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Principal Examiner Feedback

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Examiner's Report International GCSE Human Biology 4HB0 01

The number of candidates was much higher for this series than has been the case for comparable previous series. However, whilst there were some high quality answers seen there were, on the other hand, a number of poor quality responses. Failure to express themselves adequately and give full answers were common errors. There were some encouraging signs though that points raised from previous series have been taken on board and are now reflected in candidates' answers.

Question 1

Most of the multiple choice questions were very accessible to candidates only 1(d) and 1(i) caused any particular problems to a significant number of candidates. The commonest incorrect answer to 1(i) being choice D.

Question 2

Again, this proved to be accessible. Reference to the type of intercostal muscles was not required, the question asking for one word to be used for each blank. A prefix of external/internal which many candidates used for intercostal, was ignored and the candidate not penalised. The blank causing the greatest problems was the one requiring the term 'forced'. Many used the term 'inhaled' but should have been keyed into what was required by the previous blanks requiring the terms 'volume' and 'pressure'. A significant number of candidates prefaced the term 'pressure' with 'air' which in the context of the sentence is incorrect.

Question 3

This was also a very accessible question with many candidates scoring well. The commonest error made by some candidates was to hedge their bets by putting two answers in the space rather than the required one answer.

Question 4

Many correct answers were seen in the identification of the parts of the bone. However, B was often incorrectly labelled 'periosteum' despite the label line pointing clearly to the compact bone. Likewise, label line C which points to the bone marrow was often incorrectly labelled as 'spongy bone'.

The functions of cartilage were very well known by the majority of candidates.

The question concerning safety precautions received a mixed response. The vast majority made reference to 'goggles' or other appropriate wording. There was an expectation that tongs or a suitable method of handling the bones would have been listed as a safety precaution. Instead, yet again, there were numerous references to 'gloves'.

It is not usual to wear gloves whilst conducting standard laboratory procedures and whilst it might be desirable to wear a laboratory coat again that is not regarded as a safety procedure.

Many candidates struggled to explain why the bone became bendy/flexible after its treatment with hydrochloric acid. This was largely because there was a lack of understanding that compact bone consists of calcium salts and that this would dissolve. Many who mentioned the involvement of calcium salts failed to say that they would be dissolved. Even when there was a mention of the calcium salts, there was often a failure to refer to their role in strengthening/hardening the bone.

Although the bones of the lower arm were identified correctly by many, in a significant number of cases the names were transposed.

The answers to 4(c)(ii) were often muddled. Many candidates simply could not express succinctly the fact that the connection to bone Y meant that the forearm (and candidates should note that it is the forearm and not the arm) could be raised on contraction of the biceps but, if the tendons were attached to the humerus, it could not move and the forearm wouldn't either.

The changes that occur in the biceps when the forearm is straightened were often set in the context of the biceps and triceps working antagonistically. This usually yielded one mark with a comment about the relaxation of the biceps but there was then no further reference to the biceps becoming longer or thinner.

Many candidates were able to give correct answers to other structures present in the synovial joints, but a sizeable number chose to ignore the instruction 'not shown in the diagram'.

The comparison between muscles and tendons was poorly answered with many candidates clearly knowing little about tendons.

Question 5

This question dealt with a topic that was relatively familiar and so, many parts were well answered. The syringe clearly represents the mouth but a fair number thought that it represented the small intestine. The real clue was surely that it contained saliva.

The iodine-starch colour change was well known and the role of amylase in digesting the starch. A number of candidates failed to make reference to the fact that amylase or an enzyme is present in saliva and it is this enzyme that causes the digestion.

A variety of ways of setting up a control experiment were described the most common being without saliva or using boiled saliva. References to equal volumes or pH control were not appropriate.

Many candidates failed to recognise that using a bodily fluid was a health hazard in that saliva could contain pathogenic organisms which could be transmitted. There were surprisingly few references to the transmission of AIDS which was the initial reason why this particular experiment was banned in many school laboratories.

Many candidates were able to describe how the Benedict's reagent should be heated in a water bath. Unfortunately, there were a number who referred to heating, but failed to mention the use of the water bath. Many mentioned boiling whereas, in fact a positive result can be achieved with gentle heating and this should be for a maximum of two minutes.

Many recognised that the positive result was caused by the digestion of starch. However, large numbers said that glucose was the end product whereas, in reality the end product would be maltose, which is also a reducing sugar. Only a minority mentioned the term 'reducing sugar'.

Most candidates identified the temperature of 37°C as being the optimum temperature of the enzyme but failed to amplify their answer with a reference to body temperature. This is in the context of saliva being used.

Few candidates could explain the expected results of the test examined in (c)(ii). Although the temperature is much lower there would still be a reaction even though the enzyme was acting at a slower rate. The results observed would be that it would take longer for there to be no colour change when the iodine was added. Of those who appreciated that part of the investigation very few recognised that maltose would still be produced and that a positive Benedict's test would ensue.

Question 6

The location of the adrenal gland was known by the majority of candidates.

Although many candidates made reference to the movement of adrenaline around the body, by the blood, fewer made any reference to it being secreted directly into the blood. There was even less reference to the fact that the adrenal is an endocrine gland indeed, many described it as an exocrine gland.

The various structures to be identified in part (c) and (d) were well known.

The usual general problem was encountered by many answering part (e) which was a comparison question. The issue is always that only one side of the equation is given i.e. blood vessel Y carries carbon dioxide. When a question asks for a difference both sides must be given. Blood vessel Y carries more carbon dioxide would be perfectly acceptable.

Question 7

This question overall, was not particularly well answered. Many answers in describing the formation of acid rain were vague and whilst there may have been reference to the sulfur dioxide dissolving or reacting with water there was a failure to clarify that the water or water vapour was in the atmosphere. Few candidates made any reference to the formation of sulfurous or sulfuric acid as the acid rain.

Although many answers mentioned the use of a pH meter or universal indicator as a way of measuring the acidity of the rain, there were too many who wanted to use litmus paper. Few candidates made any reference to the collection of the acid rain or the means by which it could be collected. A determination of the acidity requires the reading of the meter or the use of a colour chart to compare any colour change in the indicator. There were few references to the lower the pH the greater the acidity.

The effects of sulfur dioxide were not well known by most other than 'it causes damage to ...'. The effect on humans does not include dissolving limestone buildings as many answers mentioned. Few made reference to specific conditions such as asthma or bronchitis.

The effects on trees were even more poorly known with very few references to leaf die back being seen.

Inevitably marks were awarded for the death of aquatic organisms as an effect on lakes and the fact that the lake became acidic or its pH lowered was a commonly seen acceptable answer. Many candidates shot themselves in the foot by making reference to 'marine' animals' which clearly, will not be seen in a freshwater lake.

Question 8

Candidates were largely successful in completing the grid with no particular common errors. The functions of the three types of cell were well known though a number of candidates failed to mention in the role of a phagocyte that the cell engulfed a bacterium before it digests it. Pleasing to note were the very few references to 'germs'.

The answers to the structure of the red blood cell as related to its function were often incomplete. Whilst an answer may refer to the biconcave shape of the cell, further references to resulting in an increase in surface area and the aiding of gaseous exchange, were often missing. Likewise, a reference to the lack of a nucleus and the presence of few organelles was often not linked to the ability to accommodate more haemoglobin. In many cases the answer concluded that these features allowed the carriage of more oxygen without any reference to haemoglobin.

The two fluids were usually correctly identified though there were some incorrect references to plasma.

Few candidates were able to state precisely how blood pressure is generated. There were many vague references to 'heart pumping', few candidates mentioned the role of the left ventricle specifically and even fewer used the term 'contraction' to describe the process.

Suggestions regarding the fall in pressure failed to make use of the diagram where there are labels indicating the movement of fluids out of the capillary which would reduce its volume and thus pressure.

Similarly, answers to part (b)(iv) did not take account of the information in the diagram where it is quite clearly indicated that blood pressure at the arterial end is greater than the osmotic pressure of the blood and, therefore, fluid is forced out and vice-versa at the venous end of the capillary. Few candidates were aware that there are pores present through which the fluid would pass.

Question 9

The majority of candidates could give the correct direction of travel of the impulse and identify the two parts of the cell. However, there was the usual problem with the comparison between a motor and sensory neurone in that only a statement about one of the cells was given rather than a comparison. For example, a candidate might comment that 'a motor neurone has a long axon'. Unfortunately, that statement is not a comparison. To say 'the motor neurone has a longer axon' is both a comparative statement and is acceptable.

The table was well completed by many candidates though common errors included 'hot object' for the stimulus when it should have included a reference to contact with the hot object. The knee jerk response was often inaccurately described. For example, some candidates referred to the 'leg moving' or, the 'leg moving upwards'. Clearly, any movement is of the lower leg.

Question 10

Whilst many candidates could explain a sex-linked condition in terms of an allele carried on the X chromosome, many described the 'disease being carried on the X chromosome'. Many failed to mention that it could be passed onto offspring.

Candidates found, what is really an easy calculation, difficult, because they did not understand that only half of the people tested should be included in the calculation, i.e. 2500 instead of 5000. The information is clearly given in the question where it says that equal numbers of male and females were tested.

The explanation required in 10(iv) discriminated well for the more able candidates. Many recognised that there were more males than females because the allele was carried on the X chromosome.

However, only the better candidates could further explain the need for two alleles before females showed the condition versus one for a male.

The genetic cross was generally well answered by the majority of candidates. However, a significant number still do not write out all of the details in full by labelling the parental generation, the gametes and the F1 generation. Some candidates failed to indicate clearly which the affected male was. Some failed to include X and Y chromosomes in their genetic crosses and bizarrely, a few used different letters from the ones given in the question.

