



Pearson
Edexcel

Examiners' Report

Principal Examiner Feedback

October 2018

Pearson Edexcel International Advanced Level
In Biology (WBI05) Energy, Exercise and
Coordination

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October 2018

Publications Code WBI05_01_1810_ER

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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 several questions and many students appeared to struggle to apply their knowledge to the unfamiliar scenarios that were presented. In some cases, students produce detailed answers that do not address the question in the context in which it is set. Often losing valuable marks.

Question 1

1(c)(i)

Three marks were available for this calculation. Many candidates gained all three marks, correctly reading two values from the graph, attempting to calculate a percentage increase (i.e. dividing the difference by the smaller value read from the graph) and producing a correct answer. Error carried forward allowed candidates, making a mistake but clearly showing their working, to gain one or two marks.

1(c)(ii)

Many candidates only made one valid comparison, usually MP2. Frequently, candidates produced incomplete comparisons e.g. as diameter increased the speed of conduction in myelinated neurones increases in a linear relationship. Such a response does not get MP 1 or 4 since no mention is made of non-myelinated neurones.

1(c)(iii)

Many candidates produced good responses gaining all three available marks. Occasionally careless use of language meant marks could not be awarded. For example, 'nerve impulses are transmitted in the gaps in the myelin sheath'. It's not clear if the candidate means impulses are jumping between nodes, or if they mean impulses are generated in myelin that filling the nodes. The candidate needs to make it clear they are talking about impulses produced in the membranes of axons at the nodes of Ranvier.

Question 2

2(a)

A straight forward calculation for two marks. Unfortunately, many candidates ignore the instruction to give the final answer in standard form and so lost the second mark. Candidates should read each question carefully.

2(d)

Many candidates produced reasonably complete descriptions of the role of calcium ions. MP1 to 4 were frequently seen. Relatively few candidates finished the story by describing the movement of the filaments past each other (MP5).

Question 3

3(a)(i)

This question was answered well by many candidates. Most candidates gained MP1 for the effect of age. A number of candidates ignored the reference to altitude in the question and simply described the difference in FEV₁ for Andean and North American men. This meant they did not gain the second mark.

3(a)(ii)

Many good responses were seen to this question. Unfortunately, some candidates confused elasticity of lungs and muscle weakness. Descriptions of 'weaker lungs' or 'breathing muscles losing their elasticity' did not gain any credit. Candidates needed to suggest 'loss of elasticity of the lungs' or weaker breathing muscles'.

3(a)(iii)

Some pleasing responses to this question were seen. Many candidates made the link between altitude and loss availability of oxygen and the need to breath more forcefully or take larger breaths and to link this to an increased FEV₁. Some candidates struggled to produce sensible answers. This may be because they did not read the introduction to the question.

3(b)

A relatively straight forward question that was not answered well by many candidates. Most ignored the reference to finding a median in the question so did not get MP4. When they did this, they often failed to get MP1 as well, simply describing how they could calculate a rate from a trace.

Question 4

4(a)

Many candidates produced good descriptions gaining both available marks. Marking point 3 was for manipulation of the data – the difference between control and exposure to all three pesticides being the most frequent manipulation seen and this gained MP3. Some candidates 'transcribe' the data from graph to text, quoting lots of values from the graph. This is a waste of valuable time in the exam and is unlikely to gain credit.

4(b)(i)

To answer this question candidates needed to apply their understanding of the role of dopamine in Parkinson's disease. Many candidates struggled to make this link. Relatively few candidates started with the absorption or inhalation of the pesticide (MP1) or finished the explanation with reference to effects on the motor system (MP6).

4(b)(ii)

The question asked for an explanation of the treatment for Parkinson's disease. Candidates needed to choose one treatment and explain its use. The specification requires understanding of the use of L-dopa. However, answers in terms of the use of a suitable enzyme inhibitor or dopamine agonist were also acceptable.

Question 5

5(b)(i)

Many candidates produced good explanations of how the bear maintains its core body temperature. Candidates need to carefully consider the context of questions like this one. This is because many marks are only available for answers in the correct context. To gain MP1 candidates needed to make reference to the core temperature and not to skin temperature or air temperature. Similarly, MP2 was only awarded if the candidate described a role for thermoreceptors in the hypothalamus and not for descriptions of skin receptors and MP4 was about increased or more heat production. Many candidates did not make any reference to negative feedback MP5.

5(b)(ii)

This question was straightforward for most candidates. Some candidates did not think carefully about the question and simply stated the

hibernating bears did not eat. This by itself would not explain the loss of mass. The only explanation for a loss of body mass is that stored reserves (fat or protein) are being used up.

5(c)(ii)

Many candidates struggled to make sensible suggestions about how habituation of bears to humans could be investigated. Simple descriptions of counting the number of bears (MP4) and an increase in bear sightings (MP6) were accepted. Other reasonable suggestions such as observing the time bears ran away for, or the degree of agitation of the bears were also accepted. Few candidates referred to controlling the degree of disturbance (MP3) or the frequency of disturbance (MP5).

Question 6

6(a)(i)

This was a relatively straightforward question asking candidates to describe some tabulated results. Unfortunately, many candidates ignored the effect of time (MP2) and simply described the effect of oxygen concentration (MP1).

6(a)(ii)

Although some good responses were seen many candidates ignored the question and described the role of EPO in red blood cell production.

6(b)

This question seemed more accessible to candidates and many complete responses were seen.

Question 7

7(a)

This question was answered well by many candidates.

7(b)

A number of complete responses were seen for this question. However, many candidates did not explain what a 'booster' is (MP1) or explain why vaccination / booster program is effective (MP5).

7(c)

To answer this question candidates needed to apply their understanding of the role of serotonin in depression. Unfortunately, many candidates did not make the link between endorphins and the action of serotonin.

7(d)

This question was accessible to most candidates and many complete answers were seen.

7(e)

Candidates were asked to describe the role of the SAN in regulating the pulse rate of rats. Many candidates ignored the question and instead described in detail how the SAN initiates the contraction of the heart. To answer the question candidates needed to describe how the rate of impulse generated by the SAN is controlled (MP1, 2 and 3) and how the contracting heart produces a pulse (MP5).

7(f)

Again, candidates who read the question carefully provided answers that gained marks. Many other candidates did not answer the question but instead described the transmission of an action potential along an axon. The question very specifically asks candidates to describe how pacemaker cells depolarise. Depolarisation of myogenic cells is not specifically referenced in the specification, therefore, although calcium cations are the principle ions involved in depolarisation of myogenic cells responses in terms of other cations were accepted.

7(g)

To answer this question candidates needed to think critically about the statement provided. Some candidates recognised that exercise is an environmental factor (MP2) and that the number of genes would not change (MP3) but that the expression of these genes is being controlled by transcription factors (MP4 and 5). Many candidates simply took the statement at face value and incorrectly tried to invoke evolutionary or mutation driven changes in the number of genes.

7(h)

This question was answered well by many candidates. MP2 was occasionally missed if candidates described the receptor or protein being released into the ER rather than the polypeptide chain. Many candidates finished their responses by describing the exocytosis of the receptor. However, beta-1-adrenergic receptor is a membrane bound protein. The receptor is not released by exocytosis but is incorporated into the membrane.

7(i)

This question was straightforward for candidates that described how the ECG would change. Some candidates, however, did not describe changes

in the ECG but instead described changes in pulse or heart rate and did not gain the mark.

7(j)

Many candidates grasped the idea behind this question and produced reasonable responses. Many did not explain that adrenalin needs to be absorbed (MP1). Some candidates described blood vessels contracting or capillaries constricting. Neither of these were accepted. To gain MP2 candidates needed to describe vasoconstriction, or contraction of the muscles in blood vessels.

7(k)

This question appeared very accessible to candidates and many good responses were seen.

Advice for students:

The paper gave students 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 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.
- 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.
- Try to provide answers that are tailored to the biological context in which the question is set.

