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# **Examiners' Report**

## **Principal Examiner Feedback**

January 2017

Pearson Edexcel  
International Advanced Subsidiary Level  
in Biology (WBI05)  
Paper 01 Energy, Exercise and Coordination

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## **General Points**

Candidates were able to demonstrate their knowledge and understanding by tackling the wide range of questions offered in this paper. It was clear that the vast majority of candidates had studied the pre-release article and were able to relate their reading to the questions asked in a meaningful way. There were very few blank spaces indicating that candidates found the questions accessible and later questions were equally attempted indicating that few candidates struggled to make good use of time.

Some candidates attempt to “set the scene” before beginning their actual response, often merely repeating the words in the actual question. Irrelevant writing wastes time and gains no credit.

Incorrect interpretation of the wording of some questions was minimal. The majority of candidates were able to apply their knowledge to the unfamiliar scenarios that were presented. Overall, the level of knowledge demonstrated was satisfying.

### **Question 1(a)**

The multiple choice questions at the start of the paper were well answered. The most common error was found in (ii) where candidates failed to realise that both DNA and RNA are found in mitochondria and a satisfying number correctly answered the magnification question (iv)

### **Question 1(b)**

This question examined understanding of chemiosmosis and its inhibition. Many candidates lost marks by simply “telling the story” of chemiosmosis as it occurs normally but not relating their answers to its inhibition clearly enough. Overall, sound subject knowledge and application was shown.

**Question 2(a)**

Candidates were asked to relate habituation and fMRI to an experiment in which a siren is repeatedly sounded. Many gave basic details of the technique with only better candidates applying their knowledge to habituation and how it relates to brain activity.

**Question 2(b)**

This was a well answered multiple choice question.

**Question 3(a)**

Many candidates gained full marks here though the direction of movement of sodium and potassium ions was sometimes confused as were the roles of the pumps and channels involved in their transport. Few candidates used the term diffusion.

**Question 3(b)**

Very well answered with a high number gaining 2 marks for recognising the correct relationship between variables and performing a correct calculation with the relevant units included.

**Question 3(c)**

Candidates are encouraged to read questions carefully. Many failed to appreciate that this question needed specific reference to the results in the table rather than simply pure recall. Better candidates were able to link the results to their knowledge and hence explanation ie the drug causes NO change in p.d so there is no depolarisation/impulses/muscle contraction.

**Question 4(a)**

Extremely well answered with many candidates gaining full marks. There was a good level of subject knowledge, though named enzymes were often incorrectly linked to their roles and some candidates wrongly discussed translation rather than transcription so often gained only 1 mark for reference to mRNA.

**Question 4(b)**

A lot of candidates correctly related the lack of myelination to a slower speed of impulse but few went on to link it to saltatory conduction and hence gained only one mark.

**Question 4(d)**

A GCSE type question that was thankfully answered very well and often via use of an annotated Punnett Square. Sadly some referred to genes rather than alleles or stated that parents MAY be carriers.

**Question 4(c)**

This simple question revealed a wide range of responses. Many candidates gained two marks though some incorrectly mentioned structures such as the medulla or frontal lobe.

**Question 5(a)**

Well answered where candidates actually related their comments to reliability or lack of, rather than simply listing factors. Many mentioned the use of repeats of a small sample size and lack of relevant information about the subjects of the investigation.

**Question 5(b)**

Very well answered with candidates displaying excellent subject knowledge around the control of ventilation. Some however, incorrectly linked change in pH to lactic acid rather than CO<sub>2</sub> and few related the change to contraction of diaphragm/intercostal muscles. A small number incorrectly identified the carotid body as the arch or sinus.

**Question 5(c)(i)**

Very well answered.

**Question 5(c)(ii)**

Generally well tackled and involved a comparison of graphs between smokers and non-smokers. Most correctly stated relationship and manipulated data but fewer went on to compare rate of exhalation to gain 3 marks.

**Question 6(a)**

Fairly straightforward question that tested candidates knowledge of genetic modification and was very well answered though some failed to link ref to DNA ligase to its function of joining gene to plasmid, and correctly removed gene but often didn't specify from the flower.

**Question 6(b)**

Fairly well answered with many understanding that mammalian channels are different and therefore pyrethrin can't bind hence gaining two marks. Few candidates made reference to the idea that it is metabolised or diluted in mammals. Receptor was often used in place of channel and this mark was therefore lost.

**Question 6(c)**

Straightforward question, very well answered.

**Question 6(d)**

This involved comparison of graphs for two insecticides. Reasonably well answered though answers often lacked clarity and had to be pieced together. A pleasing number correctly manipulated figures from the graph.

**Question 6(e)**

Well answered most making reference to less growth but fewer linking this to less cell elongation or phototropism.

### **Question 7(a)**

Very well answered by most candidates

### **Question 7(b)**

Often misconstrued, with candidates writing about blood supply, mitochondria, myoglobin etc. Many correctly identified different muscle types and the need for controlling other factors but few gained full marks.

### **Question 7(c)**

Not well answered with few candidates gaining 4 or 5 marks. Many simply gave detailed descriptions of the Krebs cycle but did not extrapolate this knowledge to refer to the role of lactate in the continuation of exercise or the need for a supply of ATP in muscle contraction.

### **Question 7(d)**

Very well answered with many scoring two marks and most referring to atherosclerosis/stroke but a few linking it to blood clotting as well.

### **Question 7(e)**

Not well answered-very few gained 4 or 5 marks. The question was asking about experimental design but many misunderstood this and talked about the pharmacology of B2-agonists. A lot correctly relayed the need for placebo, repeats, a large sample size and a double blind trial but there was little reference to the need for standardisation or monitoring of dosage.

### **Question 7(f)**

Few candidates gained more than one mark here and often for reference to binding of hormone to a receptor. Many linked this to the consequent production of hormones but this was insufficient-we needed to see reference to androgens or testosterone specifically.

### **Question 7(g)**

Few candidates were awarded this mark. Many gave a dictionary definition or related the term to incorrect biology e.g. synovial fluid or synapses.

### **Question 7(h)**

Reasonably well answered by more able candidates though weaker once gained only one mark due to lack of reference to T-helper cells which meant they could only access a mark for talking about the development of AIDS or infection. Barely anyone made reference to lysis of T-helper cells.

### **Question 7(i)**

Lots of candidates achieved full marks here in what is a common scenario that has been tested in the past and should require a simple logical sequence of events. Some candidates incorrectly wrote about events in the pre-synaptic neurone, or referred to the post synaptic "knob" rather than membrane or neurone. The link to neurotransmitter binding resulting in the opening of sodium channels and the consequent entry of sodium ions was often omitted.

## **Paper Summary**

The paper gave candidates the opportunity to demonstrate their knowledge and understanding; their ability to apply this knowledge to unfamiliar scenarios; and their ability to draw together links between different areas of the specification.

In order to avoid common pitfalls in future papers it would be helpful to:

- Look at the number of marks allocated to each question and try to make sure that answers at least equate in terms of the number of ideas presented
- Use precise, scientific terminology that reflects A level study
- Appreciate that repeating the stem of a question or sentences from the passage is unlikely to be rewarded
- Be relevant with longer prose answers. This will help avoid wasting time which could be of value with the more difficult analytical questions
- Read the stem of a question carefully before committing to paper
- In calculation questions, show your working, to avoid losing all the marks for a simple mathematical error
- Understand that the command word 'explain' expects candidates to offer biological rationale in their response and not solely description.

