

Examiners' Report/
Principal Examiner Feedback

January 2015

Pearson Edexcel International GCSE
In Biology (4BI0) Paper 2B

Or

Pearson Edexcel Certificate in
Biology (4BI0) Paper 2B

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Question 1

The comprehension was about COPD and proved challenging and discriminating in many items.

Part (a) was a gentle introduction and most did well, appreciating that smoking, dust, fumes, and genetic predisposition are causes of emphysema. Part (b) was equally gentle and many understood that the enzyme would kill bacteria and that this would help to reduce the risk of the disease. The calculation in part (c) was more challenging and only the better candidates obtained the correct answer of 2 268 000. Many calculated the answer to be 668 000 but were able to gain one mark if they showed evidence of using 80% in their working.

Most know that the correct biological term for air sacs is alveoli, though they struggled to suggest how damage to the alveoli could cause breathlessness. Weaker candidates tend to repeat the wording of the question and many confused ventilation with gas exchange. The best candidates appreciated how a reduction of surface area would impact on the diffusion of oxygen into the blood. Part (e) was a struggle for the weaker candidates who knew little about the role of memory cells and the rate of antibody production during the secondary immune response.

Finally, in (f) (i), candidates were able to comment on the thinning properties of mucolytic medicines but few went on to state how this would help treat the symptoms of COPD by creating wider airways that would allow more oxygen into the lungs. Candidates are encouraged to look at the mark allocation in questions. In (f) (ii), two marks were available which means that the examiners are looking for at least two distinct ideas. Again, the weaker candidates tended to their answer by repeating the question. Answers that stated that 'a change in oxygen concentration will help to reduce the symptoms of COPD' cannot be given any credit. The examiners rewarded candidates who made it clear that the oxygen concentration would increase and the resulting concentration gradient would improve the diffusion of oxygen from the alveoli into the blood.

Question 2

The plotting of the graph posed problems for most candidates. A common error was to underuse the area of the grid provided, though other errors included putting the independent variable axis and the dependent variable on the wrong axes, not using a linear scale for the independent variable, plotting points incorrectly and joining the points with scruffy lines.

Most appreciated in part (b) that increasing age increases the energy requirement but few were able to note that after the age of 25 there is a decrease in energy requirement. Part (c) was also challenging, with many referring to age rather than activity. Candidates are encouraged to use technical biological terms in their answers, so stating that muscles have to work harder with an increase in activity is not as credit worthy as stating that there is more muscle contraction. The better candidates appreciated that more energy would be required for respiration and that more glucose would also be needed.

Question 3

A surprising number of candidates seem unaware of the importance of nitrate ions in the manufacture of proteins that are needed for growth. However, a pleasing number recalled that nitrogen fixing bacteria live in the root nodules of legumes. Part (b) was more challenging, but it was pleasing to note that many stated that role of nitrifying bacteria in converting nitrite to nitrate. In part (c) (i) many candidates merely described the shape of the graph. These candidates appear not to understand the meaning of the command word 'explain'. The examiners rewarded students whose answers provided a biological reason for the shape of the curve and expected responses that discussed the increased kinetic energy that occurs with a rise in temperature and the consequent increase in the number of collisions between the enzyme molecules and the substrate molecules. Many descriptions occurred in part (c) (ii) and gained no marks. The examiners rewarded answers that provided a biological explanation for the decrease in the rate of urease activity. As such, the examiners gave credit for answers that used the term denatured and linked this to a change in the shape of the active site.

Question 4

Many appreciated that the net protects the salmon from predation by birds and seals and the better candidates also realised that it protects them from wild fish that would compete or could spread disease. General answers such as 'protect from predation' were not rewarded. These candidates need to be aware of the importance of using the stimulus material provided and being more precise in their answers. In part (b) there were many excellent answers that explained that there would be a decrease in growth because bacteria would consume oxygen in respiration during the decomposition of the waste. However, there were also answers that discussed the possibility of infections from the waste, or the erroneous role of sludge worms or sea lice in decomposition. In part (c), most candidates suggested the removal of the dead salmon but only the better candidates gave a reason such as to reduce the risk of spreading disease. The vast majority understood the term biological control and gave wrasse eating sea lice as the correct answer.

Question 5

Most candidates were able to complete the table correctly. Part (b) was well answered by most though the examiners did note that many candidates struggled to express their ideas in a succinct, erudite manner. In part (c), many candidates were able to provide at least two independent variables, the most common being water and temperature. Many stated the term 'location' which was not credited. In part (d) most appreciated that the seeds would germinate

but only the better candidates provided a reason. In part (e), most appreciated that lack of oxygen caused lack of germination in tube E but only the better candidates linked this to a lack of respiration.

Question 6

In part (a), most identified waste milk as the pollutant most likely to have the most severe effect on the river organisms but few gave an acceptable explanation that demonstrated that there would be more bacterial growth and more oxygen consumption. Many candidates, in part (b), wrongly made reference to the oxygen content in the river rather than 'other factors' as asked. The better candidates recognised that temperature, pollutant concentration, speed of river flow or the nitrate content of the pollutant are factors that could have an effect. In part (c), most candidates were aware that milk contains lactose and protein. Finally, in part (d), only the better candidates gained full marks by appreciating that raw sewage has the higher BOD because it contains more organic material and more bacteria, and that as a result there will be more respiration.

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