GCSE

Biology

BL3HP

Report on the Examination

4401

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General

Students approached this paper well and generally attempted all questions. The standard of many students' scripts was encouraging and an encouraging number of scripts were above 50 marks, with very few students gaining total marks below a quarter of the available marks.

There are still a significant number of students whose poor handwriting disadvantages them as examiners cannot read what has been written, in addition, students should be clear it is better to write on additional pages as opposed to writing around the edges of the paper as these are removed for scanning purposes and their answers are lost.

In general the calculation questions were well answered, but again it is in student's best interests to ensure they have access to calculators during the exam. In addition, it is important that students have sharp pencils, rubbers and black pens to ensure their answers are as legible as possible giving examiners the opportunity to award all possible creditworthy responses.

Students need to plan their answers to comparison and evaluation questions to ensure they do not simply copy information given in a question, as simple 'lifts' from given information is not creditworthy and students use up a lot of writing space before they give answers that gain credit. There was good evidence in this paper that students have some very good understanding of some aspects of the unit, such as the kidney, although the level of detail is beyond that required by the specification.

Question 1 (Standard demand)

(a)(i) The vast majority of students correctly identified the organism *Fusarium* as a fungus, although a significant number incorrectly thought it was a bacterium.

(a)(ii) Most students knew that oxygen was the gas that is added to the fermenter. The most common incorrect answer given was carbon dioxide.

(a)(iii) The vast majority of students gained credit for correctly identifying glucose as the substance used in aerobic respiration. If students had not given oxygen in part (a)(ii), they gained credit for oxygen in this question. Common incorrect answers seen were water and carbon dioxide.

(b) Over a third of all students gained full credit in this question, and approximately one half gained partial credit. The most common correct answers seen referred to less land being used, mycoprotein being cheaper to produce and mycoprotein being suitable for vegetarians. References to mycoprotein being lower in calories or less antibiotics passed on were rarely seen. A number of students did not gain credit as they did not provide comparative answers when describing the speed or cost of production, therefore answers such as 'cheap' or 'it is quick to produce' did not gain marks.

Question 2 (Standard demand)

(a) Approximately two thirds of all students gained full credit for correctly identifying two substances that the circulatory system transports around the body. The full range of

possible answers was seen, but the most common correct answers were carbon dioxide, water and ions. A significant number of students incorrectly gave blood or blood cells as an answer.

(b)(i) Approximately two thirds of all students gained full or partial credit for correctly naming two components of the blood. The most common incorrect components given were Haemoglobin.

(b)(ii) The vast majority of students correctly named the type of tissue in this question as muscle or cardiac muscle.

(c) This QWC (quality of written communication) question was generally well answered, with over half of all students gaining credit in level 3 and approximately one third in level 2.
From the information provided in the question students were able to correctly identify the major advantages or disadvantages and clearly present them by adding value eg 'the cow tissue heart valve is made from arteries from a cow and so is readily available reducing waiting times' or 'the living human heart valve needs a major operation whereas the cow tissue does not'.
The best answers were able to concisely put the information together often making several correct points in one sentence, eg 'the cow valve requires a less invasive operation which has less risk of infection and so is much quicker procedure'.
Some students limited the marks available to them by only putting either advantages or disadvantages in their response and so limiting the marks they could achieve. Some students simply used the text from the question without further explanation and therefore did not gain credit. Responses that did not gain credit but were seen included: a lack of appreciation that cows are already farmed; references to cows been at risk of extinction as they would now be hunted for meat and arterial tissue; that the cows are unwilling donors.

Question 3 (Standard demand)

(a) Most students correctly described the trends shown in the graph. The vast majority of students gained the second marking point for stating that the amount of peat free compost had increased. Many students also gained the first marking point for stating that the levels of peat compost was steady and then fell or fell after 2005. However a significant number of students gave an incomplete description for this marking point by simply saying it decreased and missed out the information that it was steady initially or only decreased after 2005.
Marking point 3 was not seen very often and again lots of students gave incomplete descriptions of this point by failing to give the year that peat free overtook peat compost even though they identified that this had happened.

(b) Most students answered this question correctly by stating that the amount of carbon dioxide in the atmosphere increases. Where students failed to get the mark this was often because they mentioned carbon dioxide in their answer but didn't say that there was more of it or that its concentration was increasing. Other common incorrect answers seen were that the levels of methane would increase or just stating there were more gases or more greenhouse gases in the atmosphere.

(c) The vast majority of students answered this question correctly. The most common correct answers seen was related to the destruction of habitats but a reduction in biodiversity was

also very common. Indeed many students gave both of these answers. It was very rare to see answers relating to the disruption of food chains.

Common incorrect responses related to how deforestation affected the atmosphere rather than how it affected ecosystems as was requested in the question. Such irrelevant answers included the commonly seen response of more carbon dioxide in the atmosphere. This was often accompanied by a reason such as less photosynthesis or trees being burnt or trees decaying. Many students also stated it would cause more global warming. Less common incorrect responses related to methane levels increasing as a result of more cattle or rice farming.

Question 4 (Standard and High demand)

(a) The vast majority of students gained full or partial credit in this question. Both mark points were awarded in broadly similar numbers. Where students did not gain the first mark point it was often because they answered in terms of bigger families or more people in each family but didn't link this to increasing population size. The second mark point was more often achieved for giving a description of an increase in the standard of living rather than simply stating this, and for those who gave a description of an increase in the standard of living roughly equal numbers gave answers about increased packaging or more food being purchased and then thrown away. Common incorrect responses included a reduction in recycling rates or simply stated that more food was being bought or eaten and this point was often followed by students mentioning obesity. Finally, some students just stated 'more waste is produced' which was already stated in the stem of the question.

(b)(i) The vast majority of students gained full credit for calculating the percentage of household waste recycled. Where students only gained one mark, it was often for incorrect rounding of the calculated answer.

(b)(ii) Many students gained three or four marks for evaluating the newspapers' statement, with most gaining marks for describing the trends in the three columns of the table as reasons in support of the statement. A significant minority gave convoluted arguments and tried to argue that the percentage figures were misleading. Only a small number of students identified the lack of information on rates of reuse as an argument against the statement.

(c)(i) Most students gained marks in this question. Answers that did not gain credit included those referring to global dimming, the destruction of the ozone layer, acid rain and vague references to 'more pollution'. A significant minority simply answered in terms of higher temperatures, warmer seas or the greenhouse effect. Some students attempted to describe changes in the climate, and did not gain credit as they merely described more severe or extreme weather, without qualifying their ideas with correct specific examples such as droughts or flooding. The most common incorrect answers referred to global warming causing more tsunamis, earthquakes and forest fires.

(c)(ii) Approximately two thirds of all students gained credit in this question, and the most common answer seen was for identifying peat bogs. Indeed a significant number of students demonstrated understanding beyond that which was required and described the lack of decay, acidic pH and lack of oxygen. Many students described oceans, ponds and lakes as stores of carbon. However, marks were too often lost due to vague answers such as: dissolved in water; stored in fossils and locked up in rocks. Skeletons and shells of sea

creatures as answers were very rarely seen. A significant number of students described 'man made' ways of sequestering carbon, and were often vague in their descriptions, such as 'put in tanks under sea'.

Question 5 (Standard and High demand)

(a)(i) The vast majority of students scored marks in this question. Many students had obviously looked carefully at the data and as a result quoted figures from the table, such as 0 g fat. Where students did not gain full credit, they often did not make it clear that B contains the **least** glucose. They missed out the all-important idea of **least**, and statements such as 'less' or '32 g' were not creditworthy. A common misconception seen by a significant number of students was a belief that respiration produces or makes energy.

(a)(ii) Many students struggled to clearly express their ideas for this question, and consequently only half gained the mark. Correct answers were evenly split between marking points two and three with students either describing cells absorbing too much water or losing too much water. These points were expressed in a variety of ways, but there were many answers that described the movement of water, indicating a good understanding of osmosis. It was much rarer to see answers describing the inefficient working of cells. It is worth noting that the response of 'burst' was insufficient to gain credit. A significant number of students referred to cells becoming flaccid or turgid and this may indicate a lack of understanding that these terms are only appropriate for use with plant cells.

(b) This question discriminated very well with most students gaining one or more marks. Most students gained one mark for correctly identifying that the thermoregulatory centre is involved. Reference to the thermoregulatory system was encountered frequently, although many students did not achieve this mark because they used incorrect words with the prefix 'thermo'. Many students used the alternative term hypothalamus which correctly identified the anatomical part of the brain which is involved in thermoregulation, for this same mark point. Students needed to state that the temperature of the blood is monitored as it flows through the brain, for marking point three and several students stated that the brain 'senses' the temperature change, which was not creditworthy. Many students incorrectly used the terms detectors or sensors instead of receptor. The last possible mark point was for skin receptors sending impulses to the brain, but many students used incorrect terms such as sending messages or information around the body. A significant number of students simply referred to the effects of increased temperature on the body such as vasodilation, vasoconstriction or sweating.
Students need to understand the difference between the process of monitoring body temperature and controlling body temperature.

(c)(i) Students answered this question well and a full range of marks was seen. A significant number of students started their explanations with 'it' or 'they' and did not make it clear that they were referring to the sports drink. 'Drinking too many sports drinks' was a common error rather than stating that the issue, for diabetics, was that the sports drink contains a lot of glucose. Some students referred simply to the presence of glucose which was insufficient to gain credit. Correct answers about the person with diabetes not producing insulin or not responding to insulin were frequently encountered but occasionally students stated that insulin is produced by the liver, which is incorrect. The final mark point was seen frequently and often students correctly stated that the blood glucose levels were therefore too high or at a dangerous level in the person with diabetes after consuming

sports drinks that are high in sugar. Incorrect responses were usually referring to 'levels in the body' rather than the blood. Several students referred to the wrong hormone, most commonly 'glucagon'.

(c)(ii) The vast majority of students stated exercise or injections of insulin for one mark in this question. Other correct responses were seen involving insulin pumps, inhaling insulin and pancreatic transplants. Non-creditworthy responses included simply taking insulin or insulin tablets, shots, epipens, therapy, monitoring blood glucose or dialysis.

Question 6 (Standard and High demand)

(a)(i) The vast majority of students correctly identified the flexible rubber sheet as a representation of the diaphragm, although there were many different spellings of diaphragm seen. Phonetically correct spelling was credited.

(a)(ii) This question discriminated well and those students who were able to apply their knowledge accurately gained full marks. A lot of confusion surrounding the understanding of pressure changes and how that impacted air movement was seen. A significant number of students failed to gain the third marking point as they simply stated that the consequence of pressure changes was the inflation of the balloons, which is given in the question.

(b)(i) Most students gained marks in this question. Those that only gained partial credit did so due to poor explanations of concentration gradients, or not making it clear the direction of movement. Words such as 'along' in relation to a concentration gradient were not credited.

(b)(ii) Some good answers were seen in this question, with clear understanding of the features of a good exchange surface shown. A large number of students limited themselves to one of the two available marks, by failing to pair the feature correctly with the explanation, eg 'the gills are thin and they have a large surface area', rather than the gills are thin so there is a short diffusion pathway.

Question 7 (High demand)

(a) This question was a good discriminator and approximately a third of all students gained three or more marks, so the role of the kidney seemed to be well understood by many. There were some excellent descriptions of the Bowman's capsule, nephrons and collecting ducts that are not needed for this specification, but did provide further indications of good understanding. Many students also described the origin of the urea and although there was no credit for this here, it bodes well for future biologists that they are being taught a good level of detail. Where marks were lost it was often for not making it clear that it is the blood that is filtered or not, making it clear that all of the glucose is reabsorbed.

(b)(i) The vast majority of students gained credit for showing the concentration of urea falling during dialysis.

Some common errors seen were:

- Concentration rising after the beginning
- Starting one square in
- Starting in bottom left corner
- Normal distribution curve drawn.

(b)(ii) In contrast to part (b)(i), only just over half of all students showed the concentration of glucose remaining constant throughout dialysis.
In both parts (b)(i) and (b)(ii), students would have benefitted from having sharp pencils and rulers with which to sketch their graphs.

(c)(i) Students struggled to answer this question and almost a third did not gain credit. Many of the answers given were very general, with statements such as 'the kidney was rejected because it was seen as foreign' or 'it was not recognised by the body' or 'the body treated it as a pathogen/disease and attacked/killed it' were common.
Blood types being different or non-matching DNA were also mentioned frequently, and some students even wrote about the kidney being the wrong size, shape or age. Quite often antigens and antibodies were mixed up and so no marks could be given.
Students who did achieve marks usually gained one mark for mentioning the immune system or white blood cells. When antigens were correctly described students often failed to mention that they were attacked and so again could not gain the mark.

(c)(ii) Most students knew about immunosuppressants and so gained the mark. A few students gained the mark by saying tissue typing/matching.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator