GCSE

Chief Examiner's Report
Biology

Foreword

This booklet outlines the performance of candidates in all aspects of CCEA's General Certificate of Secondary Education (GCSE) in Biology for this series.

CCEA hopes that the Chief Examiner's and/or Principal Moderator's report(s) will be viewed as a helpful and constructive medium to further support teachers and the learning process.

This booklet forms part of the suite of support materials for the specification. Further materials are available from the specification's microsite on our website at www.ccea.org.uk.

Contents

GCSE BIOLOGY

Chief Examiner's Report

Assessment Unit 1   Cells, Living Processes and Biodiversity

Foundation Tier

A total of 84 candidates completed this paper and achieved a range of marks from 14–62 out of a possible 75. Whilst some candidates performed well the standard of others was disappointing; lacking good exam technique in some answers, particularly where a comparison was required. This is probably due to Year 11 students not having the same experience of mock examinations and practice tests as their Year 12 counterparts.

Q1   **(a)**   This was generally well answered, with nearly three quarters of the candidates attaining full marks.

     (b)   Although Benedict's was often correct, the detail of the test for sugar caused more difficulty for candidates.

Q2   **(a)**   The mean score of 2.8 out of 3 shows that most candidates have a good knowledge of cell structure. Some however, confuse the cell wall with the cell membrane.

     (b)   Disappointingly under a third of the candidature recalled that most chemical reactions take place in the cytoplasm of a cell.

     (c)   In a question of this type an ideal answer should refer to both the bacterium and the plant. The responses of too many candidates referred only to a plant cell. This is probably as much lack of examination technique as lack of knowledge.

Q3   **(a)**   Of those who did give answers to this question, process **A** was the one which caused most problems, with decomposition and fossilisation being common wrong responses. As far as processes **B** and **C** were concerned wrong answers often involved a description of what happened to the carbon dioxide, rather than naming the process.

     (b)   A mean mark of 0.9 out of 3 confirms that many candidates struggled to describe how carbon compounds in cows became carbon compounds in fungi. Although some realised that the carbon passed out of the cow by excretion or when the cow died, few explained the role of fungi as decomposers.

Q4   **(a)**   All three parts of the leaf were known by only a quarter of the candidature. While some confused the upper epidermis and the cuticle, the palisade and spongy mesophyll caused even more problems.

     (b)   Many candidates found the adaptations of the palisade layer an even larger challenge. Rather than focusing on the features of layer D, they described how the leaf overall was adapted for photosynthesis.

Q5   Even though this was a straightforward recall question form section 1.6.5 of the specification with a large image showing all the structures of a neurone, many candidates struggled to identify the structures, and few were able to explain the links between structure and function. This is reflected by the fact that only one candidate achieved full marks and the mean for the question was 1.4. The overall standard of QWC was however good.

Q6 **(a)** This question was reasonably well answered as most candidates were able to identify the best cereal and give at least one reason why.

(b) The explanation of why carbohydrates need to be digested proved more discriminatory as a significant proportion of the candidates did not mention the small, soluble molecules being able to pass through the wall of the blood capillary.

(c) Commonly candidates were only able to give one of the three ways the ileum is adapted for absorption.

Q7 **(a)** **(i)** Although the majority of the candidates named both A and B correctly, for others they proved more difficult, with answers varying from the sclera and lens to the cornea.

(ii) Most candidates attained at least one of the marks available.

(iii) Some candidates got mixed up by explaining why changes to the pupil and iris were necessary in both dim and bright light. This is a clear lack of examination technique. Candidates should be taught to focus on one or the other, therefore not losing marks through inaccurate or conflicting answers.

(b) **(i)** Less than half of the candidature recalled the conjunctiva correctly.

(ii) The optic nerve was known by about 60% of the candidates.

Q8 **(a)** **(i)** The term phototropism was correct in about half of the responses.

(ii) Auxin was well known.

(iii) Weaker candidates struggled to describe the uneven distribution of auxin and the role of cell elongation in the bending of the shoot.

(b) Although a significant proportion of the candidates recognised that the shoot bending would allow it to absorb more light a disappointing number made the link with increased photosynthesis.

Q9 **(a)** **(i)** Based on a new topic in the specification, the structures of the urinary system are not well known at foundation tier.

(ii) Some candidates mixed up the cortex with the medulla.

(b) **(i)** Many candidates did not know the term osmoregulation.

(ii) The calculation was answered well by the majority of the candidates.

(iii) Although many candidates appeared to understand how sweating, breathing and urine loss contribute to the overall water lost, poor examination technique meant that marks were often lost. Either the answer did not refer to all three processes or through not comparing them by using the term "more".

Q10 **(a)** It was alarming the number of candidates (less than half) who do not know the equation for aerobic respiration.

(b) **(i)** The concentration of lactic acid at the start of the race was correctly obtained from the graph by the majority of candidates.

(ii) More than half of the candidates were able to apply their understanding of anaerobic respiration to identify the periods of increasing lactic acid during the race.

(iii) Candidates found the unchanging concentration of lactic acid between 25 and 40 seconds more difficult to explain and only about a quarter of them scored full marks.

(iv) Although the information to answer this question was given at the start of the question, only a small proportion of the candidates used it. Candidates often wrote about general recovery rather than about the lactic acid being broken down.

Q11 (a) Over 90% of the candidates were able to use the information given to form the food web.

(b) It is disappointing that many think grass is the original energy source for the food web rather than sunlight.

(c) The majority of candidates were able to correctly identify the fox as the animal feeding at two trophic levels.

(d) A very high percentage of candidates understand what the arrows in a food web represent.

(e) The mean for this question at 0.82 out of 2 was particularly disappointing. The first mark point caused candidates most difficulty as many referred to plants creating or producing energy from the Sun while very few correctly identified the role of photosynthesis. A large proportion were, however, able to describe the provision of energy or food to the other organisms in the food web.

Higher Tier

This was the first higher tier paper of the new GCSE Biology specification and the questions were designed to test a range of abilities within the context of this higher tier level. The very able candidates were given the chance to show their knowledge and skill, whereas those candidates who found the paper more challenging were given a range of questioning styles which offered them some opportunity to perform. Marks awarded for questions ranged from one to four marks, with the long question awarding a total 6 marks. Variation in the mode of questioning included recall, definitions, comparison, numerical calculations, interpretation of graph and diagram, trends, coherent explanations and quality of written communication.

Overall, the paper allowed candidates of differing abilities to show their potential as candidates attempted all questions and attained a wide range of results. There was no evidence of any being short of time.

Q1 (a) (i) Nearly 90% of the candidature understood the response was phototropism.

(ii) A similar proportion of candidates named the hormone as auxin.

(iii) While some candidates failed to discuss the diffusion or movement of auxin correctly, others did not include cell elongation.

(b) About two thirds of the candidates successfully explained the advantage of the response which allows the seedling access to more light for photosynthesis.

Q2 (a) Almost all candidates were able to construct the food web correctly.

(b) Although the performance by higher tier candidates was much better than those in the foundation tier, approximately a third of candidates were not able to name the source of energy.

(c) A significant number of the candidates suggested 'frogs' as the organism feeding at two tropic levels.

(d) Almost all understand what the arrows in a food web represent.

(e) Very few candidates scored two marks in this question as many did not include the idea of plants being able to make their own food by photosynthesis, instead many referred to plants creating or producing energy.

Q3 **(a)** Even though the majority of candidates achieved full marks, some had difficulty going beyond bacteria.

(b) Disappointingly almost half of the candidates failed to score in this question. Many confused saprophytic nutrition with the nitrogen cycle, while others were unable to describe extracellular digestion in any detail.

Q4 **(a)** To the examiners this question appeared to be a fairly straightforward recall of information, but many candidates had difficulty using the appropriate biological terms when describing the way stem cells differ from other body cells.

(b) **(i)** Almost 80% of the candidature were able to give a source of adult stem cells.

(ii) Approximately half of the candidates successfully explained why embryonic stem cells have a great potential in medical research. There were however quite a few irrelevant answers.

(c) The growing point of plants was known by even less of the candidates.

Q5 **(a)** Although examiners expected that candidates would find the explanation challenging, as it involved an understanding of limiting factors, they were disappointed by the many vague descriptions of the shape of the graph. Quite a few candidates did not follow the instruction in the question (even though this was in bold type) and many described the shape of the whole graph, rather than just the shape of the graph between A and B.

(b) The performance of candidates explaining the higher photosynthesis rate between C and D was better than Part (a) with twice as many attaining both marks.

Q6 **(a)** **(i)** The calculation of average time was largely completed successfully.

(ii) The mathematical skill and understanding of average rate of diffusion proved more troublesome. Even though the formula was given to candidates and errors from Part (i) were allowed to be carried through, there were many incorrect answers. Many of those arose because candidates did not select the correct distance from the diagram.

(iii) Less than 10% of the candidature scored all three marks in this question. Many did not complete the three parts to the question; describe, explain and support your answer with data. Explanation of the trend was mostly omitted.

(b) This question required the candidate to distinguish between time and rate which was not picked up on in many circumstances and some candidates discussed enzymes which was irrelevant.

Q7 **(a)** Even though candidates were told in the stem of the question that the villi provide increased surface area and they were asked for two other ways, many answers still included references to villi. At the same time others gave adaptations which did not affect the surface area like moist and good blood supply.

(b) **(i)** Most candidates were able to name part A as a lacteal but quite a few could not describe its role.

(ii) Only about a third of the candidates were completely successful explaining how the single layer of cells helps absorption.

(c) Although a proportion of the answers did not include appropriate terminology such as surface area, transport, diffusion and absorption, almost half scored full marks in this question.

Q8 **(a)** **(i)** Although there were a number of alternative ways of calculating this percentage change, only just over a quarter of the candidates attained both marks. Since the mean mark for the question was 0.84 it means that significant numbers were not able to use the values from the graph to work out the basic increase.

(ii) Most candidates attained two out of the three marks. Many students mentioned unnecessary irrelevant information and failed to link deforestation with carbon dioxide being absorbed from the atmosphere.

(b) Although the majority of responses were rewarded positively, some candidates described each and every increase and decrease rather than the overall trend.

(c) Many candidates answered this question well but, some included ozone depletion (instead of global warming) was mentioned which was inappropriate for the question.

Q9 **(a)** **(i)** Many candidates carelessly mixed up the association with sensory neurone and as result only about half were awarded with both marks.

(ii) Again, about half of the candidates scored both marks. Some candidates however discussed voluntary reflex actions, which caused some ambiguity seen in their responses.

(iii) Many students showed little understanding of the term **effector** which was often confused with stimulus.

(b) The students were asked to describe synaptic transmission, and this was only answered well by 16% of the candidates. In general, some of the key terms associated which synaptic transmission were included, but the descriptions were not always coherent. Many candidates described the transmitter vesicle diffusing across the synapse instead of the transmitter substance and very few candidates mentioned an electrical impulse being triggered at D.

Q10 **(a)** **(i)** More than half of the candidates correctly identified the field and explained this was because of the low percentage of air present.

(ii) Less than a third of the candidates were able to fully explain why the growth of grass is affected by the increased numbers of denitrifying bacteria in waterlogged soils.

(b) The majority of candidates found this question challenging as not only did it require knowledge of nitrogen cycle, respiration and active transport but it also had to be applied to the context of the crops in the two fields. In many cases it was obvious the candidates were only Year 11 as the ability to write coherently with the use of specialist scientific terms was not always as well developed as expected. The mean score for the question of 3.1 however indicates that most candidates were able to make two or three creditworthy biological points.

Contact details

The following information provides contact details for key staff members:

- **Specification Support Officer: Nuala Tierney**
  (telephone: (028) 9026 1200, extension: 2292, email: ntierney@ccea.org.uk)

- **Officer with Subject Responsibility: Edith Finlay**
  (telephone: (028) 9026 1200, extension: 2267, email: efinlay@ccea.org.uk)

Rewarding Learning