mistake was that some candidates described the reflex arc process instead of focusing specifically on neurotransmitter action.

Q5(c)(i)

A lot of excellent answers were seen for this question, with most students gaining the maximum marks; the majority achieved the marking point concerning damage to the eye, often describing blindness as a potential consequence of damage to the retina. Some candidates incorrectly described potential damage to the pupil and were not awarded the mark. Where candidates earned the marking points around the idea of a reflex being either fast or involuntary these were generally scored together. Some candidates did not interpret the question correctly and instead described the response rather than explaining the advantage of it being a reflex.

Q5(c)(ii)

Most candidates were able to gain at least two marks on this question, particularly for stating that the ciliary muscles relax and cause the suspensory ligaments to tighten, with many gaining a third mark for a description of the change to the lens, though fewer achieved the maximum marks as often the final idea about the refraction of light on to the retina was missing. Several candidates lost marks by incorrectly stating that the ligaments contract. Examiners saw many responses which made reference to the roles of the circular and radial muscles, often mentioning the pupil reflex instead of accommodation, sometimes these were part of responses which did score some marks overall but often this represented a significant lack of understanding around the different functions of the eye.

Question 6

This question was about cloning. There was a passage with gaps that candidates were required to complete and an extended response question where data was supplied for candidates to use to support their responses.

Q6(a)

Common mistakes on this question included the use of terms like somatic or body cell instead of diploid, using cell or DNA instead of egg cell or ovum, confusing terms such as electrical impulse, electric charge, and electric current instead of electric shock. Again, we saw frequent misspelling mitosis as well as confusion with meiosis. For the final word candidates often used incorrect words like placenta, ovary, or udder instead of womb, uterus, or uterus lining, with many students struggling particularly with the spelling of uterus, although provided the meaning was unambiguous this was still awarded a mark.

Q6(b)

Most candidates were able to gain at least two marks on this question, with many achieving a third, though fewer reached the maximum marks. Many candidates discussed the fact that cloning would be expensive and analysed the data effectively, noting that the most embryos were from cattle and cattle had the highest survival rate, though many incorrectly stated that cattle had the most live births, and lots mentioned the low overall success rate. Some candidates did well in supporting their points with data; although in many cases this was simply by stating numbers from the table without further processing which did not gain additional credit.

Question 7

This question focused on data obtained from sampling organisms in a river and the discussion of the effects of sewage on organisms that lived in the river environment.

Q7(a)

Lots of very good answers were seen to this question, with “wear gloves” being the most commonly provided correct response. A few candidates lost marks where they answered with vague or less appropriate suggestions such as “wear a mask/goggle” or “don’t stand too close to the river”, when the method involved standing in the water.

Q7(b)(i)

Most candidates were able to gain at least 2 marks on this graph question, particularly for correct scale use and plotting of the bars, with many also earning a third mark for labelling the y-axis as “number of organisms (counted)”; however, fewer candidates gained all 4 marks, with common errors including missing axis labels, especially on the x-axis where some assumed listing organism names sufficed, or for failing to start the scale at zero. Examiners saw some candidates drawing stacked or overlapping bars for their bar charts which were not creditworthy.

Q7(b)(ii)

There were a lot of correct answers were seen for this question, overall performance was very good, and the vast majority of candidates were able to access at least 1 mark. Where full marks were not scored the most frequent error involving division by 67 rather than the correct value, examiners also saw responses where candidates worked out one number as a percentage of the other rather than calculating the percentage change between the two.

7(c)

This question proved challenging for many candidates with most scoring two or fewer marks for the question. Responses scoring four or five marks were relatively rare and only achieved by the strongest candidates. Responses which used the data provided were the most common with many candidates gaining marks for describing the change in population of each organism and then linking this to the effects of the sewage. Many candidates also understood that the sewage would decrease the oxygen available in the water with the strongest candidates able to link this to respiration by decomposers. Many candidates associated sewage with eutrophication and algal bloom and provided detailed answers that did not correctly answer the question. Comments on the methodology or validity of the data were less frequently seen with only a few candidates discussing issues such as errors in identification or counting the organisms or introducing the idea that other factors could affect the populations. Where candidates did start to discuss validity, it was usually to state that there were no repeats done, very few linked this to decreased validity of the conclusion which was disappointing.

Question 8

This question was about the structure of DNA and the potential result of a single base mutation.

Q8(a)

Around half of candidates were able to correctly order the structures listed in the question in terms of size. A relatively common error was putting the cell as the smallest of the structures when in fact it was the largest. Swapping the order of gene and chromosome was seen frequently too among incorrect responses.

Q8(b)

This question gave the percentage of one base present in a section of DNA and asked candidates to calculate the percentage of a different base. This was a more problem-solving based maths question and it appeared that candidates either knew the correct approach and scored full marks or they scored zero – very few responses were seen scoring one mark. Many candidates left this question blank, suggesting uncertainty or lack of time, and a common incorrect answer was “83”, gained by subtracting the percentage given from 100.

Q8(c)

This question was challenging, and a wide variety of responses were seen. With marks spread evenly across all scores. While some candidates showed a clear understanding of the processes here others struggled to use the correct terminology, and this produced some muddled responses which did not score more than one mark. A relatively common misconception seen was that one base codes for one amino acid, this idea missed out the role of mRNA and tRNA completely and prevented these candidates from scoring more than one mark.

Question 9

This question was about the use of pesticides on crop plants including a comparison of biological and chemical pest control as well as asking candidates how a plant could be genetically modified to produce pesticides.

Q9(a)

In this question candidates primarily lost marks as statements given were too vague like “they eat the crop” and there was no further attempt to expand on this idea to form an explanation. Where candidates did score marks, this was usually for the idea of damage to leaves and a reduction in photosynthesis and growth or the idea that pests may spread diseases that cause the crop plants to die.

Q9(b)

Most candidates were able to gain two or more marks on this question, with many also securing a third, though fewer went on to achieve four or more marks. While many responses correctly included advantages such as biological control being longer lasting, vague or repetitive comments often prevented full credit. A common point raised was the idea that pesticides pollute the environment, but this was not linked to bioaccumulation or potential damage to organisms further up the food chain.

A fairly common misconception was that chemical pesticides would harm the crop plants themselves which showed a lack of understanding of the topic. The idea of specificity of biological control was generally well understood by candidates, as was the idea of pests developing resistance to chemical pesticides and these were frequently seen marking points in candidate responses. Many candidate responses focused exclusively on the advantages of biological control and the disadvantages of chemical pesticides. Where candidates took a more balanced approach, they were also able to gain marks for identifying that chemical pesticides were faster acting than biological control and also for stating that biological control does not remove all of the pests.

Q9(c)

This question proved challenging for candidates, with half of responses failing to score a mark. Where candidates did score most were able to gain at least two of the three available marks, often successfully describing the use of restriction enzymes and ligase, with some also referring to the creation of sticky ends. While many

candidates could describe the process accurately, they failed to apply it to the context of modifying a plant to produce a pesticide, instead mistakenly referring to growing bacteria, which limited their ability to access the final mark. Among responses which did not score marks a common issue was that many simply described genetic modification in general terms, such as mutation or gene alteration, without clearly explaining the method and so did not manage to gain credit. A confusion with ideas around selective breeding was often seen in non-scoring responses.

Summary comments

In future series candidates should:

- Make sure that they are fully familiar with all core practicals and key processes listed in the specification. Particularly when it comes to identifying variables in experiments described by the question.
- Understand what each of the command words listed in the specification requires, especially the difference between describe and explain.
- Read through each question carefully and be sure to answer in the context provided and not repeat information already given in the question.
- Ensure that they use key terms precisely and accurately
- Explore all aspects of data when presented with data for extended answer questions, especially understanding that quoting of data provided with no further processing or explicit comparison is unlikely to gain credit.

