



Pearson
Edexcel

Examiners' Report
Principal Examiner Feedback

Summer 2024

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

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2024

Publications Code 4HB1_01_2406_ER

All the material in this publication is copyright

© Pearson Education Ltd 2024

It was noted that candidates performed better on this paper in answering questions that demanded mathematical understanding, though calculations were less complex on this occasion. A particular area of weakness was in the ability of candidates to describe experimental detail. It seemed clear that many candidates had not been exposed to practical work. It is appreciated that this may be challenging for some Centres to deliver and so, questions are designed so that candidates can express themselves in a way that will secure marks if they have at least covered the way in which an investigation could be carried out in a laboratory situation. Particular apparatus should be familiar to candidates if only through diagrams and an understanding of how such apparatus is used needs to be instilled into candidates.

Question 1

Most candidates were able to correctly identify a sensory neurone and an axon. The parts of the skin were well known but one significant mistake was to identify the capillaries as 'shunt vessels'. In answer to 1(b)(iii) the role of sweat in evaporating, thereby taking away heat, was well documented by the majority of candidates. The answers to part (b)(iii) often gave the role of 'insulation but then failed to explain how this was achieved. There were a number of irrelevant functional answers given, such as 'energy storage' and 'protection of organs' A number of answers were characterised by vague statements such as 'keeps the body warm'

In answer to part (c)(i), most students understood the meaning of hazard and got the idea of burns to the skin.

The most common incorrect answer was 'frostbite', and some seemed to think that putting hands into hot/cold water could cause the person to go into shock.

Part (c)(ii) caused problems for candidates, illustrating the point made about exposure to experimental/investigative work. Quite a number of candidates approached this question from the wrong perspective and described ways to prevent the water in the beaker from being too hot to begin with (e.g. don't use boiling water/reduce the temperature of the water used). Not many realised the water was already in the beaker or suggested using a thermometer to measure the temperature of the water to make sure it was safe. Some candidates suggested leaving their hand in the water for shorter periods of time or wearing protective gloves.

In answer to part (c)(iii) receptor and temperature receptor were the most common. Sensory neurone appeared quite a lot.

Question 2

The graphs were generally well plotted. Quite a few candidates still use strange scales which is then time consuming to check. Making full use of the graph paper seems to be taking priority over choosing a scale which allows better accuracy of plotting.

Pleasingly, hardly any line graphs were seen. Candidates could improve their answers in many cases by simply using a sharp pencil and a ruler.

Some candidates found part (b) a lot harder than it would appear. It proved to be quite a discriminating question. The first blank was often answered as stationary and also the second blank, stating growth instead of exponential.

Question 3

Part (a)(iii) was another high scoring question. Most students produced words which were recognisable as nucleus. Quite a few wrote DNA.

The majority answered part (a)(ii) correctly. Some answered 'mutation/ chromosome/ DNA'.

In response to part (a)(iii) there was quite an array of answers from 'body dysmorphia to fatigue'. Quite a few blanks were noted. Many confused the condition with sickle cell anaemia. A minority wrote the correct answer. Some students confused "limb" and "digit" but the rest of their answer made it clear that they meant fingers/toes.

The majority correctly wrote 'heterozygous'. A few went for 'carrier' in answer to part (b)(i).

There were some excellent answers to part (c). Candidates showed a good understanding of DNA structure. Some candidates gave valid pieces of detail but were outside of the Specification content.

There were vague references to base pairing rules. There were also lots of references to descriptions of nucleotides (deoxyribose sugar, phosphate group, nitrogenous base, etc.) and phosphodiester bonds which went beyond the scope of the question.

Question 4

Many candidates found question (a)(i) challenging, with only a few perfectly correct answers. This question again, illustrates the point made at the beginning of the report of candidates' lack of knowledge and understanding of experimental work. Very few knew the correct setup. Quite a few candidates understood that the long tube enters the limewater and the short tube doesn't. A large number of candidates drew one boiling tube only, with two tubes connected to one mouthpiece. Many candidates merged all the four pieces of glass tubing from the two test tubes, prior to reaching the mouthpiece.

'Sterilise equipment' was a common but too vague an answer to part (a)(ii). Quite a few recognised the need to sterilise the mouthpiece or use a new one for each person.

Many candidates mentioned gloves/goggles which are not appropriate for this experiment..

Quite a few had the idea of gentle breathing to avoid swallowing the limewater.

'Time of exercise' was probably the most common answer to part (b)(i).

'Surrounding temperature' most common wrong answer. Many candidates just said 'time' or 'temperature'.

Energy 'produced' still appeared a lot. There were some excellent explanations and the understanding of lactic acid breakdown was well explained by those who were familiar with it. Some candidates missed aerobic when describing respiration. Quite a few referenced higher heart rate when breathing rate should have been the focus.

Question 5

There were a number of high scores in answer to part (a), but some answers were very muddled, just gaining the generic marks e.g. water bath. A considerable number didn't read the question and just embarked on a description and explanation of the graph.

Most candidates scored marks for controlling the volume/concentration of the enzyme/substrate.

Not many candidates scored the first marking point as they began with the enzyme in the water bath and then added the substrate afterwards. There were lots of relevant reactions included for a description of an appropriate reaction.

There were some excellent and concise answers to part (b) that gained full marks in many instances. There were numerous references to increased energy rather than kinetic energy and there were a few references to enzymes denaturing at low temperatures.

Question 6

Parts (a)(i) to (iii) were simple calculations and the majority of candidates scored maximum marks. However, there was still a number who left the answers completely blank.

There were lots of detailed descriptions of the double circulatory system in answer to part (b) and the passage of blood through the heart and to the lungs and back again. Unfortunately, the only credit many candidates could be given was for blood vessel/naming a blood vessel and then stating that the blood carried glucose/nutrients/carbon dioxide.

Very few candidates mentioned the plasma and even fewer that substances were dissolved in the plasma. Not too many referenced red blood cells, instead stating that oxygen is carried by the blood. There were very long, detailed responses but just answering the wrong question.

In answer to part (c) some had no idea what to write here but many gave excellent, to the point answers. There were quite a few who referenced active transport and osmosis. There were also references to bacteria having a high SA:V ratio.

Question 7

Answers to part (a) were generally good, but it was also quite a discriminating question. Many didn't express themselves well enough to score full marks.

Candidates tended to score the first point, (though there was confusion between external and internal intercostal muscles, not something candidates are expected to know). Many candidates stated that the diaphragm contracts, but didn't say it flattens (instead saying it moves down). There were lots of good explanations of volume changes/pressure changes relating to marking point four but others were far too vague to score a mark, not even referring to the lungs.

Quite a number of candidates in part (b) said it has receptors which attach to hormones.

A challenging question for most students. Some knew it perfectly and explained it impressively. Some said it helped fight off cancer cells, or it has a role in preventing atherosclerosis. There were numerous blanks compared with most other questions. Some candidates did state that chemoreceptors detect changes in pH/carbon dioxide levels. Weaker candidates saw chemo and thought of chemicals or chemotherapy. For the second point there were some correct references to adjustments to heart/breathing rate, but not many. Quite a few candidates just stated that nerve impulses are sent to the brain.

Many candidates could accurately name the volumes in questions (c)(i) to (iii). It was the vital capacity that caused the most problems.

Question 8

Issues that arose in answering part (a)(i) included large molecules or particles as incorrect answers. Most candidates understood the idea of filtering but several mentioned screening which was in the question. Many candidates found part (a)(ii) challenging thinking it was for cleaning the tanks, keeping sludge from blocking pipes. Many candidates referred to aerobic respiration or aerobic bacteria and respiration but didn't explain that the air provided contained oxygen.

In answer to 8(b)(i) some candidates had the right idea, but used phrases such as 'plants need them to be healthy' not saying what and why. Some talked about making proteins but not specifically growth of plants.

Question 9

Few candidates scored full marks in answer to part (a)(ii). The first two points were fairly common. Not many candidates referred to an immune response but many did give good descriptions of how lymphocytes release antibodies that bind with the antigens on non-blood group O cells. Many candidates referred to blood group O having antibodies A and B, rather than anti-A and anti-B antibodies. Many candidates did reference agglutination (though they could have said agglutination of red blood cells which would have been preferable).

Many candidates found part (b)(i) very challenging and achieved no marks but some wrote excellent answers, explaining it very clearly.

A significant number of candidates could explain why males have a higher probability, though unfortunately, a sizeable number thought it was a sexually transmitted disease.

Part (b)(ii) caused few problems.

