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# **Examiners' Report**

## Principal Examiner Feedback

### Summer 2017

Pearson Edexcel GCSE In Science  
(5BI3F) Paper 01

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## Paper Introduction

This paper was for candidates entered for the Foundation tier of GCSE Biology Unit 3: Using Biology. It was written to test the full range of skills and specification content as described in the 2011 GCSE Specification. The paper included a range of question styles as usual, with multiple choice, missing words, short answer and longer 6-mark questions. The longer questions were designed to test candidates ability to write and communicate scientific ideas and tested their quality of written communication.

Areas of unit three that were covered included fermentation, immunisation, genetic modification, behaviour and reproduction. Many areas of the specification were addressed well by candidates, however there are still some areas that require more thought and deeper learning in order to be able to access the full range of marks available.

This report hopes to identify areas of strength and weakness shown by the broad majority of candidates and also tries to highlight possible misconceptions that could be addressed by both teachers and pupils as an aid to teaching and revision in preparation for forthcoming examinations.

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## Questions

- 1 This question tested candidates knowledge and understanding of fermentation set in the context of mycoprotein production using *Fusarium*.
- 1ai Most candidates correctly identified the function of air and glucose when supplied to the fermenter.
- 1aii Use term 'aseptic' was often seen when describing the type of precautions taken to ensure the fermenter was not contaminated.
- 1aiii Both marking points were accessible to candidates and good responses were seen when describing the need for a cooling system.
- 1aiv Most candidates correctly identified the microorganism as a fungus, but a significant number stated that it was a bacterium.
- 1b Candidates must ensure that they understand pH scales. Many correctly identified that it would become more acidic, but then went on to state that this meant that the pH would increase, and so lost the mark. Very few candidates identified lactic acid as the cause of the drop in pH.
- 2 This question asked candidates to consider the migration of Monarch butterflies as an example of innate behaviour controlled by circadian rhythms.
- 2ai Many candidates did not identify that circadian means daily, and chose instead 'monthly cycle' from the list of options.
- 2aii Candidates responded well here with good definitions of innate behaviour. A few got confused with imprinting however and lost the mark.

- 2b Most candidates could identify the reason for the annual migration from the information given in the question, with fewer correctly stating a reason in terms of survival or breeding of the butterflies.
- 2ci Most candidates found the calculation of the average number relatively straight-forward.
- 2cii Many candidates found this challenging and stated a conclusion based on the six individual figures rather than the two means, as indicated in the question.
- 3 Question 3 focused on an immunisation programme to deal with cases of malaria. Candidates were asked carry out a calculation and consider the data from the immunisation. Defences in plants was also covered.
- 3ai The majority of candidates managed to calculate correct answer for 90% of 584000. A few did not read the question carefully and calculated 90% of 198 million.
- 3aii Most candidates correctly identified that the deaths may have had other causes, but many answers were too vague and lacked a reason for the number of deaths being an estimate.
- 3bi Some very good answers were seen, with a concise description of the data provided, together with a manipulation of the data in the form of a simple calculation.
- 3bii Most candidates correctly identified the cause of an immune response.
- 3c Most candidates gave at least one good reason for not wanting to be immunised, but once again too many answers were vague and lacked detail.
- 3d Many candidates found this more challenging, and did not identify any sensible means by which plants defended themselves. Many assumed that plants also had an immune system with lymphocytes.
- 4 This question used the example of genetically modified tomato plants as an example of genetic modification using *Agrobacterium*.
- 4a Most candidates identified *Agrobacterium* as a bacterium.
- 4bi Candidates did not score well on this question, but this was partly due to not reading the question carefully rather than lack of knowledge. Some candidates gave excellent accounts of how the modified bacterium was produced, with reference to restriction enzymes and ligases. Unfortunately, the question asked how the transformed bacterium could be used rather than how it was produced. A minority of candidates did score full marks however.
- 4bii Some good answers were seen here and candidates had learnt this section well. The most common error was assuming that the plants would grow better rather than referring to any benefit to human health.
- 4c Very few candidates fully appreciated what was meant by herbicides and assumed that they were the same as insecticides. This meant that they lost marks on this question, describing how plants would not be eaten by

insects. Another source of error was to repeat part of the question and simply say that the herbicides would increase the food supply.

- 4d It was pleasing to see that many candidates had a very good understanding of how biological control worked, and gained full marks on this question.
- 5 Question 5 used the example of imprinting to ask candidates about animal behaviour.
- 5a Although most candidates identified the behaviour as imprinting, a significant number put one of the other options instead.
- 5b This was another question in which many candidates scored well, but far too many gave answers that lacked detail. 'To help the goslings survive' is only part of an answer – candidates were expected to describe how the behaviour helped the goslings survive.
- 5c Most candidates correctly identified why parental care sometimes puts parents at risk. The most common answer given was the potential threat from predators attempting to get to the young.
- 5d Many candidates found this question very challenging, either getting the types of conditioning confused, or describing a different type of behaviour completely (such as reflexes).
- 6 This question focussed on human reproduction and asked candidates on two specific topic areas – the menstrual cycle and specialised structures of egg and sperm cells.
- 6ai/ii Most candidates could identify the events of the menstrual cycle.
- 6aiii Nearly all candidates gave excellent answers to this question, with oestrogen, progesterone, FSH and LH all seen.
- 6aiv Very few candidates gave the wrong answer to this question.
- 6av Answers were rather varied for this question with some confusion as to when fertilisation took place and the role of the uterus lining. Despite this, a good number of candidates managed to write some description of implantation.
- 6b This is obviously a topic that candidates have learnt and revised well. Sperm cell structure and function were described by nearly all candidates, but far fewer could correctly describe specialised features of an egg cell.

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## **Paper Summary**

Based on the performance of candidates taking this paper, some broad recommendations can be made:

- All topics must be learned in sufficient depth.
- All areas of the specification must be covered during teaching and revision, as any specification statement could be tested on any examination.
- As always, candidates should read the questions carefully and look for the command words such as 'describe' and 'explain' as these will require very different responses.
- Candidates should pay particular attention to the 6-mark questions that test quality of written communication, thinking carefully about how the full 6 marks might require based on the question stem.
- Answers should be structured carefully with a view to the number of marks available (two facts or statements are unlikely to gain full marks on a 3-mark question).
- When carrying out mathematical calculations, candidates should always show working.

