



Examiners' Report

Principal Examiner Feedback

January 2019

Pearson Edexcel International GCSE
In Human Biology (4HB0) Paper 02

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Question 1

Most candidates managed to achieve some marks for this question with a high majority gaining 5 or 6 marks. Those achieving lower marks generally gained them by knowing malaria is spread by mosquitoes, Bilharzia is caused by Schistosoma and gonorrhoea is sexually transmitted. Polio and typhoid were commonly incorrect and some students lost marks by either not drawing lines at all or for drawing two lines from one disease to different features despite the question clearly stating to draw one straight line from each disease.

Question 2

2ai: This was well answered with most candidates recognising that the student shouldn't be able to see the food. Those not gaining the mark usually wrote 'to make it a fair test' or that the student would 'know' the food.

2aiaii A number of students were unable to carry out a simple percentage calculation and although extensive working out was shown in many cases these often failed to extract the correct information from the details given and therefore omitted either the figure 160 or 200 in their workings. Some candidates added the response values incorrectly or divided the 160 by any other number other than 200. However, a large proportion arrived at the correct answer or illustrated clear workings where full marks were not awarded which did include 160 and/or 200 to obtain one or, more rarely, two marks.

2aiiaiii Most commonly marks were lost by candidates who did not distinguish clearly enough between the two experimental data sets e.g. making statements about the 'eyes closed' group rather than 'nostrils not covered' or by recognizing person 3 as different but not stating it as an anomaly.

2aiiaiv Marks were lost by some candidates repeating the same marking point e.g. same gender, same age. 'Same temperature' or 'storage temperature' and 'same type of eye cover' or 'nose clip' were common errors in responses although many candidates were correctly able to list three control variables as shown on the mark scheme

2b There was extensive incorrect use of terminology in the responses seen. Improve *accuracy* was particularly common and many students discussed errors rather than anomalies. However, on the whole, this was well answered by candidates who were able to identify reliability and calculation of mean for two marks.

2c Some candidates named sense organs rather than senses and others gave incorrect responses that listed different types of taste i.e. bitter, sweet etc. Most candidates scored the mark by stating 'touch' although others mentioned 'feeling' which was deemed too vague to award on its own. Several students gave 'hearing' or 'sensitivity' which failed to gain any marks.

Question 3

3a Responses often stated that urea was formed by ultrafiltration in the kidneys and many students went on to describe the production of urine indicating that a number of candidates had not read or understood the question. Irrelevant details about urea were also given such as its pH or what it was made up of which were completely detached from what the question was asking. Other candidates describe the breakdown or deamination of proteins rather than excess amino acids. More successful responses gaining a mark indicated an understanding that urea was produced in the liver although a fair proportion of candidates failed to mention by 'excess' amino acids which was essential for a second mark. Other candidates simply stated 'by the breakdown of amino acids' which was awarded one mark only although 'deamination' was mentioned often by better candidates, usually scoring three marks if seen in a response.

3a ii A very large proportion of students compared the properties of urea with only one other substance shown in the table rather than both. For example, 'urea is lower in toxicity to ammonia' or 'urea is more soluble than uric acid' without comparing them to the other substance in the table. This 'incomplete story' failed to gain marks although had students gone on to compare them to the other substance as well marks may have been awarded. Candidates were unable to link high solubility with water conservation and the majority failed to obtain this mark. It was also common to see students describing the properties of substances other than urea which did not meet the expectations demanded by the question.

3a iii Too many responses misused the term 'excretion' to describe the removal of urine from the body indicating a wide-scale misunderstanding of this term.

3b ii A fair number of candidates were misconceived into thinking that the concentration of urea determined whether the kidneys worked or not giving answers such as 'when the urea concentration was 100 the kidneys were working but when the concentration increased the kidneys stopped working'. These did not gain any marks. Many candidates were able to score a clear two marks although those scoring one mark generally obtained this for understanding that the kidneys regulated the urea concentration in the blood. Few students stated that the kidneys maintained the concentration of the blood but as the question was directed specifically to urea these were not awarded. Similarly vague answers such as 'the normal concentration of urea in the blood is 100 au' or 'when the kidneys are working the concentration of urea is low' or 'kidneys work best when the concentration of urea is low' were not given credit.

3c A very well answered question with most candidates using the correct terminology. A few incorrect answers included details about medicine or controlling diet or water intake

Question 4

4 Students often lost marks when discussing osmosis as the movement of water from a high to low concentration without being clear about what 'concentration' they were talking about. Others discussed 'water concentration' and failed to obtain marks. Some students also lost marks for focussing on just one or two transport processes. In a fair few cases, students correctly referred to a process but then completed their response by giving lengthy examples which were not asked for in the question. These were awarded one mark for reference to a transport process. Overall candidates gave clear, structured responses and many gained full marks.

Question 5

5a ii Common incorrect or insufficient answers here included 'filtering blood', 'prevents oxygenated and deoxygenated blood mixing' and 'pumps blood around the body'. Candidates also lost marks by giving vague responses such as 'prevents backflow to the atrium/chamber Y' which lacked the detail required for full marks.

5b Many candidates gave details such as 'the heart wont pump properly', 'tiredness' and 'fatigue' but failed to justify these with creditworthy by, for example, referring to a reduction in the rate of aerobic respiration. Other students stated that 'they won't be able to exercise'. Some references to anaerobic respiration and lactic acid were given and also to pressure changes although these were often vague. Many descriptions of the role of the septum were given which were irrelevant detail and therefore not awarded.

Question 6

6b Some students made it very unclear what enzymes they were discussing in their responses and insufficient details such as 'human enzymes are denatured below 70 °C' or 'enzyme activity decreases' without stating a temperature were not awarded. Although candidates recognised the plateau of the graph as the optimum temperature of the enzymes many preferred to state just one optimum temperature for this enzyme, mostly 60 °C, rather than the range of 60 °C to 70 °C that was clearly shown in the graph. Although this was not preferable, it was not penalised and students were awarded a mark for recognising this. The marking point most commonly missed was the lack of activity of this enzyme at body temperature despite this being strong evidence to suggest that the enzyme was not from a human.

6c There were many descriptions, rather than explanations, of enzyme activity above 70 °C where candidates described, quite correctly, an increase in activity, the plateau and the subsequent decrease. This lost students many marks. Candidates scoring less than full marks tended to mention the enzyme denaturing but then added no further details to access remaining marks.

There were few candidates that included the 'active site denaturing' and although the 'denature' mark was awarded, more detailed information was needed on what this actually meant to gain marking point 2. There were a number of one mark answers, the most common being the 'enzyme denatured' and 'the active site changed shape' although these answers failed to continue with an explanation but were often mixed with a description of what was going on e.g. because the temperature increased which was not credited. The few references to enzymes 'dying' or being 'killed' were rejected. Students should be discouraged from using these terms.

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