GCE EXAMINERS' REPORTS

WJEC EDUQAS AS BIOLOGY

SUMMER 2016

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Unit	Page
Component 1 – Basic Biochemistry and Cell Organisation	1
Component 2 – Biodiversity and Physiology of Body Systems	4

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BIOLOGY - NEW

General Certificate of Education

Summer 2016

Advanced Subsidiary/Advanced

Component 1 – Basic Biochemistry and Cell Organisation

General Comments

Some of the responses to questions showed a real understanding of biological principles and their application in novel settings. These were a real pleasure to mark and a credit to their teachers and themselves.

The new specification requires candidates to read and understand the text and how it relates to the question. Many candidates would benefit from improving their exam technique, as not answering the question posed, but regurgitating text books/school notes which have been learned by rote, does not gain marks. Candidates must know, understand and be able to apply biological knowledge to gain high marks. Many scripts showed a lack of basic biological knowledge.

Comments on Specific Questions

1. This was intended as an easy start to the new-style paper and it proved to be so for most. Routinely candidates scored well in the sections, although in (a) (ii) many did not read the question, but just wrote everything they had learned on the three molecules. The second part of (b) and (c) required candidates to explain their choice of sugars and use the data to show how a conclusion was supported. This proved problematic as evidenced on many scripts.

2. Parts (a) and (b) were not well done at all, despite being simple recall. In many cases (c) was also poorly done. It really was just a simple matter of describing what was happening in the diagram using correct terminology. There was no need to know anything about the virus other than the information given.

3. (a) This part of this question was generally well done. However, only a few candidates connected the result being a colour change with the fact that whole blood would already be a red colour.

   (b) This required a little more thought than just listing all the advantages of immobilised enzymes. The advantages needed to be relevant to the situation given – clearly there is no product to be kept separate from the enzyme, nor extremes of pH being used.

   (c) For those that remembered the standard response to the differences between alpha and beta glucose, this question was very straight forward, but describing the position of H and OH on the carbons ‘on the left hand side’ of the sugar is not an acceptable answer. Candidates should be able to state the number of the carbon.

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4. (a) The maths was routinely done well, the major errors being using the diameter, not the radius and not giving the answer to one decimal place.

(b) The graphs were also good, but too many mixed up the x and y axes, did not label the axes or did not plot correctly.

(c) Clearly there were some who had no idea how to calculate Ψ_{cell} using the graph, and many could not explain clearly how to use the graph to determine Ψ_{cell}.

(d) This was very well done.

(e) This however, proved difficult. This was an extension of the experiment already given and was much the same as the 'further work' section on the legacy practical papers. As such, this should have been a straightforward response

5. (a) A simple digestion of lipids by lipase question. This required the knowledge that one of the products of lipid digestion is fatty acids. Many simply stated that the lipase turned the solution colourless because it was acid.

(b) Many candidates thought that the fact that the colour change was qualitative meant that it could not be used to determine effect of pH.

(c) This was simply a description of competitive inhibition and its effects and many good answers were seen here.

(d) Although most candidates understood the competitive inhibition, they did not go on to expand how this could lead to weight loss. To lose weight you must use the body's reserves of fat and if using the drug does not change your dietary habits, you will put weight back on (stored fat) as soon as the lipids can again be digested and absorbed. Pulling the whole 'drug use in weight loss programmes' together required candidates to re-visit the stem of the question, the graph and then think about the pros and cons of the drug use. In many scripts there was evidence that there had been thought and consideration given to this, but too many simply quoted the text instead of thinking about it and the implication of the pattern of weight loss as shown on the graph.

6. (a) Sloppy answers in here meant marks were lost. Omissions include, no reference to RNA nucleotides being joined to make mRNA, (simply saying nucleotides is not enough), not mentioning complementary base pairing when RNA nucleotides line up opposite DNA and not stating clearly that RNA polymerase joins RNA nucleotides together (to form a long chain of RNA nucleotides).

(b) The exons/introns questions were well done, although this really does require some comment on the fact that exons code for the amino acid sequence in a polypeptide chain (whereas introns do not), somewhere in the answer.

(b) Far too many could not complete part (i) and put another string of nucleotides along the dotted line. The question clearly asks for the amino acid sequence, so we are at a loss to know why this was not done.

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(c) The calculation of the ratios in (i) was poorly done. The final part of this question, again, asked them to use the information given along with their own knowledge of DNA structure to evaluate the work of the two researchers. This was very poorly done in many scripts, even though if they knew their DNA structure they just had to compare this with the two short paragraphs. It was sad to see that despite being told the names of these workers, the vast majority changed Rosalind into a 'he'.

7. There were some really good essays which gained top marks. They showed real knowledge of the purposes of the two types of cell division and could explain why there was a difference in terms of tumour production; a pleasure to mark. Far too many turned this into a 'write everything you know about mitosis and meiosis' question. This meant there were long descriptions on the stages of the two types of cell division without actually covering what the question wanted.

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BIOLOGY - NEW

General Certificate of Education

Summer 2016

Advanced Subsidiary/Advanced

Component 2 – Biodiversity and Physiology of Body Systems

General comments:

The paper allowed all candidates to access marks.

The quality of written communication was again an issue for some candidates. They were reminded of the necessity for good English and orderly presentation on the front of the examination paper, but a significant number lost marks because they gave incomplete answers.

Comments on Specific Questions

1. (a) In part (i) almost all candidates correctly described an adaptation of red blood cells. However, in part (ii) fewer candidates gave an answer in terms of the number of red blood cells despite the clue given in the opening paragraph.

   (b) The majority of candidates were able to give some description of carbon dioxide's reaction with water inside red blood cells for (i). However, only a small minority were able to make three distinct points. Part (ii) was not attempted by a significant number of candidates, reflecting its challenge. However the quality of answers that were given was generally good with many candidates describing either the effect of lower pH on the affinity of haemoglobin for oxygen or hydrogen ions displacing the oxygen.

2. 100% of candidates attempted some part of question 2, and this question proved to the easiest on the paper.

   (a) Most candidates were able to identify the polecat and the bat as being most closely related. Although candidates were not required to study Order Carnivora, enough information was provided for most candidates to be able work out that these two are carnivores whereas the dormouse is an herbivore. Most of those who lost one mark here did so because they made no reference to carnivore or herbivore.

   (b) Almost all candidates were able to identify 'Noctule' from the information provided in (i). For (ii), at this level, candidates can be expected to understand that because the pulses are not perfectly regular they need to use a number of them in order to calculate the rate, so both marks were only awarded if candidates used four or more in their calculation. A range of answers were accepted because different answers could be obtained if different numbers of pulses were used.

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(c) This was not attempted by a significant number of candidates. The relatively simple calculation was generally well done, but the explanations were not so good, including some issues with quality of written communication. A very small number of candidates accounted for START and STOP codons and were credited accordingly.

(d) This was well done, with the great majority of candidates understanding all three parts of the question and giving correct responses.

3. (a) The labelling of xylem and phloem was generally well done, although all possible wrong labels were seen (including cambium which is already labelled).

(b) This was not attempted by a significant number of candidates. Most candidates understood that the explanation was something to do with bidirectional transport but there were significant issues with quality of written communication so that many answers lacked clarity.

(c) Most candidates realised that the answer to part (i) related to the information provided in the table. However, there were again significant issues with quality of written communication so that many answers lacked clarity. Part (ii) was not attempted by a significant number of candidates. There was evidence here that many candidates did not fully understand the link between standard deviation and consistency of the results. Part (c) (iii) again, was not attempted by a significant number of candidates and was generally not well answered. Many candidates referred to the large standard deviations. Some made vague references to either the plants used or the aphids but lacked description of how the success of the experiment would be limited.

(d) The calculations were generally well done but there were some candidates who did not understand what is meant by 'standard form'.

4. (a) Part (i) was meant to be an easy lead in to the rest of question 4, and proved to be so. However, some candidates did lose these marks because they seemed to think 'the more the better' or lost one mark because they explained why it was important not to use more but not why fewer should be used or vice versa. In part (ii), most candidates made some reference to grids or coordinates but again there were significant issues with quality of written communication so that many answers lacked clarity.

(b) The calculations in part (i) were generally well done although there were a small number of issues with rounding to two decimal places. A written conclusion was required for part (ii). Some candidates merely repeated the values for Simpson's Diversity Index. Candidates must understand that repeating results, even if they do so in words rather than tabulated values does not constitute a conclusion.

(c) Again quoting the values from the table alone does not constitute a description of the effect. Also, some candidates did not read the questions carefully enough and gave explanations referring to Dog's Mercury being unable to recover from being coppiced even though the question specifies the Hazel trees were coppiced.

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5. This question proved to be slightly more difficult than most of the other questions.

   (a) Part (i), was not attempted by a significant number of candidates. It was a challenging question because candidates had to realise that at 770 nm the values were high for deoxygenated blood but low for oxygenated blood so they must be absorption not transmission. Relatively few were able to do so. The great majority of candidates picked correct values from the graph to complete the table in part (ii). There were significant issues with quality of written communication so that many answers lacked clarity for part (iii).

   (b) There were also significant issues with quality of written communication here, where some candidates gave answers such as “Double systems are more efficient.” as their answer even though that is given as part of the question.

   (c) In part (i) most candidates were able to spot two defects in the drawing but the arrows they drew to label them often lacked accuracy. Lots of candidates referred to mixing of oxygenated and deoxygenated blood in part (ii). Far fewer went on to get all three marks by explaining how this would affect the oximeter reading.

6. This proved to be the most challenging question on the paper.

   (a) In part (i) candidates were required to refer to differences between the starch and cellulose and explain why the enzyme did not work in terms of the active site and 3D shape of substrate. Many referred only to differences between the molecules but made no reference to the enzyme or made a vague statement such as “cellulose must have cellulase” Part (ii) required candidates to think about where the enzyme would come from, rather than in which part of the system. Many candidates said “they have a functional caecum” which ignores the fact that the caecum would be made of rabbit cells.

   (b) Parts (i) and (ii) were both generally well answered, though in part (ii) some stated that hard faeces contain no sugar. For part (iii) candidates were expected to recall the knowledge that sugars taste sweet and many were able to do so.

   (c) There were significant issues with quality of written communication here, so that many answers lacked clarity. Also, some candidates failed to realise that they were expected to make links between the various sections of information in the question. Some of these candidates gave a general account of the functions of organs in the digestive system.

7. This question assessed quality of extended response (QER). The best answers here addressed all of the following: adaptations of the respiratory surface and associated structures; details of the ventilation mechanism of bony fish and the significance of counter current flow; a comparison with the external gills of the axolotl. Candidates’ responses were banded according to the extent to which they addressed these points. The mark within the band was awarded according to quality; the top mark in the band was awarded where an integrated, articulate account with no significant omissions or irrelevant inclusions was given. The full range of marks was awarded.

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WJEC
245 Western Avenue
Cardiff CF5 2YX
Tel No 029 2026 5000
Fax 029 2057 5994
E-mail: exams@wjec.co.uk
website: www.wjec.co.uk

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