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Edexcel

Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel GCSE Biology

(1BI0) Paper 2H

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The Pearson Edexcel GCSE (9-1) Paper 2 Biology (Higher tier) paper is the second of two papers taken as part of the GCSE (9-1) Biology qualification. This is the fourth assessment of the GCSE (9-1) Biology specification and the qualification follows a linear assessment model whereby candidates must complete the two papers in the same single year of certification.

Paper 2: Biology (Higher tier) is awarded a total of 100 marks and it is assessed by a variety of question types, including, multiple-choice questions, short answer questions, calculations and extended open-response questions. Candidates should answer all questions in a time period of 1 hour and 45 minutes. The extended open-response questions are identified by an asterisk (*) in the question paper to indicate that marks are also awarded for the ability to structure a response logically.

In addition, the GCSE (9-1) Biology qualification assesses practical knowledge and maths skills; the requirements of which are given in the specification. Furthermore, there are 8 mandatory core practical tasks that candidates must complete prior to the examination, as aspects of working scientifically are also assessed in questions throughout the paper.

Paper 2: Biology (Higher tier) paper contains questions assessing the content from topics 1 and topics 6 to 9 as identified in the specification. In this examination series, candidates were required to respond to questions that tested their knowledge and understanding of the competition and conservation, photosynthesis specialised cells, the urinary system and dialysis, the structure and function of blood cells, female hormones used in contraception and fertility, blood glucose regulation and plant hormones.

Questions designed to assess practical work included writing a plan to determine sampling techniques, the core practical task of respiration, applied knowledge of food testing and decomposition including an understanding of the need to control variables and how to set up a control.

The maths skills assessment in this paper related to questions magnification calculations, BMI calculations, rate calculations related to decomposition and calculation of percentage change.

Question 1

Q1a_{ii} In this question candidates needed to recognise there would be competition for resources including food or that the new signal crayfish may carry a disease that is transferable. Several candidates were able to recognise the competition element, but some just repeated the information in the question.

Q1a_{iv} In this question candidates were expected to explain the outcomes of eutrophication as well as identify the link to nitrate increase in the watercourses. Candidates were very good at recognising the result of an algal bloom and its consequences.

Question 2

Q2a Any example of a type of decomposer was accepted here as an answer.

Q2b There was some difficulty in answering this question with confusion between the role of the xylem and the phloem in transporting mineral ions dissolved in water through the plant by the process of transpiration.

Q2c_i As this was an explain question candidates needed to identify that as light intensity decreases the number of small plants decreases but also needed to link this to scientific reasoning because the light is needed for photosynthesis.

Q2c_{ii} This question was specific to the variable required to ensure the light intensity readings were effective rather than a variable related to soil or water. Answers such as measuring at the same time of the day were most common.

Q2d This question required candidates to write a plan for using a belt transect. Several candidates were able to recognise the need for a quadrat and tape measure but found it more difficult to describe the whole process.

Question 3

Q3ai This answer required the biological drawing of the photomicrograph of a ciliated cell. This should have been a drawing of the cell shown not a 'textbook' example of a ciliated cell. The labelling of the cell was marked separately. Only structures that could be seen were acceptable these include cell wall, cytoplasm, nucleus and cilia.

Q3aii There was some confusion here will ciliated cells producing mucus which they do not, they move the mucus to remove any harmful microorganisms, duct etc.

Q3bi This calculation required the candidates to note where the drop of coloured liquid was at the start of the experiment and where it had moved to at the end with a simple calculation of rate by dividing by 10 to achieve 2.5 mm per minute.

Q3bii The question asked for a control for the experiment which would mean setting up the apparatus the same as the original experiment but replacing the living organisms with non-living organisms. Candidates are still confusing a control with controlling variables.

Question 4

Q4a Most candidates were able to identify the kidney on the diagram.

Q4ci This question required a basic understanding of dialysis to filter the blood removing urea by diffusion. Those candidates that answered were able to describe this process.

Q4cii This is an applied question getting candidates to think about why one patient needed more treatment than another. Answers included one may have a higher protein diet or that ones kidney disease maybe more advanced.

Q4d This question required candidates to apply their knowledge of food testing to the testing of urine. Glucose was being tested so Benedict's reagent/solution should be used which is heated and turns brick red in the presence of glucose. Other colours such as green and brown were also acceptable. Candidates do confuse the biuret solution with Benedict's frequently.

Q4e This is another applied question asking about the enzyme urease. Candidates are not expected to know urease but should be able to apply their knowledge of enzymes to explain that the substrate will not fit into the active site of urease because enzymes are specific.

Question 5

Q5ai This was a magnification calculation where candidates were required to use $I = AM$ to calculate the image size of the red blood cell by selecting the correct information from the diagram. They were then required to give the answer in mm which required a conversion. Credit was given for 1 mark if the incorrect blood cell was selected and if they did not manage to convert the answer.

Q5aii This question required candidates to give a structure-function relationship for a red blood cell. Many recognised the biconcave disc shape, (credit was given to those able to describe this rather than state the shape), and link this to a larger surface area allowing more oxygen to be carried.

Q5aii Most candidates were able to recognise that haemoglobin is needed for the oxygen to bind to the red blood cell. Credit was also given if the candidate said to carry oxygen.

Q5b Many candidates failed to answer this question. It is a synoptic question and aimed at the higher grades. It required candidates to recognise that red blood cells will take on water by osmosis and because of the lack of a cell wall the cell will lyse. Credit was also given to references of concentration differences used in the correct way.

Question 6

Q6aii Many candidates stated that a barrier method could be used for extra protection, but it was pleasing to note that many also recognised the need to prevent STIs and that hormonal methods do not prevent STIs.

Q6bi Oestrogen is released from the ovaries, there was some confusion with the pituitary gland but that releases LH and FSH not oestrogen.

Q6bii This question required candidates to understand the role of oestrogen and/or progesterone and relate this to its use in the contraceptive pill. Oestrogen inhibits FSH thus preventing the maturation of ova in the follicle. Progesterone inhibits the production of LH thus preventing ovulation. Some candidates were able to link these effectively.

Q6c Many candidates were not able to access this question and it does target the higher grades for the paper. There should be a clear understanding of the use of clomifene including the use of LH and FSH to allow more eggs to develop or more eggs to be ovulated linked correctly. For IVF, understanding that the egg is fertilised externally and is then implanted into the uterus was important.

Question 7

Q7ai Candidates should be able to recall the equation to calculate BMI and the majority were able to achieve all the marks. A few candidates did not square the height at the bottom of the equation and therefore lost a mark here.

Q7bi This question asks the candidates to describe what is happening in the data. It is essential they pick up the trends including an increasing concentration in the first 8 hours then decreasing until after 16 hours followed by a further increase. Candidates should use the headings of the table to describe this and also quote from the data to maximise their marks.

Q7bii Whereas the previous question asked candidates to describe the data, this question asks them to explain. This requires a scientific understanding of the mechanism. A person with type 2 diabetes still produces insulin but the cells were not able to take in this glucose because the cells are resistant to the insulin, therefore, no glucose is converted to glycogen and therefore glucose levels remain high. A few candidates confused Type 1 and Type 2 diabetes.

7biii This is the second synoptic question on the paper and required candidates to link the reduction in glucose to the patient using that glucose during respiration as he exercised.

Question 8

Q8bi In this case abiotic factors were asked for which were relevant for this experiment. These included temperature, water availability, pH of the soil etc. Biotic factors such as competition were not awarded marks.

Q8bii There were several different ways that candidates could answer this question. The most common answer was to repeat the investigation or to control a given variable. This could be awarded 1 mark but the question asked them to explain so an explanation of why was also necessary this could be to identify anomalies or to make the results more comparable.

Q8cii Candidates needed to do a rate calculation here to find the difference in decomposition and divide it by the time taken. Most candidates were able to do this but did not include the units. This was asked for in the question.

8d For this question it was important to link the fact that as oxygen concentration increases so does the rate of decomposition because the microorganisms respire faster.

Question 9

Q9ai This calculation required accurate reading from the graph to calculate the percentage change of blood flow. The calculation is a change in blood flow divided by initial blood flow multiplied by 100. The question was then asked to give the answer to the nearest whole number. Some candidates were not able to correctly round the number down to 33%.

Q9aii Once again the identification of variables that were needed for the investigation to be controlled. It is vital here that candidates check what has already been controlled before trying to answer. Acceptable variables include the length of exercise, type of exercise etc.

Q9aiii This 6 mark question was well answered by a large number of candidates. They were able to extract the relevant detail from the graph effectively making statements such as blood flow to the stomach was reduced or blood flow to the heart and muscles was increased. To gain higher marks they needed to relate this to the reason why. This included delivering more oxygen and glucose for respiration to release energy. Or where there was a reduction in blood flow, to send more blood to where it was needed in the muscles.

Question 10

Q10b The term comment on has not been used often in biology papers but it requires candidates to synthesise a number of variables from data to form a judgement. In this case several ideas such as the most obvious which was that the fields with fertiliser had a higher crop yield. More difficult was the idea that these numbers varied between years for both types of the field which must be due to factors other than the fertiliser.

Q10c This final six mark question required candidates to have a knowledge of both phototropism and gravitropism and explain how auxins cause each of these processes. The better candidates were able to do this including the differences in the auxin action on root and shoot. The majority of candidates were able to explain phototropism reactions including cell elongation on the shaded side causing the shoot to bend towards the light effectively.

