Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

November 2020

Pearson Edexcel International GCSE
In Biology (4SD0) Paper 1BR

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Introduction

The examiners were impressed with the high standard of many of the students' responses. Students and centres have clearly worked very hard to prepare for this autumn sitting of the Biology International GCSE and should be commended on their efforts. The factual knowledge of many students was excellent and fully in line with what is expected at International GCSE level. Data analysis and graph plotting were very good although some students still tend to lose marks due to errors in simple calculations and not labelling axes. Students are becoming more familiar with the new styles of question and demands of command words such as 'discuss.' Some students found questions on unfamiliar data challenging and in future series they should prepare by applying their knowledge of all the topics on the specification to novel sets of data.

Question 1

(a)(i) Many students were able to correctly recognise that cell walls are not found in plant cells.

(a)(ii) This question tested students' understanding of the carbohydrates present in plants. Many correctly recognised that starch is present in plant cells, although a few incorrectly thought that glycogen is found in plant cells.

(b)(i) Many students correctly recognised that A was a chloroplast and has a role in photosynthesis and that B was a nucleus and contains genetic information. Fewer students correctly recognised the functions of C and D. Some students named the organelles but did not give functions, and some incorrectly identified A as a nucleus. Some students did not give a correct function for the cytoplasm or gave vague details such as 'it acts as the liquid part of the cell.'

(b)(ii) Many students found this question challenging. Strong answers often referred to the shape of the cell providing a large surface area for light absorbance and the presence of many chloroplasts also providing a large surface area for light absorbance. Many students referred to the structure of a leaf as a whole rather than just the one cell.

Question 2

(a) Many students were able to recognise that plasmids are involved in genetic modification although some thought that the nucleoid is involved.

(b) This gap fill exercise about the use of industrial fermenters generated answers of a wide range of quality. Many students recognised that the hormone produced in fermenters is insulin and that the paddles stir the contents. Fewer students gave a correct substance with which the fermenter is cleaned, and a surprising number thought that carbon dioxide is added to the fermenter rather than oxygen.

Question 3

(a)(i) Many students were able to correctly identify the trachea, although a few confused the trachea with the oesophagus.

(a)(ii) Many students recognised that the pulmonary artery transports blood to the lungs. Some students confused the direction of blood flow in the pulmonary artery with the pulmonary vein.

(a)(iii) Many students correctly stated that both sets of muscles contract during inhalation. Some students, however, found this question challenging often thinking that the diaphragm relaxes during inhalation.

(b) This question required students to look at the effects of exercise on the flow of blood to the leg muscles and intestines. Some excellent, high quality answers were seen that fully explained the need for increased flow of oxygen to the muscles for respiration. Many students also correctly explained that more blood flow is needed to the intestines when resting for maximal absorption of nutrients. Weaker answers had basic descriptions of the changes in blood flow but did not give any reasons for the changes.

(c) Many students correctly referred to oxygen debts incurred during the exercise. The examiners were impressed with many excellent answers that referred to the breakdown of lactic acid.

Question 4

(a) Many students drew the food web correctly including all four organisms. Where students did not score both marks, it was typically due to drawing arrows in the wrong directions and / or not including all the organisms.

(b) Many students correctly recognised that the caterpillar is a primary consumer. A few students mistakenly thought that the caterpillar was a secondary consumer.

(c)(i) Many students were able to correctly complete the calculation. The most common error observed was incorrectly converting from standard form.

(c)(ii) This question was found to be challenging by many students. Stronger answers referred to several ideas such as an increase in food supply, increase in temperature or decrease in other predators. Several students simply referred to the mice reproducing rather than linking the reproduction rate and death rate. Many students also referred to a reduction in number of owls, although the table shows the owl population increasing.

(c)(iii) Some excellent answers were seen that gave correct suggestions for the owl population remaining constant. Common, correct answers included: that owls have few predators and that the reproduction and death rates were equal.

(c)(iv) Many excellent answers were seen to this question and the examiners were impressed that centres are clearly preparing the practical skills of students well. Many answers recognised the need to sample random quadrats repeatedly and excellent practical details were often given. A few students did not seem to have a strong understanding of sampling and just suggested counting the entire mouse population.

Question 5

(a)(i) This question assessed students' knowledge of active transport and its need for oxygen and glucose. Many students recognised the need for oxygen and glucose so that respiration could take place to release energy for active transport. Some students stated that active transport would be required to transport molecules against a gradient rather than relating active transport to the need for oxygen and glucose.

(a)(ii) This question was well answered with many students recognising the role of antibodies. Some students confused the terms antigen, antibiotic and antibody. Precise, accurate use of terminology is essential when answering exam questions.

(b) Many students were able to recognise that the karyotype was for a female and that the chromosome number was diploid. Some students described the karyotype incorrectly as haploid and / or stated that the fetus was male.

(c)(i) Many students demonstrated an excellent understanding of the roles of the nutrients given in the table. Some students did not give sufficient detail in

their answers, simply stating that the nutrients were necessary for the growth of the baby. When presented with a table with specific substances, it is good practice to give a detailed function for each, for example the uses of vitamin D and calcium in bone growth.

(c)(ii) Many students found this calculation very challenging. It required students to recognise that the 9.0 mg of iron required by a pregnant woman represented 50 % of the mass of iron for a woman who was not pregnant. Some students forgot to add the 9.0 mg to the 18.0 mg that a non-pregnant woman would need.

Question 6

(a) This question required students to recognise that the percentage area covered by lichen increased closer to the city centre and then link this to car use. Many students recognised the trends and gained both marks.

(b) Many students correctly suggested that to calculate the percentage of the wall covered by lichen they would have to measure the area covered by lichen and the area of the wall. Some students suggested counting lichen, this, however, would not give the area covered by lichen.

(c) Some excellent experimental plans were seen and it is clear that centres are preparing the practical planning skills of students very thoroughly. Many students recognised that a valid method requires the control of variables and needs repeating. This practical plan required students to use their knowledge of the core practical that investigates the heat released by respiring seeds and only a minority of students included the use of a thermos flask or insulation. A few students did not realise that the question required a plan with experimental details and gave an explanation of the effects of sulfur dioxide on seed germination rates.

Question 7

(a) Many students correctly stated that glucose or maltose would be produced from the digestion of starch by amylase and gave the correct colour change of Benedict's reagent. Some students did not fully read the question and suggested that iodine could be used to test if the starch had been digested.

(b) This question discriminated well and produced a spread of marks. Some very strong answers were seen that rewrote the method but gave stated volumes or concentrations of solutions, masses of bread and details of how to control the Benedict's test. Some students found the question challenging and gave an alternative method or gave vague statements, such as, 'amount of

water.' Students should try to give precise measurements such as volume or mass rather than the term, 'amount.'

(c) Many students gave excellent, detailed answers that explained that the rate would increase due to an increase in kinetic energy and collision frequency but would then decrease due to enzymes denaturing. Some weaker students simply stated whether or not the prediction was correct without giving any real explanation.

Question 8

(a) Graph plotting is a strength of many students and the examiners were impressed with the quality of many of the graphs produced. A few students tried to draw bar charts rather than line graphs – it is important to read the instructions carefully. The scales chosen by many students were sensible and most were able to join the points with straight lines. Students should not extrapolate beyond the first and last point.

(b) Many students gave very good descriptions of the results, stating that the percentage of students smoking tobacco had decreased and that the percentage using e-cigarettes had increased until 2015 and then decreased. It is important to look for turning points in data series.

(c) This question required students to calculate the change of the number of students who smoked normal cigarettes between 2011 and 2016. Many students were able to correctly convert the percentage of students into the number of students in both years and then go on to find the difference.

(d)(i) Many students showed excellent awareness of the contents of tobacco smoke and its consequences. The presence of both tar and carbon monoxide was recognised by many and their effects on cancers, other lung disorders and heart disease stated. A few students mixed up the effects of cigarette smoke contents, often giving lung cancer as being caused by nicotine.

(d)(ii) Good answers to this question about the reasons for discouraging the use of e-cigarettes by young people described the addictive and health consequences of nicotine and the idea e-cigarettes could be a 'gateway' towards smoking normal cigarettes. Some students found the question challenging and discussed the problems of smoking conventional cigarettes rather than e-cigarettes.

Question 9

(a)(i) This question required students to define the term phenotype. The question also asked them to use the context of the genetic condition of cleft chin. Some students gave generic definitions of phenotypes rather than

relating it to cleft chin and some confused the term phenotype with the term genotype.

(a)(ii) This question required students to define the term gene. Some students gave excellent descriptions stating that a gene for cleft chin would be a section of DNA that codes for a protein involved in the cleft chin phenotype. A common error was to simple state that a gene is a section of DNA without giving further detail.

(a)(iii) Many students recognised that alleles are alternative forms of genes. Some students confused the term allele with the term gene. Students should try to give precise, accurate definitions of genetic terms.

(b)(i) The examiners noted that some excellent genetic diagrams were produced by students. High quality genetic diagrams were well set out and fully labelled so that it was easy to see both the genotypes and phenotypes of the offspring. A common error was to not include the phenotype of the offspring when this asked for in the question.

(b)(ii) Many students were able to correctly deduce that probability of producing a female child without a cleft chin. Where students did not gain full credit, it was typically for not considering probability of producing a female child and so only considered the probability of the child not having a cleft chin.

(b)(iii) Many students correctly recognised that a mutation or environmental effects could affect whether a child has a cleft chin or not.

(c) This question was found to be very challenging and only stronger students tended to gain credit. High quality answers often stated that genetic crosses should be carried out and then explained what the results would be if the genetic condition was caused by a single gene or caused by many genes.

Question 10

(a) This question discriminated well producing a wide range of answers. Strong answers gave specific examples of mineral ions and their effects and went on to explain how photosynthesis could be affected. Weaker answers tended to give very vague answers about fertilisers in general rather than focusing on specific minerals. It is good practice for students to give as much detail as they can in their answers and always give specific examples that are list in the specification – in this case, nitrates and magnesium.

(b) Many students found this question quite challenging, although some excellent accounts of eutrophication were seen. A few very strong students

considered both eutrophication and the validity of the results. Some students gave confused accounts of eutrophication, such as algae consuming oxygen; students should be very clear about the roles of decomposers and the process of respiration when discussing this topic.

(c) Many students were able to suggest a correct alternative to chemical fertiliser such as manure. A few gave incorrect suggestions such as pesticides and vague statements such as organic fertiliser.

Summary

In future series, students are advised to:

- read questions carefully to determine what content needs to go in answers
- be fully familiar with the requirements of all command words
- do not extrapolate graphs unless specifically asked to do so
- be sure to give some experimental details when planning experiments
- give detail that is commensurate with the level required by International GCSE.

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