

Cambridge National

Science

Level 1/2 Cambridge National Certificate in Science **J815**

OCR Report to Centres January 2016

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Reports should be read in conjunction with the published question papers and mark schemes for the examination.

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R072/01 How scientific ideas have developed

General Comments:

This unit gives candidates the chance to show their understanding of the processes by which scientific ideas have developed. It was clear that Centres had entered candidates who were suited to the structured approach of this Level 1 paper so that they were often able to demonstrate their knowledge and understanding. The language used in questions was appropriate and there was no evidence that candidates did not have sufficient time to complete the examination. However, it was noticeable that more candidates left answer spaces blank, even when the question only asked for a selection between different options.

Candidates often gave vague answers relating to 'having' or 'not having the technology'. They need to give specific examples in their answers (e.g. 1cii, 5c).

Question 1 is based on the Case Study and provides 25% of the marks for the whole paper. In answering this question candidates made better use of the pre-release material than in previous sessions. In some cases it was sufficient for candidates to quote directly from the text to gain full credit and candidates did this well (e.g. 1ai, 1aaii). However, where the question asked for an explanation it was necessary to do more than this (e.g. 1ci).

Candidates do need to ensure that they spend sufficient time reading questions carefully so that their answers address the question asked. For example, many only addressed one aspect of the two aspects required in the extended writing tasks (2c, 6b).

Comments on Individual Questions:

Question no.1

The structured parts that required answers using direct information from the pre-release material were usually answered well (ai, aii, b, dii and ei) but other parts required candidates to interpret the pre-release information. In (ci) only the best answers went beyond the text statement to express the idea that there was too much data for one person to process; the idea of scientists working collaboratively (cii) was not a common answer. Candidates were able to state that birds were classified as a group by their feet and beaks (ei) but the concept that members of the group would be distinguished by differences in these two features was not well understood (eii). Better answers in (f) were able to show how the work of later scientists related to that of Linnaeus.

Question no.2

Most candidates did not understand the concept of pure breeding (a) and answers often related to the plants used rather than the offspring. A common misconception (b) was that repeating an experiment makes the results more accurate. In part (c) candidates were firstly required to describe the results of plant breeding experiments from drawings; this should have been a straightforward task potentially giving 4 of the six marks available. Unfortunately, many candidates ignored this part of the question and answered the second part explaining why these results occurred, several simply relating to tall plants being dominant with no reference to genes. The best answers explained the results and some made reference to paired alleles. It is clearly important that candidates read this type of question carefully and address both aspects.

Question no.3

This question proved challenging for candidates as they had to decide who made certain statements about the universe, most got two of the four marks available correct.

Question no.4

This question concerned reaction times and many candidates showed confidence in identifying the fastest reaction (ai) and mean reaction time (aia). The two data tables showed a series of four reaction time tests, the first before playing a computer game and the second after. In (bi) candidates had to suggest why the reaction times improved but rather than compare the two tables, many candidates described how it changed during the sequence of the second four tests rather than comparing the 'before' and 'after' playing games results tables. This also resulted in few good responses in (bia). Candidates were asked to give two ways in which more evidence could be obtained (biii) but although there were good answers many only gave one way.

Question no.5

The relative distance from Earth of the Moon, Sun and stars was not well known (a), most candidates gained one of the two available marks. Only better answers gave Isaac Newton as the scientist who suggested the idea of a force of attraction (bi) although more could name this force as gravity (bia). Part (c) required two reasons why galaxies other than the Milky Way could not be seen, most responses only gave one, the most common ones being the idea of distance and not having a telescope. Vague answers referred to 'not having the technology' which was clearly not creditworthy. Many candidates had difficulty in interpreting the Hubble constant graph (ei) where B was a common incorrect answer and the idea that data with the smallest range is the best to use was not well understood (eii). Few candidates could name three parts of the electromagnetic spectrum other than visible light in the correct order (f); more gained one mark for naming two in the correct order.

Question no.6

This question covered aspects of body responses when exercising. Candidates were able to interpret a data table to identify a rise in body temperature (a); only better answers gained full credit by stating that the temperature stayed constant later. When answering the extended writing task (b) most candidates only addressed one aspect, in this case how the body responds by sweating when its temperature increases although few tried to explain the mechanism by which this occurs. The other aspect relating to why the body temperature increases was not well known, a few mentioned muscle movement but not the idea of muscles releasing energy or generating heat. A common answer was to state that we are hot because blood flows round the body more quickly. Few candidates could fully explain why an athlete would use a special blanket (ci) and usually gained credit for stating that it prevents heat loss. Many candidates understood that the purpose of eating sweets was to raise sugar levels (cii) and the best answers indicated the need to raise blood sugar levels.

R072/02 How scientific ideas have developed

General Comments:

This unit gives candidates the chance to show their understanding of the processes by which scientific ideas have developed. The first question (relating to the Case Study) provides 25% of the marks for the whole paper. Most candidates showed evidence of being familiar with this document and it seemed that they had spent some time preparing in advance of the examination. It was, however, very clear that many candidates were unable to address the questions which related specifically to the bold print (level 2) statements in the specification. These can only be examined on the level two paper.

There was little indication of time pressure or other constraints for most candidates, although some very weak candidates did not attempt a number of questions throughout the paper. They would have been better advised to attempt the level one paper.

Comments on Individual Questions:

Question no. 1

Most candidates were able to answer both parts of (a).

About half the candidates achieved one mark for part (b) but very few put enough detail in their answers to get both marks. Many of the answers that did not gain credit just gave characteristics of all birds eg beaks, wings and feet, rather than specific details of the feet and beaks of the duck and pelican.

Few candidates gave answers gaining credit in (c)(i) but were able to give a valid reason for (c)(ii) such as more species had been discovered.

Answers gaining credit in (d) usually mentioned that either species adapted or became extinct. Fewer candidates recalled biodiversity.

In (e)(i) the correct characteristic, vertebrae, was given by the majority of candidates, but fewer chose shark in part (ii). The most common incorrect answer was tuna fish. In (iii) most candidates gained at least one mark. Often answers lacked details and did not gain credit e.g. both had eggs instead of *amniotic* eggs; one has hair but the other has not instead of saying *the rabbit has hair*.

Question no. 2

The majority of candidates were not able to give the correct numbers or the ratio in (a).

Few candidates drew correct conclusions from the experiment results. Ideas about recessive and dominant allele were sometimes mentioned but often not used correctly. Some candidates tried drawing a Punnett Square but few were correct or were not used in the explanation. Some candidates copied one of the diagrams from the stem of the question but did nothing with it. The minority of candidates gaining any credit usually got Level 1 (one or two marks).

The most common correct answer in (c) was about repeating the experiment. Only a few candidates gave similar results as an answer.

Question no. 3

In (a) nearly all candidates got at least one mark, with the majority gaining two of the three marks. The most common mistake was putting stars before planets.

Only a very few candidates gained a mark in (b), which was usually for the idea of gravity.

About half the candidates chose the correct option in both (c)(i) and (ii).

Very few candidates chose the correct option in (d) with 'heating stars' and 'climate change' being strong distractors.

In (e), just over half the candidates were able to give one correct reason, which was usually the idea of making his work widely known or for being the basis for further work. Few gave two correct reasons.

Neither part of (f) was answered well. A number of candidates wrongly chose telescope A and gave the reason that it was the first to be used. In (ii) the idea of range was not understood and many answer just said it was longer without indicating what 'it' referred to.

Question no. 4 Candidates answered (a) better than the previous Level of Response question (Q2b). Most candidates were awarded a level 1 (one or two marks). Candidates were able to describe the temperature changes and to give at least one cause of a change.

In (b) the majority of candidates were able to give at least one idea such as search the internet but repeating the measurements with other people was rarely given.

Question no. 5 The first two parts, (i) and (ii), of part (a) were well known but few candidates knew muscles for (iii).

Answers such as fair test and accuracy were given for (b)(i) but more detail was required to gain credit.

About half the candidates successfully calculated the mean correctly in (b)(ii).

Very few candidates said that Kyle's *mean* value was the lowest and so did not gain the mark in (c)(i). A few candidates saw that his sister's mean was almost the same or some of her results overlapped his in (ii).

Very few candidates gave correct answers for (d) parts (i) and (ii) or (e).

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