



General Certificate of Education

Human Biology 1406

**HBIO2 Humans – their origins and
adaptations**

Report on the Examination

2009 examination - June series

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General

The paper produced a wide range of marks and correct responses were seen to all parts of all questions.

It was pleasing to note that candidates did relatively well on parts of questions that involved descriptions of trends in tables and in scatter graphs. They also appeared to be quite well prepared for questions requiring explanations of these trends, or evaluation of decisions based upon data presented.

Many candidates did score poorly on questions involving topics that are now covered at a simple level in AS and were formerly solely A2 topics, or are revisited at A2. This was especially evident in question 10, where questions relating to evolution and the relationship between DNA and proteins were poorly done by many candidates. It was also evident that many candidates were not prepared for the synoptic questions relating to enzymes and cell membrane structure. Centres should be aware that candidates are required to be familiar with the material in the Biological Principles at the end of Unit 1 for all subsequent Unit assessments; this would include Units 3 and 6. Centres should also note that similar requirements apply to the Biological Principles at the ends of Units 2, 4 and 5.

Question 1

This question was intended to be a highly accessible start to the paper and almost all candidates scored highly.

Question 2

This question proved to be more challenging than expected. AS level answers were all that the examiners expected for part (a); organisms are put into groups, that are then put into smaller groups, that are more specific or do not overlap. A large number of candidates failed to score in (a). Part (b) illustrated at a simple level the change to factual recall *with understanding* that QCA required for the new A levels. Weaker candidates were unable to put *Canis familiaris* into the table and instead put *Homo sapiens*. Part (c) was well done by most candidates.

Question 3

Part (a) discriminated quite well but about half of the candidates were able to describe and explain the appearance of the chromosome and obtained 2 marks. In (b), some candidates got their names and descriptions mixed up but, in general, candidates scored well here.

Question 4

In (a), about half of the candidates knew that it was important to have haploid gametes in order to restore the diploid number at fertilisation. Only a minority appreciated that gametes being haploid keeps the chromosome number constant from one generation to the next. The main problem for candidates in (b) appeared to be expressing themselves clearly. Quite a few appeared to use *chromatid* and *chromosome* interchangeably. Relatively few made it clear that one chromosome from each pair moves to each pole. There were similar problems of expression in (c). It was encouraging to note that many candidates were aware that chromosome 21 is implicated in Down's Syndrome.

Question 5

In (a), the majority of candidates correctly suggested that a small surface area to volume ratio could reduce heat loss. Very few went on to link this to maintaining a constant body temperature.

In (b), many candidates obtained one or two marks. Most spotted the trend to longer forearms and narrower hips in hot climates. Many went on to link this to body form, surface area and heat loss. Few commented on the overlaps between the two sets of data or the relative strengths of the apparent correlations.

Many candidates scored well in (c), linking the blocking of UV to lower risks of cancer. References to vitamin D were ignored in this context.

Question 6

Most candidates obtained one or two marks in (a). A common misconception was that oxygen is a source of energy.

Part (b) discriminated well across the range. The commonest error was a failure to read the stem carefully and think that the information applied to a single race, rather than races of different lengths.

Part (c) was poorly done by many candidates. This question required a basic understanding of enzymes as outlined in the Biological Principles at the end of Unit 1.

Question 7

There were many correct answers to (a). Candidates should be reminded that numerical answers are usually given to 3 significant figures; so 2.14 rather than 2.1 or 2. The commonest error was for candidates to attempt some form of percentage calculation.

Very few candidates failed to score in (b) and about a quarter obtained three marks. In (c), most candidates obtain one or two marks but few came up with three observations about the wisdom of spending money on radon traps.

Question 8

Part (a) discriminated across the range. Most candidates spotted that people with IED were (on average) worse at identifying facial expressions. How many marks they obtained beyond that depended on their ability to select further information from the chart.

Part (b) was more challenging. A large number of candidates failed to score because they thought that a person with IED displayed the wrong expression, because they were aggressive. Better candidates deduced that people with IED might act the way they do because they incorrectly identify the facial expressions of people they meet or see.

Question 9

There were some really good answers to (a) with candidates writing about the strong correlation between increased cereal per hectare and decrease in bird populations and going on to note that the correlation was strongest with intensive farming. Weaker candidates often obtain one or two marks for noting that bird populations decreased with both types of farming and that intensive farming produced (on average) the greater falls.

Part (b) discriminated well across the range. One problem for some candidates was that they failed to read the question stem carefully and thought that the points on the graph were different farms in the same country. The best answers attempted a *yes* and *no* approach.

Part (c) was intended to be accessible and the majority of candidates obtained two marks.

Question 10

The answers to (a) divided almost half and half into those who understood that the scientists developed their hypothesis because neanderthals lived in Europe (as stated in the passage) and those who thought it was because of the results of their investigation. The latter approach was not given credit.

Part (b) was well done. 10(c) was another question requiring some knowledge of Biological Principles from Unit 1 and was poorly answered.

Part (c) required an AS level of understanding of the links between DNA and protein. This topic is required at AS and is revisited in detail at A2. At AS level, candidates are required to know that a sequence of DNA bases is copied as RNA. This RNA is used at the ribosome to assemble amino acids in the correct sequence into a protein, to give a functional shape (tertiary structure). In this question, a change in DNA would involve a change in the base sequence, the RNA produced and the sequence of amino acids in the protein produced. There was evidence that some candidates had been taught beyond AS requirements and some of these candidates produced very confused accounts.

In part (e), many candidates approached the question by describing the differences between neanderthals and modern humans. Some went further and described a range of hominids. There were some very good answers where candidates used AS level knowledge of the principles of the theory of evolution.

Part (f) was intended to be an A grade discriminator and that was what it proved to be. Many candidates scored one or two marks by focusing on one or two reasons. Few came up with a wider range of possible issues that could affect the reliability of the conclusions.