GCE AS EXAMINERS' REPORTS

BIOLOGY
AS

SUMMER 2018

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COMPONENT 1

In general the standard seen in scripts was poor and only the minority gained high marks. A significant number of candidates failed to have grasped many of the concepts and principles associated with component one, and as a result struggled to answer questions involving application of knowledge. The quality of written communication was a real issue with the majority of candidates using precise biological terminology.

Question 1

For the opening question on the paper this was poorly answered. Only the very best candidates demonstrated a good understanding of the differences between mitosis and meiosis. In part (b) only the better candidates identified the stage shown as being anaphase of mitosis, with many basing this on the fact that there was only one cell drawn. In part (a) the candidates simply failed to recognise that this was assessing their practical skills. The majority of candidates made reference to growth stages of interphase and DNA replication.

Question 2

The majority of the marks available in this question were AO1, but many candidates lost marks as their answers were vague. In part (bi) the majority made reference to the regeneration of ATP but did not explain why that it was important for muscle contraction, the majority thought it was required for aerobic respiration. In part (bii) too many answers started with 'it' and the majority of candidates only tried to explain induced fit theory. However, in the majority of responses no reference was made to the active site and very few used the word complementary. Part (cv) most candidates picked up two marks for their descriptions of the structure of cellulose. However very few could apply this knowledge to peptidoglycan and few marks were gained for the other sections of part (c).

Question 3

In part (ai) the majority of candidates correctly identified the ribosome, but their explanations made reference to the site of translation. Part (aii) should have been easy marks for the candidates to gain. However, it is quite alarming the number of candidates that simply cannot calculate a percentage. A good number of those that could, failed to read the information in bold and didn't convert their answer to standard form. Part (aiii) highlighted the candidate's lack of knowledge and understanding of the genetic code; very few scored any marks. In part (b) the majority correctly identified the peptide bond, but only the better candidates picked up both marks by making reference to the COOH group and NH_2 group.

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Question 4

The majority of the marks on offer were AO1 and as a result this was the best answered question on the paper. In part (a) the majority correctly identified it as a longitudinal section, but couldn't explain why. More than half of the candidates labelled the sieve tube element as the xylem vessel. Far too many candidates gave vague answers as to why xylem is a tissue. In part (b) only the better candidates gained both marks for (bi) but many gave very good accounts of their knowledge of transpiration in part (bii). A significant number of candidates didn't attempt part (bii), which would indicate that they either had not realised there was a synoptic element to the paper, or that they had not revised for component two by the time they sat the paper. In part (c) the majority of candidates picked up marks in each of the different parts. However it was only the better candidates that demonstrated a good understanding of the transport of ions. Part (d) discriminated between the mathematical ability of candidates – those that could rearrange an equation gained three marks and those that could not, did not gain any.

Question 5

This was the hardest question in the paper and many candidates struggled to gain high marks. In part (a) an alarming number of candidates thought that a nucleus and mitochondria were only found in animal cells. In part (bi) the majority correctly calculated the volume of the contractile vacuole but far too many inaccurately read the scale of the graph. In (bii) most of the candidates recognised the question was about osmosis, unfortunately the answers they gave explained that this was the reason for *Chlamydomonas* losing water. Only the better candidates gained all four marks and made reference to rates of osmosis. Part (c) proved too challenging for the majority of candidates and they simply could not interpret the graph. As a consequence they picked up few marks.

Question 6

In general the responses for this question were poor and the quality of written communication was an issue for the majority of candidates. They demonstrated some knowledge of the experimental procedure, but many failed to mention bacteria and simply talked about 'DNA being allowed to replicate' or 'DNA of different densities being mixed in a centrifuge'. Most candidates picked up their marks for semi-conservative replication only; but poor terminology regarding DNA molecules was a real issue with many stating 'each strand of DNA is made up of an old strand and a new strand'. Many candidates realised that the result from generation one disproved conservative theory but few could explain why. The majority thought that only one band would appear at the highest density. Very few candidates demonstrated an understanding of dispersive theory. However, some candidates had clearly spent time learning this topic, they gave very good accounts and scored highly.

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COMPONENT 2

Comments on Specific Questions

Q.1 This question required candidates to demonstrate a knowledge and understanding of adaptations for parasitism as shown by the pork tapeworm *Taenia solium*.

(a) Many candidates gained this mark, the commonest error was not stating that the products of extracellular digestion were absorbed by the worm.

(b) Students need to be reminded to make complete statements. Many lost marks for vague or incomplete descriptions including many which stated that food was ingested by the worm – despite it not having a mouth.

(c) Many good answers were seen for part (i) with candidates gaining up to full marks for this section. However, candidates, perhaps surprisingly, did not answer part (ii) very well. Some gained the second mark but few actually named products of digestion for the first mark.

Q.2 This question required candidates to apply their knowledge and understanding of taxonomy including the three domain system.

This proved to be the easiest question on the paper with a facility factor of 47.5%.

(a) Many good answers were seen to part (a) showing that this part of the specification was well understood by candidates.

(b) The calculation was carried out well by many candidates and full marks were frequently awarded in this section. The most common error seen was for candidates to multiply the number of mutations by the mutation rate rather than dividing. Candidates were generally confident in the use of standard form and this aspect seemed to pose little difficulty.

(c) Many good responses were seen in this question and candidates generally seemed to have a sound grasp on the concept. Many gained the first two marks with the third mark proving to be the most elusive.

(d) The majority of candidates gained the first mark for correctly identifying the domain but few were able to gain the second mark here. Many candidates applied a kind of reverse logic in their responses, stating that as it was a mammal then the giant panda had to be an eukaryote. Candidates need reminding of the hierarchical nature of taxonomy.

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Q.3 This question examined the candidates' ability to apply their knowledge and understanding of the adaptations of plants to reduce water loss through transpiration and their understanding of the practical method for measuring stomatal density in a leaf – a required practical in the AS specification.

(a) Candidates commonly gained one or two marks in this section but full marks were rare. Frequently, answers did not show the logical progression required for this part of the question. Most candidates seemed satisfied with themselves after explaining how the *Pinus* leaf is adapted to reduce water loss and did not go on to explain why *Ligustrum* leaves lose more water vapour to complete the comparison.

(b) There was a clear difference between centres where candidates had obviously either carried out or observed this practical and those where they had apparently not yet had that experience. This is a specified practical in the AS specification and all candidates should have had the chance to see the method before the exam. Very few candidates obtained full marks for this section as one or more of the steps required were usually omitted.

Some candidates had little or no idea how to calculate the stomatal density, possibly as a consequence of not having used the method themselves. Having said that, many good answers were seen and many candidates gained full marks. Good answers to part (iii) were rare.

(c) This section was well answered and many candidates gained full marks.

Q.4 This question required candidates to demonstrate a knowledge and understanding of ventilation in mammals and tissue fluid formation.

(a) The calculation was generally well answered and candidates who correctly identified the feature of the trachea in part (ii) almost invariably went on to gain the mark for explaining its function.

(b) Candidates who had learned the work on inspiration in mammals scored highly in this part. This was a straightforward recall question that should pose no difficulty to those who have prepared adequately for the exam.

(c) Many good responses were seen to this section and candidates clearly had a sound understanding the role of the capillaries in gas exchange. However, part (i) I was particularly poorly answered with very few candidates appearing to understand that air in the alveolus had reached equilibrium with the ppO_2 of the capillary blood.

(d) Candidates generally had a good understanding of the formation of tissue fluid and gave good answers to this section.

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Q.5 This question required candidates to demonstrate a knowledge and understanding of Transport in plants. This proved to be the most challenging question in the paper with a facility factor of 28.6%.

(a) This section was well answered with candidates demonstrating good understanding of the concept of experimental controls.

(b) The intention of this part of the question was to test candidates' ability to apply their understanding of practical experimental techniques in an unfamiliar situation. Part (i) was generally well answered with candidates appreciating that the leaves were removed to test the hypothesis that sucrose, ions and water could be transported up the plant from the region below the cut. Parts (ii) I and II were particularly poorly answered with very few candidates gaining any marks at all. This mainly seemed to be as a result of candidates over-thinking what was, in reality a very straightforward question.

(c) A large variety of answers were seen to this section with some unusual logic. However, some very good responses were seen which gained high marks. The quality of written communication varied greatly and more marks were gained by those who gave clear, concise and accurate explanations.

(d) This section was well answered on the whole with a large number of candidates gaining both marks.

(e) Well answered on the whole but a surprising number of candidates were unable to locate the endodermis.

(f) Many candidates gained the mark for stating that cyanide is a respiratory inhibitor or, more often, that it stops ATP synthesis and that this would inhibit the active transport of ions past the endodermis. Far fewer gained the third mark for linking this to a reduction in the water potential gradient. Again, the quality of written communication let candidates down here.

Q.6 This question assessed the quality of extended response (QER). The best answers fully addressed the three aspects relating to the dentition of both wolves and dogs, the process of starch digestion and a logical explanation of the advantage of starch digestion in domesticated dogs. Most candidates managed at least a perfunctory description of carnivore dentition and better candidates were able to give very detailed explanations of this aspect. Accounts of starch digestion tended to be rather abstract and limited to descriptions of the action of amylase enzyme. Only the better candidates gave detailed descriptions of the whole process of starch digestion in mammals including the locations in the alimentary canal where starch digestion occurs and how conditions in these locations are maintained. The third section on the advantages of starch digestion in domesticated dogs was the least well answered with many candidates reasoning that this was advantageous because it meant that dogs could digest commercial dog foods.

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