Pearson Edexcel

Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel International GCSE Level

In Human Biology (4HB1)

Paper 02

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1aii Most candidates gained one mark for their answer with grinding or chewing being the most common correct answer. Answers that failed to gain a mark included 'breakdown food' which was too vague and this was seen fairly often.

1aiii It was more common for students to gain one mark for their answer rather than the two marks allocated to this question. Often candidates repeated information e.g. adults have more molars and adults have more teeth both of which covered marking point one. There was little mention of wisdom teeth and where numbers of teeth were quoted in responses these were often incorrect. Many candidates attempted to describe adult teeth as permanent but weren't quite able to structure their answer clearly. These answers included details such as 'children's teeth can be replaced' or 'children lose their teeth' without adding further clarification. Interestingly, there were several responses that stated children's teeth were larger or softer than adult teeth.

1bi The majority of candidates were able to score full marks for their response by identifying either London or the North of England where most tooth decay was found. These answers were supported by an appropriate explanation. No mention of the other regions was seen although candidates that scored one mark failed to give an adequate explanation of why the region that they chose was likely to have more people with tooth decay. In these cases, students tended to just quote percentages that they extracted from the chart although failed to state that these percentages were either the lowest or highest in relation to dental visits. Other incorrect conclusions failed to use information from the graph but instead discussed health, living standards or diets in certain regions.

1bii There were less responses than expected that mentioned the presence of ridges or crevices although where these terms were present, they were inevitably linked to food being trapped. Often students appeared to misunderstand the term 'cusps' and linked these to either larger surface area or more food getting stuck. There were a few responses that stated the teeth were harder to clean although failed to mention why and these were not awarded. Students frequently failed to link larger surface area with more of the teeth being in contact with the food and, again, large surface area on its own gained no credit.

2a Student failing to score full marks for their table most often omitted the column heading for pulse rate preferring to give just the units (bpm) alone. This limited marks to 2 rather than the 3 if headings were complete. A small number of candidates drew bar charts or line graphs rather than a table as the question asked and these were not awarded any marks. On the whole, candidates performed well with most gaining full marks for completing a clearly drawn table.

2b There were some very vague answers to this question which was disappointing, and it appeared that some candidates felt that depth of detail was not necessary. For example, some responses mentioned taking the pulse rate at rest and added little more than repeat with each exercise. There were answers that included taking the pulse rate whilst sitting down which is the not the same as 'at rest' and didn't provide quite the detail necessary to award marking point one. Although most marking points were covered in the responses seen, the point most frequently missed was marking point 6 where many students failed to mention taking a rest between each exercise. Most candidates were able to describe how to take pulse reading, with using fingers on the wrist being more common than the use of a monitor.

2c Some candidates unfortunately missed out on a mark due to the way that they worded their answer. For example 'time of activity' could have been interpreted in different ways and lacked the clarity of responses that more implied 'duration'. Other candidates that were unsuccessful gave

factors such as age or gender, seeming not to realise that the investigation was carried out by one person. However, the majority of answers gained a mark with the most common being the duration of exercise.

2d Students answered this well with breathing rate being by far the most common correct answer. Some candidates failed to score by stating heart rate and either failed to associate this with pulse rate or did not read the question carefully enough. Other candidates gave a list of factors, despite the question only asking for one, with some factors included in the list being incorrect. This negated any correct response.

3ci Another well answered question where most candidates gained full marks. One mark responses tended to use the term 'messages' rather than 'impulses' and were, consequently, only awarded the second marking point.

3cii Again, despite the use of the term 'messages' most students gave good answers. Where full marks were not obtained, it was mostly for marking point two where candidates failed to construct their answer clearly enough to be awarded a second mark. Some students insisted on writing that light or the image is sent to the brain and some responses focussed on discussing an upside down which were both incorrect and failed to gain credit.

4ai The symptoms given by students were particularly varied and it seemed that guess work was at play in many cases. Details given include painful egestion, diarrhoea, constipation, redness in anal region and others that failed to score one mark. It was hoped that the students would engage with the information given in the passage to formulate a valid answer that linked with a nutritional deficiency of some kind although for many candidates this was not the case. Several responses were seen that repeated information given to them in the stem of the question. Although seen infrequently, the most common correct answer was 'nutritional deficiency' but other alternatives such as weight loss, fatigue and malnutrition were also awarded.

4aii Some students failed to mention that itching would transfer the pinworms to the hands or fingers although details on transferring the worms to other surfaces or people were generally clear. There were several responses that stated the infection would spread to other parts of the host body rather than to other people or surfaces. Few responses included information on ingesting pinworms for marking point three so most answers gaining full marks obtained these for providing a response that covered the first two marking points.

4b There were some responses that made an attempt to discuss the pH of the environment which did not quite meet the mark. For example, 'the small intestine has an acidic/alkaline environment' were not related at all to an optimum condition for the pinworms. There was no mention of lack of predators for marking point 3 although a good number of candidates gained full marks for showing understanding that the small intestine had plenty of nutrients for absorption by the pinworms and that it provided warmth.

4ci Most candidates gained the mark for correctly providing a definition of a nutritional deficiency although some lost out by giving details such as 'poor diet' or 'the body cannot absorb nutrients'.

4cii It was common for students to name a nutrient that might be lacking rather than give the name of an actual nutrient deficiency although these were given the benefit of the doubt despite not being a preferred answer. Most often, protein deficiency was given in these cases but better responses included anaemia, scurvy and kwashiokor.

4ciii There were a fair number of candidates that repeated the stem of the question in their answer which failed to gain a mark. These candidates were aware that the pinworms would feed from the nutrients supplied by the host but then simply stated that this would lead to a nutritional deficiency. More thought through answers went on to state, for a second mark, that there would be less absorption of nutrients (into the blood).

4d Some candidates mentioned that the use of transparent tape would cause a colour change to indicate an infection which was not awarded. There were many responses that failed to state clearly that eggs or pinworms would stick to the tape and although several of these were close to gaining a mark the details given were too vague to award.

4e There were several responses that suggested the patient should be isolated or not touched which were rather extreme. Others mentioned that sexual intercourse should be prevented or repeated a marking point by stating that clothes *and* towels should not be shared. Others imply mentioned personal hygiene without elaborating or gave 'antibiotics' rather than medication indicating a lack of understanding or knowledge on the role of antibiotics. Interestingly, there were several mentions of bacteria despite the passage focussing on a parasite. However, many answers gained two marks and these nearly always included washing hands.

5c Students lost a mark by stating that the infection would enter the blood/body rather than the pathogen although most gained a mark for giving details that implied damage to skin and/or blood vessels. Some candidates included information about skin acting as a barrier to prevent the entry of pathogens but did not relate this to the context of the question by stating that the barrier was damaged allowing the entry of pathogens.

5d There were some very thorough, well-structured responses for this question making it clear that many candidates were sound in their understanding of blood clotting. A good level of scientific language was used in most cases and used correctly. Where students lost marks it was generally for a lack of detail rather than incorrect science with the most common marking point missed being the formation of a mesh to trap red blood cells. Although most candidates mentioned the mesh, some failed to state that it trapped red blood cells. There was also little mention of a scab or clot being formed in answers seen but other marking points were covered well. There were few answers that were confused on the cascade of events occurring in blood clotting and a low proportion of candidates got the conversion of substances the wrong way round e.g. thrombin to prothrombin or fibrin to fibrinogen.

6ai Some candidates lost a mark for repeating the same marking point in their answer. For example, a few responses stated that as age increases the number of deaths is higher and then gave a second statement about people at aged 85 being infected more. However the data in the table was analysed well with most students identifying an increase in infections with age and a larger number of males than females infected.

6aii Many candidates were unsure of calculating a ratio and the variation in the calculations seen was vast with a fair number showing the correct figures used in an incorrect sum. A large number of candidates added together 416.6 and 1.8 rather than divided one by the other and others rounded up the value of 231.4 to 231.5 and even 231.6 which failed to gain a mark for the final answer. In these cases, students were generally awarded a mark for showing the correct workings. Some responses gave the correct figures for the final answer but presented the ratio in the wrong order i.e. 1:231.4. There were few students that did not express their answer as a ratio giving just 231.4 as

a final answer. Again, most of these displayed correct working out clearly and were awarded one mark for this.

6aiii Candidates were probably equally as successful at gaining marks for this question as what they were for the previous. There were a fair number of responses that gained one mark for showing correct working that included the correct values although these generally failed to multiply the answer of 63.1 by 53 to give the number of people (in a population of 53 million) between the ages of 65 and 74 who died of S.*aureus*. In other responses students carried out the correct calculations but then rounded the final figure incorrectly. In this case the final answer of 3345 was not awarded.

6aiv Candidates scored well on this item with most responses referring to antibiotic resistance for 2 marks. There were some vague answers such as 'it can be transferred' which really doesn't distinguish it from less harmful. The idea that MRSA can be transferred *easily* would have been preferable. A common incorrect answer was that MRSA still causes a large number of deaths. Again, these responses were not supported with the necessary details to gain a mark. Others repeated information given in previous answers such as 'it still kills a lot of people over the age of 85' or that 'it kills more males than females'.

6bi Names of actual antibiotics, particularly penicillin, were commonly seen in responses. Some candidates thought that this was produced by bacteria and provided the answer 'penicillin bacteria' which was not awarded. Other incorrect responses included plants, antibodies and even painkillers such as paracetamol. However, a good number of candidates scored one mark for correctly stating a source of antibiotic and these answers covered the range of alternatives shown in the markscheme.

6bii There were some excellent responses to confirm that some candidates were well familiar with aseptic methods and although many students gave their answers in the context of MRSA and S.*aureus* the major points were mostly covered in most responses. Answers that failed to gain marks discussed methods that involved groups of infected people in clinical trials or use of animals e.g. rats and although many of these were logical albeit unethical in their content, no aseptic method was mentioned. There were several discussions about repeats, calculating averages, use of controls and safety which were irrelevant.

7aii There were a fair number of responses that associated the motor area of the brain with memory or thinking and others that gave a list of functions such as vision, intelligence and hearing. These were not awarded and neither were those that mentioned involuntary movement. Some answers were worded poorly – 'sends instructions to effectors' or 'sends messages to parts of the body' were seen fairly often.

7b There were some really thorough responses to this question which implied excellent understanding of the cause of Parkinson's disease. Many students were able to gain full marks for detailing the role of dopamine and how a lack of this neurotransmitter affects nerve transmission and movement. Consequently, marks were gained for recognising that less dopamine would be produced leading to less or random impulses to effectors and resulting in the tremors characteristic of Parkinson's. Candidates that failed to score full marks generally omitted information about less impulses being transmitted or just simply stated the symptoms of the disease. Some candidates recognised that less dopamine would be produced for one mark but then completed their answer with vague details such as 'leading to the symptoms of Parkinson's disease' without expanding on this information.

8 It appeared that candidates were familiar with the term 'hydridoma cells' although were less sure of how they were formed. Some responses stated that antibodies or lymphocytes were fused with cancer cells with no mention of lymphocytes from the *spleen*. Others simply stated that lymphocytes or antibodies were *mixed* with cancer cells or that the antibodies themselves were fused with the cancer cells - both not enough to gain a mark. Candidates failed to gain a mark for stating that a pathogen (rather than antigen) was injected into a mouse and other responses incorrectly gave information about a general immune response without structuring their answer in the context of the question.

9bi Interpretation of the pedigree analysis was carried out well by students who identified the genotype of person 1 as Nn. There were few incorrect answers here which covered the alternative options, NN and nn.

9biii Student responses to this question were extremely good providing clear diagrams, in most cases, to support clearly structured answers. Most candidates scored full marks. There were a number of candidates that assumed PKU was sex-linked and proceeded to construct genetic diagrams to try and show this. Although in some cases the alleles given were correct no mark was awarded if they were shown linked to the sex chromosomes. Other responses drew genetic diagrams but failed to show the linkage or that did not identify nn as the person with PKU. These were careless oversights that lost the students marks.

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