Examiners' Report
Principal Examiner Feedback

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Pearson Edexcel International GCSE in Biology (4BI1) Paper 1BR

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General Comments

The general standard of scripts was very high and it was clear to the examiners that centres and candidates had prepared thoroughly for this examination series. Factual knowledge of all areas of the specification was generally of a very high standard and most candidates were able to interpret data correctly. Centres and candidates have clearly got to grips with the longer, evaluative questions, with most candidates applying their knowledge of the topics and the scientific method to unfamiliar data. Graphical and mathematical skills were generally very strong and most have a secure understanding of the need to control experiments. A few candidates found data analysis challenging and a few others confused the requirements of command words such as describe and discuss.

Question 1

(a)(i) and (a)(ii) Most candidates were able to correctly identify the labelled structure as a bronchiole and knew that during inhalation the diaphragm contracts and moves downwards.

(b)(i) Most candidates were able to describe the difference in the composition of inhaled and exhaled air and many went on to explain that oxygen is used and carbon dioxide is produced in respiration. Many candidates also understood that oxygen diffuses into the blood. Some candidates only described the data without giving an explanation, and a few only referred to diffusion into the body rather than referring to blood – candidates should be careful to give precise answers.

(b)(ii) Many candidates found this question very demanding, although half recognised that alveoli are the site of gas exchange. Few recognised that the exhaled air would be a mixture of alveolar air and inhaled air, or stated that gas exchange does not occur in the trachea or bronchi.

Question 2

(a)   (i) This multiple-choice question was well answered with over half of candidates correctly recognising that the coats of viruses are composed of protein.

(a)   (ii) Most candidates were able to gain at least one mark for this magnification calculation. Most were able to correctly measure the length of the virus and many went on to convert the units correctly and then calculate the magnification. Some candidates did not convert units correctly and others multiplied the actual length with the image length.

**(b)   **This question asked for candidates to explain the reasons for slow plant growth after the plants have been infected with TMV. Most recognised that the role of chloroplasts is to absorb light for photosynthesis and so convert light energy into chemical energy (as glucose). A small number of candidates confused respiration with

photosynthesis, suggesting that respiration requires the absorption of light.

Question 3

(a)(i) and (a)(ii) Both these multiple-choice questions were well answered. Most recognised that the only primary consumer in the food web was the aphid and that a community represents all the species in the area. A few candidates confused primary consumers with secondary consumers and others confused the term, community, with the term ecosystem.

(b)(i) Candidates were generally very confident when drawing a pyramid of numbers. Most correctly labelled the levels, although a few did not add labels at all. Most were able to draw a symmetrical pyramid with neat, straight lines. Some did not draw the bars to scale and a few drew a bar chart rather than a pyramid.

(b)(ii) This calculation was well answered with most candidates gaining both marks. A few candidates calculated the energy flow for all the mice and then did not go on to divide the number by 20.

(b)(iii) Most candidates were able to gain two marks with many going on to gain all three. Most candidates clearly understood the methods by which energy is lost along food chains with popular correct answers including heat loss, and losses due to indigestible and inedible parts. A few candidates continue to confuse excretion and egestion, incorrectly stating that faeces is excreted.

Question 4

(a)(i) This question was correctly answered by most candidates with only a minority not gaining the mark. Candidates understanding of the biological molecules and human nutrition topics was very impressive.

(a)(ii) Most candidates were able to correctly state that biuret solution is used to test for protein and that a lilac colour indicates a positive test. A few candidates incorrectly stated that Benedict's solution or iodine would be used.

(b)(i) Most candidates were correctly able to complete the calculation to determine the mass of milk needed to provide 1400 mg of calcium.

(ii) This longer, discussion question generated many excellent answers. Most candidates understood the roles of protein, calcium, and iron in the human diet. Most were able to compare the nutritional content of the soy and rice products and consider which best met the nutritional needs of a child. The examiners were very impressed with how well most candidates approached the question and organised their answers. Many

considered each component in turn in a clear, methodical way – this is excellent practise when answering these longer answer questions.

Question 5

(a)   This question tested candidates' understanding of the need for control experiments. Most candidates correctly recognised that the greenhouse with no pesticides was a control that enables a valid comparison with the other conditions.

(b)   This question required candidates to produce a graph for two sets of the data. The examiners saw many excellent quality graphs that had linear scales, accurate plotting, and clear labelling of axes and lines. A few candidates did not use linear scales, whilst others did not label axes or lines. Candidates should try to select sensible increments when deciding on scales – this increases the chance that they will plot all points correctly.

(c)   This question was a challenging question requiring candidates to compare the effect of using biological control with pesticides and go on to give explanations. Many excellent answers were seen that clearly and accurately described the data, and then went on to fully explain how natural selection leads to resistance to pesticides. A few candidates only gave descriptions of the data, and a minority simply gave general answers about the benefits and drawbacks of both methods without relating it to the data.

Question 6

This question was a gap-fill question testing candidates' knowledge of the action of insulin and auxin. Many excellent answers were seen that gained at least six marks. Common errors included: suggesting that the liver releases insulin, confusing glucagon with glycogen, and stating 'blood' as the first answer instead of giving 'plasma'.

Question 7

(a)   This multiple-choice question asking candidates to give the chromosome numbers of root and pollen cells was well answered. Most correctly recognised that the root cell would have a diploid number and the pollen grain a haploid number.

(b)   This question required candidates to look at the diagram of a grass flower and explain how it was adapted for pollination. Most candidates were able to gain at least three marks, with many going on to gain all four. Common correct features that candidates referred to included: the anthers being outside the flower, the stigma being feathery, and the absence of large petals. A few candidates simply gave features without explaining how they were an adaptation for wind pollination.

(c)(i) Around half of candidates were able to correctly identify the percentage of pollen grains growing as the dependent variable. Some candidates incorrectly gave control variables.

(c)(ii) This demanding question discriminated well between candidates. Strong answers correctly explained that the higher rate of pollen tube growth for different plants would lead to increased genetic variation and adaptability in a changing environment. Some candidates did not give an explanation but simply described the differences in the number of pollen tubes growing. Candidates should always be careful to read the command word in questions.

(d)(i) Most candidates were able to correctly state that mitosis would produce plants by asexual reproduction. A minority incorrectly suggested that meiosis would be the type of cell division occurring.

(d)(ii) This question was well answered by many candidates with most gaining at least one mark. Common correct suggestions included the retention of characteristics, the production of genetically identical plants, and the ability to produce large numbers in a short period of time.

Question 8

(a)(i) This question required candidates to name a part of the central nervous system such as the brain or spinal cord. Most gained the mark, although a few referred to the names of neurones rather than regions of the CNS.

(a)(ii) Many candidates gained at least three marks for this question which required a description of a reflex arc. Strong answers used accurate terminology throughout. Weaker answers often confused the roles of sensory and motor neurones, referred to signals rather than impulses, and did not mention the role of neurotransmitter diffusion across synapses. Accurate use of scientific terminology is essential to gain full credit for this type of question.

(b)(i) and (b)(ii) Most candidates correctly identified that the body cells of male dogs would have XY sex chromosomes. Part (b)(ii) was a demanding question that required candidates to identify the number of heterozygotes in a pedigree diagram. Many candidates correctly gained this mark showing that most candidates have an excellent understanding of genetic crosses.

(b)(iii) This question required candidates to draw a genetic diagram and then go on to calculate the probability of a male dog with sensory neuropathy being produced. The standard of answer was generally excellent with most gaining three or four marks. Candidates should use upper- and lower-case letters (in this case, N and n) to represent the dominant and recessive alleles.

(b)(iv) This question required candidates to explain how selective breeding could be used to remove a recessive allele. Many candidates found the question challenging but a significant number gave excellent answers that gained at least two marks. Strong answers correctly explained that two homozygous animals without sensory neuropathy should be bred, and this is then repeated with the offspring over several generations.

Question 9

(a)(i) Approximately half of the candidates were able to correctly identify the labelled blood vessel as the hepatic portal vein. Common errors included labelling the blood vessel as the hepatic artery or renal artery.

(a)(ii) Approximately half of the candidates correctly recognised that the pulmonary vein would have the lowest concentration of carbon dioxide.

(b) This question was well answered with over half of the candidates gaining at least one mark and many gaining both. Most recognised that Y would have a thicker, more muscular wall. A few candidates incorrectly stated difference in blood pressure or oxygenation of the blood.

(c)(i) Most candidates were able to suggest at least one risk factor for coronary heart disease, with many giving two. A few candidates gave vague answers such as exercise or diet rather than a lack of exercise and a high fat diet.

(c)(ii) This challenging question required candidates to look at data about the relationship between the number of deaths due to coronary heart disease and blood pressure for three geographical regions. Most candidates gained at least two marks but only the strongest answers gained all four. Common correct statements included: increased blood pressure increased the number of deaths, Japan having the lowest number of deaths, and that other factors such as genetics and / or diet may explain the differences between the regions.

Question 10

(a) This question was well answered with most candidates gaining both marks for giving a correct balanced equation for photosynthesis.

(b) (i) Most candidates were able to gain one mark for recognising that temperature would need controlling. Fewer went on to describe how a water bath could be used to control the temperature. The question asked candidates to 'describe how' to control a named factor rather than just give the factor. A few candidates referred to the pond weed – the question asked for an abiotic factor rather than a biotic factor.

(b)(ii) Many candidates found this question demanding with about half gaining at least two marks. Many recognised that the rate of oxygen production decreased as the distance increased due to a reduced light intensity. Stronger candidates recognised that when the distance was between 5 cm and 15 cm the concentration of carbon dioxide was acting as a limiting factor and that at further distances, light intensity was the limiting factor.

(b)(iii) This question asked candidates to describe how the apparatus could be modified to improve accuracy. A significant number of candidates confused accuracy with reliability and incorrectly suggested repeating readings. Strong answers that gained both marks typically described the use of gas syringes to measure volume.

(b)(iv) Over half of candidates gained both marks for this question. Most understood that repeating the experiment would improve reliability and many went on to describe the calculation of means or identification of anomalies.

Question 11

(a)   Over half of candidates gained both marks by naming restriction enzymes and ligase and going on to describe their functions. A few candidates gave the functions of the enzymes but did not name them.

(b)   This experimental planning question was well answered with almost a quarter of candidates gaining six marks. Candidates are clearly well prepared for these questions and often plan their answer using CORMS and then commendably give full experimental details. Common errors included:
- A few candidates simply gave note like answers such as 'C-change temperature' – to gain credit, there needs to be a context.
- Some candidates referred to amounts rather than masses or volumes. Candidates should always be clear about what measures they are using.
- Some candidates did not give a plan but described the effect of temperature on enzymes.

Summary Points

In future series, students should:

- be fully familiar with the requirements of all command words
- when planning experiments, give full experimental detail
- when answering evaluation and discussion questions, structure answers so that they are clear
- select sensible linear scales for graphs
- give detail that is commensurate with the level required by International GCSE