



Pearson
Edexcel

Examiners' Report

Principal Examiner Feedback

November 2021

Pearson Edexcel Combined GCSE

In Biology (1SC0) Paper 2BH

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The Pearson Edexcel GCSE (9-1) Paper 4 Combined Science (Higher tier) paper is the fourth of six papers taken as part of the GCSE (9-1) Combined Science qualification. This is the fourth assessment of the GCSE (9-1) Combined Science specification which is a linear assessment model whereby candidates must complete all six papers in the same single year of certification.

Paper 4: Combined Science (Higher tier) is awarded a total of 60 marks and it is assessed by a variety of question types, including, multiple-choice questions, short answer questions, calculations and An extended open-response question. Candidates should answer all questions in a time period of 1 hour and 10 minutes. The extended open-response question is 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) Combined Science qualification assesses practical knowledge and maths skills; the requirements of which are given in the specification. Furthermore, there are 6 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. There was leniency on the completion of practical work for this year as a result of the pandemic.

Paper 4: Combined Science (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 transport in plants and the effect of light intensity, specialised cells, the structure and function of blood cells, female hormones used in contraception and fertility, blood glucose regulation and the effect of exercise on the body. Questions designed to assess practical work included writing a plan to sample a habitat and the core practical on respiration, 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 and calculation of percentage change.

Question 1

Q1a Any example of a type of decomposer was accepted here as an answer. Many candidates gave decomposers or examples but worms was also seen and credited.

Q1b 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. Candidates also gave details on how the mineral ions get into the root which was not being assessed.

Q1ci 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. This was well answered by many candidates who obtained full marks. Those who did not obtain full credit did not explain why there was a decrease.

Q1cii This question was specific to the variable required to ensure the light intensity readings were comparable rather than a variable related to soil, water or the environment. Answers such as measuring at the same time of the day were most commonly seen.

Q1d 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 2

Q2ai 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 membrane, cytoplasm, nucleus and cilia. Incorrect responses seen included cell wall and flagella for the cilia.

Q2aii 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. from the airways.

Q2bi 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. Many candidates did not find this straightforward and made errors on the reading of the scale or converting to mm per minute. Some candidates read the middle of the drop as 2.4 cm meaning they had incorrectly read the starting point. Incorrect reading of the scale at 3.5 cm was also seen.

Q2bii 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. It appears from paper 1 of this qualification that they are recognising a control in an experimental set up but cannot describe how to set one up.

Question 3

Q3ai This was a magnification calculation where candidates were required to use $M = \frac{I}{A}$ 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 from μ . Credit was given for 1 mark if the incorrect blood cell was selected and if they did not manage to convert the answer into mm correctly but showed the correct working for the calculation.

Q3aii This question required candidates to give a structure-function relationship for a red blood cell. Some candidates 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. Other responses referred to the lack of a nucleus or the presence of haemoglobin which is not the shape of the red blood cell.

Q3aii 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.

Q3b Many candidates failed to answer this question. It is a synoptic question and was 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. Many candidates gave the idea of red blood cells dissolving in pure water and so the glucose and salt was required to prevent this happening.

Question 4

Q4aii 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.

Q4bi Oestrogen is released from the ovaries, there was some confusion with the pituitary gland but that releases LH and FSH not oestrogen.

Q4bii 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 preventing ovulation and FSH preventing the maturing of ova in follicles. Higher ability candidates made some of these links effectively, many candidates gained some marks for a partial explanation.

Q4c Many candidates were not able to access this question and it does target the higher grades for the paper. Some candidates were able to explain IVF but not clomifene therapy. Clomifene therapy uses hormones stimulates the release of LH and FSH to allow more eggs to mature and ovulation to occur. For IVF, candidates need to understand that the egg is fertilised externally and is then implanted into the uterus.

Question 5

Q5ai Candidates should be able to recall the equation to calculate BMI and the majority were able to achieve some marks with higher ability candidates gaining full marks. Many candidates did not square the height at the bottom of the equation so only achieved one mark.

Q5bi 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 help them in their answer and quote from the data to maximise their marks. Some candidates did not correctly identify the switching points between the increasing and decreasing trends.

Q5bii Whereas the previous question asked candidates to describe the data, this question asks them to explain why blood glucose remained high between two time points. Explanations requires a scientific understanding of the mechanisms involved. 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. Some candidates gave the idea that they had not exercised or had eaten.

5biii 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. Candidates answered this much better than 5bii linking the idea that the blood glucose levels decreased to its use in respiration.

Question 6

Q6ai 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. Higher ability candidates obtained full marks for this item. Some candidates did not correctly calculate the percentage change but if working was shown were able to gain the mark for giving their answer to a whole number. Other candidates correctly calculated the percentage change but did not round the answer to the nearest whole number.

Q6aii This item required the identification of variables that needed to be controlled. It is vital here that candidates check what has already been controlled before trying to answer. Acceptable

variables that were most commonly seen include the length of exercise, type and intensity of exercise. This question was generally answered well by most candidates.

Q6aiii This extended open response question was well answered by many 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 candidates 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.