



Examiners' Report
Principal Examiner Feedback

November 2021

Pearson Edexcel International GCSE
In Human Biology (4HB1) Paper 01

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The overall performance was very varied with some outstanding candidates but unfortunately, there were a number whose understanding of human biology was very limited. Many candidates found difficulties with the calculations. It would help if working of the solution was always written down in a logical and complete way. If the derivation of the answer cannot be followed it is difficult to award any marks in the absence of a correct final answer. For those candidates who are unable to confine their answers to the allotted line space but must continue elsewhere in the answer booklet guidance should be given to ensure they make it clear as to where that extended answer is to be found.

Question 1

(a)(i) Most candidates were able to identify that two columns were required and gave suitable headings. Very few candidates scored the third mark point. The reason being that they wrote down the results in the order that they were presented in the examination paper. The appropriate way would be to order the results either from low to high or vice versa.

(a)(ii) Few candidates recognised that their investigation had only been carried out on a single occasion and that there were no repeats.

(a)(iii) Not many candidates scored a mark here. Many misinterpreted how the results of the experiment were gathered, thinking that bubbles had been counted and therefore explaining how some bubbles could have been missed or that the bubbles could have been different sizes. Quite a few candidates confused accuracy with reliability and mentioned repeat trials. Few made any reference to the fact that the results obtained depended upon the judgement of the student.

(a)(iv) This was generally well answered, with lots of candidates scoring marks for suggesting the use of a gas syringe and measuring the volume of oxygen. Most candidates mentioned repeat trials despite not having mentioned their absence in answer to (a)(ii).

(b)(i) Most candidates recognised that the sample kept at room temperature was the most active.

(b)(i) Whilst many candidates correctly identified this as a control, a few referred to it as a 'controlled experiment' which is not acceptable. All investigations should be 'controlled'.

(b)(iii) This question saw lots of candidates relate the more acidic pH to denaturation of the enzyme, with stronger responses referring specifically to the shape of the active site changing. Vague references to 'denaturation' were not considered to be worth a mark and specific reference to the change in shape of the active site was required. Many candidates referred to a reduction in the rate of the reaction. Again, this was not considered to be worth a mark, instead, specific reference to a reduction in the rate of the activity of the enzyme was required. Too few candidates made any reference to the optimum pH.

Question 2

- (a) The only issue here was the use of the word particles or substances instead of molecules.
- (b) Again, lots of candidates were missing marks for not using the word molecule. Not too many mentioned protein carriers and whilst many referred to the need for energy, few qualified their answer with reference to ATP.
- (c) Most candidates got two marks, though there were some references to movement of water from a high to low concentration instead of water potential.

Question 3

- (a) Diagram B showed a phagocyte and so the function is to engulf bacteria and not produce antibodies as stated by many candidates
- (b)(i) Many candidates connected prothrombin to thrombin, and fibrinogen to fibrin. However, this was often in the middle of a jumbled answer which lacked a sequential order. Few candidates referred to the release of thromboplastin/thrombokinase/enzyme from disintegrating platelets. Too many suggested that platelets 'secreted' the enzyme which is clearly an inappropriate use of the term. Not too many candidates referenced calcium ions. Few candidates were able to distinguish between a clot and a scab
- (b)(ii) Candidates understood the role of blood clotting, with most correctly identifying its importance in the prevention of excess blood loss. There was also a general understanding of how it prevents the entry of pathogens into the body but there was a less clear understanding that this would prevent infection of the wound instead, there were rather vague references to disease.

Question 4

- (a) Identification of the pancreas proved to be challenging for several candidates. Some hedged their bets by putting lines in between structures or on the very edge of structures. Candidates should be advised that where their answer is not clear, they will not be awarded a mark. Additionally, although the question asks for a 'labelled line' to be drawn, many chose to disregard that instruction and put the letter directly onto the diagram. It was often difficult to decipher exactly to where the letter referred. Consequently, no mark could be awarded.
- (b) Many candidates were able to make the connection between flattened villi and reduced surface area for absorption, with stronger candidates linking this to reduced calcium absorption (and weaker candidates simply referring to nutrients). Not too many mentioned calcium passing from bone, but quite a few did link calcium deficiency with weakened bones/less dense bones.
- (c) This was well answered, with lots of candidates scoring two marks. Unfortunately, a common omission was to make a statement that the large intestine is the site of water absorption but then fail to link that statement to the fact that less water would be absorbed as a result.

Question 5

(a)(i) Candidates really struggled with this question. Many candidates described breathing through the apparatus, without referring to inhalation or exhalation and individual tubes. Very few candidates mentioned replacing the limewater in between exhaling and inhaling. Another issue was candidates confusing the measurement required here. Many went with measuring the intensity/cloudiness of the limewater or stating that 'one tube will go cloudy whilst the other won't'. Very few candidates mentioned recording the time taken for this change, with even fewer stating that this time should be compared between inhaled and exhaled air. Many candidates gave descriptions of the more standard two tube version of the apparatus rather than describe the use of the one in the diagram.

(a)(ii) Most candidates stated that exhaled air contains more carbon dioxide than inhaled air, with quite a few relating this to the faster colour change in the limewater. Not too many linked this to respiration. Weaker responses focused on the cloudiness of the limewater rather than the time taken.

(b)(i) Often, when the correct letters were identified candidates gave the volumes 1dm^3 greater than the correct figures because of a lack of understanding of the volumes recorded on the trace.

(b)(ii) Many candidates could see that the volume was higher for this part of the trace, but they simply used the word 'breathe' instead of inhaled and exhaled. Not too many achieved two marks here. Where candidates did use the terms 'inhale' and 'exhale', they were often in the wrong order.

Question 6

(a)(i) Quite a few candidates seemed to struggle with the comparative aspect here, without too many scoring three marks. The question asked for trends though many candidates just quoted figures at specific times to illustrate their answers which was not acceptable on this occasion. Candidates must learn to distinguish between what is required when describing trends and what is required when describing the graph. Not many referred to the fluctuations seen on the graph.

(a)(ii) Many candidates correctly identified ultraviolet light as causing the effect but did not refer to the layer of dividing cells found in skin which would undergo uncontrolled cell division. Candidates must appreciate that the division is uncontrolled rather than necessarily rapid. There were lots of references to mutation in the DNA which didn't score a mark.

(b)(i) Candidates clearly found this question challenging. Many candidates could identify 17 and 48 for one mark, but they weren't sure what to do with the difference between these numbers.

(b)(ii) Candidates fared a little better on this calculation, with many scoring maximum marks. A casual approach by some candidates meant that they put the incorrect number of zeros in their answer.

Question 7

(a)(i) The majority of candidates were able to correctly sequence mitosis though the commonest error was to transpose metaphase and anaphase.

(a)(ii) There were a variety of answers, with some candidates confusing metaphase with anaphase, and others confusing mitosis and meiosis. There were some excellent drawings, in some cases showing spindle fibres and clearly indicating the equator.

(b)(i) Most candidates correctly identified A as the correct answer.

(b)(ii) Candidates found this question challenging becoming muddled with the conversion from cm or mm into micrometers. Many candidates measured the distance in cm rather than mm which would have made the calculation easier.

(c) Most candidates scored full marks here, with weaker candidates stating that the cells produced were identical without referring to genetically identical. A number failed to mention the term 'diploid' and others referred to the daughter cells as having a full set of chromosomes which was too vague an answer.

Question 8

(a)(i) Candidates struggled with this question and many missed the arrows and the upside-down image on the retina. Many candidates failed to show refraction at the lens and others failed to show the rays of light crossing in the vitreous humour.

(a)(ii) Many candidates made a correct reference to the impulse being transmitted to the brain. Still far too many continue to use inappropriate terms such as 'signals' or 'messages' which are not considered to be worthy of any credit. Far fewer made any reference to the fact that the impulse is transmitted from the retina, with many discussing the reception of light by the rods and cones and conversion into an impulse, neither being the function of the optic nerve.

(b)(i) Answers were mixed with many thinking that the image would be formed in front of the retina or on the fovea or even in front of the lens.

(b)(ii) Candidates found this question challenging, with lots of responses along the lines of 'lens too convex'. Quite a few candidates confused concave and convex.

(b)(iii) Quite a few candidates simply stated wearing glasses that focus light onto the retina, without giving any detail on how this could be enabled. Of those who correctly responded that a convex lens would be required, few went on to state that this would cause the rays of light to converge onto the retina.

(c) Quite a few candidates scored one mark for either infection or rejection. Many weaker responses centred around blindness after the operation or difficulty in finding a donor.

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