Examiners' Report
Principal Examiner Feedback

Summer 2017

Pearson Edexcel GCSE
In Biology (5BI1H) Paper 01

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Paper Introduction

The inclusion of the 6 mark questions to test the quality of written communication, and the ability of candidates to communicate science effectively is steadily improving.

The aim of the paper is to test the candidates' knowledge across the specification. The paper is designed to enable as many specification points as possible to be assessed, thus enabling the candidates to be able to communicate their scientific knowledge across a range of topic areas. In addition, the candidates are also expected to be able to apply the knowledge they have gained to new situations.

Both quantitative and qualitative data is included for candidates to interpret and evaluate, mathematical skills such as the calculation of means are included to ensure that candidates are able to deal with data effectively.

Approximately 35 - 40% of the marks are awarded for assessment objectives, including the recall and communication of candidates' knowledge of science.

Approximately 35 - 40% of marks are awarded for the application of scientific concepts and skills, including those in practical and other contexts.

Approximately 25-28% of marks are awarded for the ability of the candidates to analyse and evaluate evidence, and make reasoned judgements based on scientific evidence.

The paper was designed to test this range of skills, and it is pleasing to note that candidates are improving in their ability to communicate science effectively. This was particularly evident in the 6 mark questions, which are now attempted well, with the vast majority of candidates scoring marks on this style of question.

The genetics question on the paper was answered extremely well, with the majority of candidates able to complete a correct genetic diagram. Knowledge of the build-up of thick sticky mucus as a symptom of Cystic Fibrosis was answered well although there was still some confusion about the role of the pancreas in the secretion of enzymes which can be blocked due to excess mucus.

Candidates showed a good understanding of both natural section and eutrophication scoring consistently well across these questions. The knowledge of the four main categories of drugs and their effects on neurotransmission was impressive.

The paper was well accessed across all of the mark ranges, showing that candidates were well prepared for the paper. Marks were often lost due to the candidate misreading the question and therefore going down the wrong path. This could be addressed by candidates highlighting the key words in the question, to focus their attention.

5BI1H_01_Q01aii

Generally this was well accessed with most candidates able to identify that it was the build-up of mucus. The linking of this to the increase in lung infections due to pathogens being trapped or the cilia being unable to function was often missed.

Examiner Tip

Ensure that you read the entire question. This was not just about the symptoms of Cystic Fibrosis but why this caused an increase in lung infections.

5BI1H_01_Q01aiii

Most candidates were able to identify that it was the enzymes that were blocked but many confused the pancreas with the stomach or large intestine so lost the second marking point.

5BI1H_01_Q01b

Candidates are now very capable of completing a Punnett square but they often confuse homozygous and heterozygous and so end up with the incorrect gametes. Heterozygous means they have a dominant and a recessive allele.

Examiner Tip

Only put one allele in each box this will enable you to interpret the Punnett square correctly.

5BI1H_01_Q02aii

In this case many candidates lost marks due to incorrectly reading the information off the graph. The simple subtraction was calculated well but often with incorrect data so could not be awarded the mark.

Examiner Tip

Make sure you read the information from the correct lines on the graph.

5BI1H_01_Q02aiii

Most candidates were able to give a reason for the reduction in the number of people diagnosed with HIV although a few confused this by talking about better treatments. A treatment for a disease does not affect the contraction of the disease. Just mentioning improved contraception also does not answer the question as taking the contraceptive pill would not affect the number of people contracting aids.

5BI1H_01_Q02aiv

It was very pleasing to note that most candidates knew that it was the transfer of bodily fluids that was the method of transmission, however there were still some misconceptions that touch was enough to contract HIV.

5BI1H_01_Q02b

As a higher tier only statement this was quite a difficult question and many candidates were able to link the fact that the bacteria were resistant and so could not be treated with antibiotics. They did not often complete the story by stating that these resistant bacteria keep increasing in numbers and so cause more infections. A misconception here was a use of the term immune which is incorrect so although the idea of the antibiotics not working can be given, they lost the mark for resistance.

5BI1H_01_Q03a

Indicator species is the correct response here but several candidates lost the marks by giving a specific indicator such as lichen. Indicators alone was not worthy of credit.

5BI1H_01_Q03bi

Almost all candidates calculated this mean correctly. It is important to show your working whenever a mathematical calculation is completed in case the actual calculation is incorrect, marks can still be awarded.

5BI1H_01_Q03bii

This question was not very well answered, several candidates were able to note that bloodworms are an indicator of high levels of pollution or low levels of oxygen but the interpretation of the data was not done well. Candidates needed to state where the pollution entered the stream - between 25m and 55m and not just talk about it increasing as it was not a consistent rise.

Examiner Tip

When answering tabulated data questions it can be useful to try to visualise this as a graph to pick up trends in the data.

5BI1H_01_Q03c

This question was accessed well across all the candidates with many able to link the fact that fertilisers leak into the lake to the increase in the amount of algae growing on top of the lake. The consequences of this were less clear. It was important to note that the plants underneath the algae did not get any sunlight and so could not photosynthesise so decomposers broke them down and removed oxygen from the water during respiration. Vague statements such as fish die or organisms die were not creditworthy.

Examiner Tip

When talking about plants growing or algae growing, it is vital to talk about increased growth as plants grow anyway.

5BI1H_01_Q04ai

Candidates are getting better at referring to the essential components of natural selection such as competition for resources and survival of the fittest in the correct context. The final part meaning that they survive long enough to reproduce and pass on advantageous traits was also seen quite often. Candidates mainly lost marks for just describing what the birds in the diagram eat and not actually answering the question.

5BI1H_01_Q04bi

The important idea here is that the organisms that reproduce have inherited the characteristics from two different species. It was not sufficient to state they inherited different characteristics from their parents and this happens during sexual reproduction.

5BI1H_01_Q04bii

There are only two possible responses here, either mutation or sexual reproduction. Many candidates gave specific features such as eye colour or an environmental change.

5BI1H_01_Q04c

Most candidates were able to answer this question successfully referring to heterotrophic feeding, that organisms are multicellular or that cells have a nucleus. Acceptable marking points also included they do not have cell walls or chlorophyll as this is the information given in the specification. Where there were misconceptions is where candidates referred to characteristics of vertebrates rather than the kingdom Animalia.

5BI1H_01_Q05ai

This was a percentage calculation. Any method of calculating the percentage is acceptable. Candidates often lose marks where they do not show the working and their answer is incorrect so no marks can be given for the working.

5BI1H_01_Q05aii

Most candidates were able to make a suggestion as to why less people are now smoking. Responses acceptable for the marks include increased health awareness, changes in legislation, more alternative methods for giving up smoking given and increased cost.

5BI1H_01_Q05b

In order to gain all the marks for this question, candidates should give the idea that the carbon monoxide binds to the haemoglobin so less oxygen is carried by the red blood cells. Therefore less oxygen is delivered to the muscles or less energy provided. Candidates did lose marks for the idea that no oxygen is transported as this would result in death rather than a reduction in the amount of exercise.

5BI1H_01_Q05c

In general this question was answered extremely well. Candidates were able to name the four categories of drugs required by the specification and relate this to the effects on the body and the nervous system. Examples of the drugs given were also well known.

5BI1H_01_Q06ai

An arrow pointing towards the muscle was required for the mark here. Several scripts were blank for this question so I advise all candidates to make sure they read every question carefully so they do not lose marks unnecessarily.

5BI1H_01_Q06bi

The brain and spinal cord are the required responses here. The spine was marked incorrect as the spine is not part of the nervous system.

5BI1H_01_Q06c

The required response here were the idea that the synapse is a gap between two neurones and an idea that neurotransmission is chemical which results in the electrical response being stimulated in the next neurone. Common mistakes were that an electrical signal was sent by neurotransmitters.

5BI1H_01_Q06d

For this question the interpretation of the graphs was the skill level required by the candidate and this linked with the role of the myelin sheath in insulating the neurone. Key areas candidates should have identified are the ideas that as axon diameter increased so did the speed of conduction both for myelinated and unmyelinated neurones and the idea that myelinated axons carried impulses faster or had a faster conduction speed than unmyelinated axons. In order to gain the top marks candidates also needed to back this up by quoting data from the two graphs. Common errors were where candidates referred to axons moving rather than the speed of the electrical impulse.

Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

- Ensure they have a clear understanding of vasodilation and vasoconstriction and do not refer to blood vessels moving.
- Work on their maths skills, remembering to answer the question ensuring that they interpret information from graphical data effectively. In addition to this they must always show their working in order to maximise marks.
- Ensure that they have a detailed understanding of the higher tier topics, as these tend to be the areas where the higher marks are allocated, and are often discriminators for the higher grades; in this case the topic of the resistant bacteria and Darwin's theory of evolution.
- It is essential that candidates look to the number of marks allocated to the question, and answer the question with the relevant number of points. If the question is allocated 3 marks, then the candidate needs to make 3 separate points.
- Candidates should work on the way in which they answer the 6 mark questions. If the question asks for interpretation of graphs then quote the information from the axes 'as axon diameter increases conduction speed increases'.
- Be careful to look to the command words on the paper especially with the command word 'explain' - here, you must base your answer on scientific principals and not just a list of stages.