Pearson

# Examiners' Report
# Principal Examiner Feedback

## January 2018

Pearson Edexcel International Advanced Level Biology (WBI06) Paper 1
Energy, Exercise and Coordination

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# Introduction

Students were able to demonstrate their knowledge and understanding by tackling the wide range of questions offered in this paper. It was clear that some students had studied the pre-release article and were able to relate their reading to the questions asked in a meaningful way. However, many students appear to have struggled with aspects of the paper and, in particular, with the scientific article.

Some students attempt to "set the scene" before beginning their actual response, often merely repeating the words in the actual question. This wastes valuable time and gains no credit.

Incorrect interpretation of the wording of some questions was apparent in a number of questions and many students appeared to struggle to apply their knowledge to the unfamiliar scenarios that were presented.

**Question 1**

1(b)(i) Most students were able to identify a carboxyl group. The most frequent reason for losing the mark was drawing a circle that did not include the complete group.

1(b)(ii) Students generally had a good idea of the differences between hormonal and nervous communication. Some students did not make clear comparisons between hormonal and nervous communication and failed to gain all the available marks. Reference to one process was not sufficient, eg statements such as 'hormonal coordination uses chemicals released into the blood' would not gain MP1. There also needs to be a reference to 'nervous communication using electrical impulses'.

1(b)(iii) Many students recognised that thyroxine would need to enter the nucleus and regulate the activity of a transcription factor (MP1, 2 and 3). A number of students then missed the point that adrenaline is not a protein and went on to describe regulation of the transcription and translation of adrenaline and did not gain MP4 or 5.

**Question 2**

2(a)(iii) Students frequently demonstrated an understanding of what breathing rate is. However, they often failed to explain completely how to determine breathing rate from a spirometer trace. To gain two marks students need to explain how they would obtain the number of breaths (eg count peaks) and then how they would get a time (eg 'run the trace for one minute' or 'calibrate the spirometer speed'. Simply saying they would count the number of peaks in one minute was not sufficient for both marks.

2(b)(i) Many students were able to describe the general trend that as exercise increased tidal volume increased (MP1). A number also described the effect on breathing rate – which was not required. Some students described the effect of each individual increase in cycling speed without actually describing the overall change. Students need to look at the available marks to determine the extent of analysis that is required. If they are going to manipulate data they should generally start with the overall change.

2(b)(ii) Students generally recognised what the question was asking them to do and many scored well on this question. A few students did not mention the idea that as cycling increases there will be more respiration. Some students avoided any description of the control of breathing and focussed on oxygen demand, gas exchange or cardiovascular changes.

**Question 3**

3(a) Students generally demonstrated an understanding of what the term negative feedback means. However, they often struggled to express the idea clearly.

3(b) This calculation was straightforward for the majority of students.

3(c) Students generally had a good understanding of how the internal body temperature could be maintained. Most students focussed on cooling processes as required by the question. Marks were most frequently lost because students did not produce a full description of a particular process or used technical terms incorrectly.

**Question 4**

4(a) This question was relatively straightforward for those students that appreciated that extension would straighten the arm, triceps contract and biceps relax. Many students forgot to mention that these muscles were acting synergistically, so did not gain (MP2).

4(c)(i) Many students found this question straightforward and gained both available marks. However, some students struggled to make clear comparisons of the rate and duration of the contractions (MP2 and 3).

4(c)(ii) Most students found this question about fast twitch and slow twitch fibres straightforward. Marks were generally lost when students mixed up fast and slow twitch fibres.

4(d) This was a straightforward quest that most students scored well on.

**Question 5**

5(b) This question was answered well by many students. However, a number appeared to lack an understanding of the role of calcium ions and others struggled to describe the role eg 'calcium ions move into the membrane'. When discussing synapses students should be clear they are describing pre- or post- synaptic membranes. When describing processes involving membranes, students should make it clear in which direction ions etc. are moving eg calcium ions move into the cell/presynaptic knob.

5(c) Students who read the question carefully generally produced good responses. The question is about the synapse, many students gave answers about axons, ie refractory period, and gained no marks.

5(d) Many students struggled with this question. Most recognised that the membrane potential increased in an excitatory synapse and decreased in and inhibitory synapse. However, relatively few seemed to pay attention to the scale of the x and y axis. As a consequence, few students commented on the difference in magnitude or duration of the responses.

**Question 6**

6(b) A number of students produced good accounts of the role of auxin in phototropism. However, many seemed to be unable to recall much relevant information. Some students also lost marks as a result of poor expression eg 'therefore plants **move** towards the light' was not accepted for MP4.

6(c) This part of the specification appears to be understood by students and the question was answered well by many. Marks were sometimes lost when students did not mention phytochrome ($P_R$ / $P_{FR}$ was not sufficient) – MP2, ignored the effect of the short light period between two dark periods (MP6) or mixed up the effects of light on $P_R$ / $P_{FR}$ (MP3).

**Question 7**

7(a) Many students ignored the instruction to use examples from the article and scored few marks for this question.

7(b) Most students have a reasonable understanding of oxidative phosphorylation and this question was well answered by many students. Marking points most frequently awarded were MP1 to 4. Relatively few students finished the story off by explaining why the cells would die (MP5, 7 and 8).

7(c)(i) Students who read the article carefully were able to gain both marks for this question. A surprising number thought the response was a positive correlation and a disappointing number of students mixed up the x and y axis.

7(c)(ii) This question was reasonably well answered by most students.

7(d) This question was straight forward for most students.

7(e) Many students produced extended responses describing all aspects of clinical trials from stage I to stage III wasting a lot of time. To answer this question well, students needed to appreciate the treatments were used to reduce non-motor side

effects. Reference to appropriate non-motor side effects gained a mark (MP4), as did description of suitable study designs (MP1 and 2) and the idea of using a placebo (MP3).

7(f) Many students gained a mark for suggesting animals may react to the drugs in a different way to humans (MP1). Few had picked up from the article that animals do not suffer from Parkinson's disease (MP2) or that animal models of Parkinson's disease are not sufficiently similar to human disease (MP3).

7(g) Many students struggled to make reasonable suggestions. Marking points 1 and 4 were the most frequently seen.

7(h) Many students appreciated that there would be less dopamine in the synaptic cleft (MP1) and therefore less would bind to the post synaptic membrane (MP2). Very few then went on to describe the effect on sodium channels (MP3) or threshold potential (MP4). A number did address the idea of fewer excitatory or more inhibitory pathways (MP5 and 6) although these ideas were often poorly expressed.

7(i) Relatively few students answered this question well. Most students simply repeated information from the question. To gain marks students needed to address the idea of why viruses specifically infect particular cells.

## Summary

Based on the performance of students on this paper, the following advice is offered:

- Look closely at the number of marks allocated to each question and equate this to the number of ideas or points presented.
- Use precise, scientific terminology of an A level standard.
- Read the stem of the question closely before committing an answer to paper.
- Understand that simply repeating the stem is unlikely to gain any credit.
- Show workings in calculation questions to avoid losing marks.
- Understand that the command word 'explain' requires a biological rationale in the answer and not simply a description.
- Show how data has been manipulated where required instead of simply quoting figures from a graph or table.
- Use time management sensibly.
- Have a greater appreciation of the scientific method, in particular the design of experiments.
- Understand that the command word **explain** expects students to offer biological rationale in their response and not solely description

### Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

http://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html

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