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Examiners' Report/ Principal Examiner Feedback

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Examiner's Report International GCSE Human Biology 4HB0 01

There was a very wide range of performance by candidates with a number scoring over 100 marks. However, unusually there were some who managed only single figure marks. A common theme, as in previous examination series is a failure on the part of candidates to use the correct biological terminology. This makes it more difficult for candidates to express themselves and also more difficult for examiners to understand the point that is being made.

Question 1

The multiple choice questions were all very accessible with over 80% of candidates achieving the correct answer for each question with the exception of 1(i). Here, there was a mixture of incorrect answers though 'water vapour' was the most common incorrect answer.

Question 2

Candidates scored well on part (a) and were able to select the most appropriate words. However, a significant number did transpose the answers to blank four and blank five and a fair number thought that the adult heart beats at 100 times per minute at rest.

Part 2(b)(i) was well answered by many candidates though a significant number did confuse the aorta and pulmonary artery.

Parts 2(b)(ii/iii) - many candidates scored at least one mark on each part of the question. The names of the valves in 2(b)(iii) scored more highly than the drawings of the valves although there were a large number that scored full marks. Some candidates, despite the diagram indicating which was the left and right sides of the heart, chose to draw valves in the wrong side and some positioned the bicuspid valve at the anchoring points for the chordae tendinae.

Question 3

It was apparent from the answers to part (a)(i) that many candidates had not done much in the way of laboratory work in taking down results and then presenting them in a coherent tabular format. Many candidates failed to put units in their column heading and many headed the column 'mass' of the potato cylinder rather than 'change in mass'. Many also failed to put the figures in either descending or ascending order but, instead, simply copied out the figures in the order in which they appeared in the laboratory notebook on the paper.

For part 3(a)(ii/iii) many responses scored full marks on the graph and those that were drawn correctly managed to record the correct value for 3(a)(iii). Common incorrect responses were, a failure to correctly label the axes of the graph, particularly with respect to units, in addition many candidates drew a point to point line despite the question asking for a line of best fit.

Most candidates were able to give 'osmosis' as the correct answer to part (b)(i), though some thought that it was diffusion.

The answers to 3(b)(ii) were often confused and indeed, confusing. In many cases this was because the candidate did not use the correct terminology. The easiest way to describe the movement of water is down a water potential gradient. This avoids any chance for a candidate to become confused about the concentration of the solution. Far too many talked about a water concentration gradient which should not be used. The use of water potential as a term should be encouraged at all times and it was pleasing to see that many candidates easily scored the two marks by means of a correct reference to it.

Part 3(b)(iii) proved surprisingly difficult for many candidates. Some thought that the paper acted as a filter paper drawing out water from the cylinder. Others thought that it was to stop water entering from the atmosphere. whilst many recognised that it was used to remove surplus water or sugar solution, far fewer went on to explain that the presence of unknown and variable volumes of water/sugar solution on the surface of the cylinder would have impacted adversely upon the results of the weighings.

In answer to 3(b)(iv) most scored at least one mark. Temperature and surface area were mentioned the most and also volume of solution was common as well. Far too many referred to 'amount' of solution and 'size' of potato. Candidates should be encouraged to use for specific, accurate and meaningful descriptions.

Question 4

The majority of candidates could correctly describe a joint though a significant number included movement in their description, obviously forgetting about fixed joints.

The names of the structures in part (b)(i) were often correct though many did think that label A referred to cartilage and label B, to a tendon.

In answer to part 4(b)(ii) many responses scored four marks, with marking points 1 and 2 for A scoring well. Not many candidates managed to score both marking points for B with the majority of candidates failing to make any reference to movement but a fair number scored both marking points for C.

Question 5

Answers to 5(a)(i) that scored full marks tended to score on marking points1, 2 and 3. Some lost marks as they put too high a temperature or just stated the temperature and then didn't get any of the other marking points. Quite a lot of responses linked the temperature to marking point 4 and enzyme activity.

In answer to part (a)(ii) many candidates scored one mark for a statement that tube C was a 'control', (a minority stating that it was a 'controlled experiment'). The

majority of candidates did not understand the role of a control though a significant number did make statements to the effect that bacterial enzymes had been denatured or that the bacteria had been killed. Unfortunately few were then able to explain the significance of this treatment.

In general, in part 5b, where responses gained marking point 1, they also tended to gain marking point 2 or marking point 4. It was more unusual for them to link the breakdown of food to glucose (marking point 3) and its subsequent conversion to lactic acid.

Question 6

The majority of candidates were able to correctly calculate the mass of insecticide but a significant minority termed the units as mg per kg which is incorrect. Others chose to write their answers giving it as 65.000 though the position of the dot in the figure often left examiners wondering whether the candidate really meant sixty five thousand. The calculation of the energy transfer was well calculated by the vast majority of candidates.

Most candidates could draw an appropriate food chain though some omitted arrows indicating the flow of energy and some drew arrows pointing in the wrong direction. Some candidates invented their own food chains not using any of the organisms in the table.

In their answers to 6(b) a small number of candidates linked the longer food chain with bioaccumulation (marking point 5) however these responses tended to miss full marks as they didn't mention marking points 2 - 4. When full marks were attained it was mainly from marking points 1, 2,3 and 4. Candidates often found it difficult to express the concept that as a result of more stages in a food chain the more energy would be lost overall.

Question 7

There was a wide range of marks seen in the answers to part (a). The usual problems associated with the spellings of glucagon and glycogen were seen and there were many hybrid words listed. Accurate spelling is essential with these terms if candidates are to be given credit. The one answer that proved to be more difficult than the others was that of the islets of Langerhans. Candidates quoted a number of endocrine glands as being the potential source of the hormones.

There were many good responses in answer to 7(b) with majority getting at least two marks and many three or four. Marking point 5 wasn't mentioned very often and some confused the two sides of the question and muddled the marking points.

Question 8

Part 8(a)(i) scored very well with the majority of candidates making reference to reduced oxygen carriage and the subsequent effect on the body. Many thought that blood vessels generally would become blocked rather than the capillaries. Far fewer candidates made reference to the clumping of the sickle cells instead, chose to describe it as 'clotting' and the blood vessels being 'clogged up'. Candidates should be discouraged from using such terms as 'clogged up' and they also need to appreciate the differences between clotting and clumping.

In answer to part (a)(ii) most candidates recognised that there would be a greater resistance to malaria in the case of sufferers. Unfortunately, a number described this as 'immunity' which it is not.

In answer to 8(b)(i) many responses gained one mark, mentioning one marking point which was a reference to the presence of male carriers in the family tree. Many candidates failed to mention that if the condition were sex-linked it would not be possible for there to be a male carrier. Some tried to describe this by a detailed description of who could have the disease and who could not but their answers were not always creditworthy.

Most candidates achieved one mark in answer to part 8(b)(ii) This was invariably for a correct reference to the carrier not having the disease or the condition not being expressed in the phenotype. However, many responses didn't give a full description of heterozygous or mention heterozygous.

Most candidates could correctly state the genotype of person A though many insisted on putting in the sex chromosomes despite an earlier question making it clear that it was not sex-linked.

In answer to part 8(b)(iv) a large number of responses scored all three marks. There were good descriptions of the recessive nature of the disease and identification of both parents as carriers and the need to be homozygous recessive, though this latter point was the one area of weakness amongst a number of candidates.

Question 9

Although many candidates correctly identified the three structures found in the skin, common errors included naming the hair or hair shaft as the hair follicle and naming the blood vessel as simply that rather than as a capillary or capillary loop.

In answer to 9(a)(ii) the role of D in the movement of the hair was well known.

Although part 9(a)(iii) was well answered with the majority of candidates achieving both marking points there were some poor descriptions. For example, with reference to the hair, many responses mentioned the hair 'moving down' rather than lying flat against the skin and many candidates described the capillary as having 'more blood'

which is not a correct answer to the question which is about the change in the structures.

Part 9(a)(iv) was often well scoring with the role of air as an insulating layer being well understood. Unfortunately, however, there was still a large crop of candidates who insist on making reference to blood coming to the surface of the skin as though we sweat blood. Candidates must come to terms with the fact that it is more blood flowing through the skin capillaries that therefore, brings more heat with it which can then be lost through the skin itself, hence cooling the body.

Most candidates recognised the uncontrolled muscle contraction as shivering.

In answer to part 9(b)(ii) many responses missed the point of the question and included information that was in the answer to the previous question 9(a)(iv). Many candidates thought that the process released energy rather than the need for more energy released by an increase in respiration that generated heat as a waste product. Few candidates made any reference to the fact that the heat so generated was then circulated around the body via the blood.

Question 10

Most candidates could correctly identify the two structures.

The label line for structure A is actually pointing to the nucleus and so in response to part (b), answers were sought that made reference to chromosomes, genetic material or DNA and not descriptions of the acrosome enzymes and their role in the penetration of the ovum. In addition, a number of candidates made reference to mitochondria which are contained in the middle piece and not in the head of the sperm. The role of the tail or flagellum was well known.

In answer to part10(c) many responses gained at least one mark for either marking point 3 or 4. A smaller number answered with marking point 1.

Question 11

Although many candidates correctly identified the structures A and B, correct spelling of their names proved to be an issue for a significant number of candidates.

The vast majority of candidates correctly calculated the oxygen debt though a large proportion failed to show any working despite the question asking for such working to be included.

Whilst most knew that it was lactic acid that was produced a sizeable minority suggested it was carbon dioxide, which is also produced during aerobic respiration.

The answers to part 11(b)(iii) were either really good gaining at least two or three marks, or in many cases not scoring any marks as the response focused on the figures in the question and the idea of 'payback'. Some responses scored only two marks for marking point 1 and marking point 2 but then focused on the time for

removal needing to be greater, rather than the need for more oxygen, for removal needing to be greater. Some candidates described the need for more oxygen in terms of a greater level of respiration during the 10,000 metre race rather than its role in oxidising the accumulated lactic acid. Too many candidates failed to make a comparative statement concerning the point of more lactic acid being generated during the longer race.

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