



Examiners' Report Principal Examiner Feedback

Summer 2025

Pearson Edexcel International GCSE in
Human Biology (4HB1) Paper 02R

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 2025

Question Paper Log Number P74628A

Publications Code 4HB1_02R_2506_MS

All the material in this publication is copyright

© Pearson Education Ltd 2025

The progress made by candidates concerning the answering of maths related questions appears to have continued for this series. Candidates are reminded that it is in their interests to always show their working. Candidates still require much more practice with the drawing of diagrams and apparatus. A minority, unfortunately, continue to use very blunt pencils and inappropriately use free hand when trying to draw straight lines. Label lines often fall short of their destination leaving the examiner to guess where they should terminate, which is not done. There is still the issue of many candidates failing to concentrate their answers on what is actually asked rather than including irrelevant information.

Question 1

Most candidates failed to identify the long bone correctly. They need to be advised that 'femur' and 'humerus' are not types of bone but actual bones. Most candidates scored maximum marks for completing the tick box question but, despite the question stating, 'put one tick', a number still insisted in putting two or more ticks on one line. In answer to part (a)(iii), many candidates failed to mention that the blood vessel takes away waste products as well as bringing oxygen/nutrients to the bone.

Part (b) was well answered with most candidates scoring full marks for both sections. The commonest mistake was to identify tendons as ligaments and to transpose contracts and relaxes. The simple calculation was nearly always completed correctly.

Question 2

Part (a) was generally not very well answered; few candidates recognised the ER as the correct answer. The order of mitosis was generally well known though Y and Z were sometimes confused. The answers to part (b)(ii) were usually correct though some candidates did talk about the repair of cells, which was not accepted.

Most candidates gained two marks providing clear answers. A common mistake was not to make comparative statements.

Question 3

The quality of the drawings was very varied; however, most candidates drew a representation of a motor neurone and labelled it correctly. A common mistake was to draw an incomplete neurone. Overall, the quality of most diagrams was poor. It is a skill that seems to be increasingly neglected. A small number of candidates drew a relay neurone rather than a motor neurone.

The answers to part (a)(ii) were generally acceptable. Candidates should be encouraged to use the term 'nerve impulse' rather than any other terminology. It is also useful to be familiar with the term 'transmits' rather than the variety of euphemisms that were seen.

Most candidates gave a good description of the method and gained all six marks. Marking point one was rarely seen despite it being clearly shown in the diagram.

With this type of question, candidates should be encouraged to make a brief plan of their answers before committing to their accounts. The failure of many candidates to do this led to some of the accounts not necessarily following a logical sequence.

Most candidates recognised that the measurement on the ruler or the reaction time was the independent variable, though some candidates were not particularly clear in their references to the measurement. Some candidates found difficulty in expressing the point about the independent variable being discrete or not continuous, a lack of knowing the correct terminology penalising some candidates.

The calculation of the reaction time caused few problems for the majority of candidates.

Question 4

In their answers to part (a), a high number of candidates failed to quote the figures for the decrease. Some decided to state what happened year by year despite the question asking for the trend. Candidates must understand that the trend is the overall picture despite variations within that overall picture.

Most candidates were able to calculate the ratio correctly.

The answers to part (a)(iii) were generally poor. The question was seeking explanations for the incidence of lung cancer in people who had never smoked. Whilst some candidates recognised that air pollution and passive smoking were contributory factors, few candidates were able to score full marks.

The majority of candidates recognised tar as being the carcinogenic component of cigarette smoke, but a sizable number thought that it was nicotine or just put the term carcinogen.

Spellings in part (b)(i) were an issue. The term bronchiole is similar to the term, bronchus, but they refer to different structures. Hybrid spellings were not accepted and candidates must be alerted to the need to learn how to spell the word correctly.

The word alveolus elicited a variety of spellings. Since this term can't be confused with any other, apart from alveoli, which was acceptable, it was easier to award the mark.

The majority of candidates gained four marks for this question giving good accounts of the damage to the alveoli and the consequences of this damage. A common mistake was to refer to less oxygen without directly stating less oxygen passing or being absorbed into the blood.

Question 5

Most candidates identified that a higher concentration gradient would lead to an increase in the rate of diffusion. Marking point two was seen very rarely.

The majority of candidates realised that Benedict's solution was the reagent used, there were however, a variety of spellings with a few being hybrids of biuret reagent.

The variety of additional apparatus that was seen in answers gave the impression that this particular experiment is not performed in a number of centres.

The diagram was challenging for the candidates. A small minority of candidates fully immersed the Visking tubing in the water in the boiling tube. There were some inaccurate drawings of boiling tubes which could not be given credit.

The majority of candidates were able to identify the villus/villi, though not necessarily spell the term correctly.

Many candidates gained three marks, with some identifying all of the adaptations and linking these to suitable explanations. Some candidates listed some adaptations but did not explain the significance of these.

Question 6

The majority of candidates were able to explain the meaning of the term phenotype, though not always in the most concise of ways.

Most candidates identified that a mutation could cause a recessive allele which caused cystic fibrosis. Many also recognised that individuals would need to be homozygous recessive to have the condition.

The answers were often vague to part (b)(ii) and as such did not always gain full credit. Some candidates clearly did not know the effects of cystic fibrosis and gave answer relating to coronary heart disease or general illness.

Most candidates, in answer to part (b)(iii) identified that the parents would be carriers or heterozygous with some then identifying that the child would inherit a recessive allele from each parent. Some showed this inheritance on a Punnet square to support their description.

Question 7

The majority of candidates correctly identified amylase as the enzyme though there were a significant number that stated it was maltase or carbohydrase. The latter term should be used as a general term for carbohydrate digesting enzymes rather than as a specific enzyme.

Many candidates gained the first marking point for recognising that the enzymes are immobilised on the test strip. Some candidates gave excellent accounts of the enzymes involved and exactly how this leads to a colour change on the strip. Some candidates showed a lack of understanding of the use of test strips.

The majority of candidates recognised that it is the pancreas that secretes insulin though again, there were some interesting spellings.

Most candidates recognised the idea of an immune response, fewer linked this to the idea of the insulin acting as an antigen.

Most candidates gained maximum marks for this question, with the most commonly awarded marks being the first two points. However, there were many confused

descriptions of what is involved in the process and a lack of use of precise and correct terms.

Question 8

The majority of candidates recognised that the skin is the main barrier though some correctly mentioned cilia. A few stated that condoms were a barrier. The passage is all about the workings of the human body so, this answer is incorrect.

Many candidates recognised that the role of chemical barriers is to kill the pathogen.

The majority of candidates gave a clear account of phagocytosis.

In answer to part (v), most candidates gained one mark for the idea of complementary antibodies; however, they did not always go on to say that these bound to a specific antigen.

Many candidates were able to give good descriptions of both natural and artificial passive immunity. A common mistake was to link artificial passive immunity to vaccination. Some candidates confused passive immunity with active immunity.

Most candidates were able to calculate the number of antibiotics correctly. The calculation they used was different from the expected method.

In their answers to part (b)(ii) many candidates recognised that the precautions taken were to reduce the likelihood of the investigator becoming infected or that the bacteria could be transmitted more easily if the precautions were not in place.

Most candidates gained two marks with their answers to part (b)(iii). Some gave excellent accounts of how antibiotic-resistant populations of bacteria develop.

