

Examiners' Report June 2007

GCE

GCE O Level Human Biology (7042)

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PAPER 1

General comments

The paper appeared to be very similar in demand to previous papers. All questions proved to be accessible to at least some of the candidates. There was no evidence that candidates had insufficient time in which to complete the paper. However, what was disappointing was the number of misconceptions held by candidates despite the fact that many of them have been mentioned in previous reports. Overall, the quality of candidate's answers is very good and the papers are a pleasure to read.

Question 1

Many candidates failed to give a function for each of the parts; instead they attempted to name them, despite the word 'function' being in bold type. In answer to A, many candidates made reference to the term *germs*. Candidates will not be given any credit for the use of this term since they should be using words such as pathogens, bacteria or even microorganisms. The answers to C often made reference to insulation but failed to qualify the term with a mention of heat or heat loss.

The change occurring at X was usually well known though a few candidates thought that the muscle relaxed. However, the change at Y was littered with the usual comments about the constriction of the capillaries rather than their supply arterioles. In addition, reference to the migration of the capillaries was common and very many candidates seemed to think that blood comes to the surface of the skin. Candidates should not take the phrase 'sweating blood' as literal! The majority of candidates made reference to sweat reduction at Z but often failed to explain how this reduced heat loss.

Question 2

The area of implantation was very variable with many candidates confusing this with the area that fertilisation might occur. Many thought that implantation could take place in a space as shown on the diagram. The role of progesterone was not well understood. Those who recognised its importance in maintaining the integrity of the endometrium were in a minority and a comment that it maintained the uterus wall was commonplace. Far fewer made any reference to it preventing miscarriage and its suppression of ovulation. The structures secreting progesterone were not well known nor were the times when sudden changes occur in the hormone concentration during the menstrual cycle.

Question 3

Although most candidates were able to identify correctly which of the two students was the athlete, few were able to go on and give two reasons, based on data, as to why this is the case. Although the more rapid return to pre-exercise levels for breathing rate was identified as a reason by some, few could suggest lower levels of normal breathing as a reason or the lower level during exercise.

In answer to (b) most candidates made reference to anaerobic respiration or oxygen debt; usually there was a reference to lactic acid formation. Few made mention of the toxic nature of the acid or seemed to appreciate that oxygen was required to metabolise it.

Question 4

Colour changes were usually well known, though it should be emphasised that a positive test for starch yields a blue-black colour with iodine and a negative result yields the brown colour of the iodine.

The precautions to make it a fair test were often vague in the descriptions given. For example, many candidates referred to a constant temperature rather than the same temperature. Although the examiners were prepared to allow references to the same amount of starch / amylase, candidates should be encouraged to use the terms volume and concentration as appropriate. A significant minority made reference to maintaining the same pH; they clearly had misinterpreted the nature of the question. The interpretation of the optimum temperature of the enzyme proved to be easy for most candidates and most were able to explain that the enzyme was denatured as the temperature was increased towards 60°C. However, only a minority made any reference to the fact that the shape of the enzyme or its active site is changed. Converting the time taken for the reaction into the rate of reaction was not an obstacle to the majority of candidates though a number did leave the graph paper blank or produced a sketch graph identical to the one in the question.

Candidates found it difficult to describe the formation of enzymes within the cell. Accounts were often confused and indeed, confusing. t-RNA and m-RNA were often interchanged and candidates seemed to have difficulty in focussing on the need for amino acids to be linked via peptide bonds to form a long chain.

Question 5

This proved to be a very straightforward and accessible question. The common mistakes were to suggest that the majority of carbohydrate is taken in as glucose rather than starch and to name a variety of vitamins, when deficient, that would give rise to the condition of rickets.

Question 6

Most candidates were able to plot the graph correctly though some plotted the two points at 200 incorrectly. The fall in glucose levels in student A was well documented with most knowing that the excess is converted to glycogen and stored in the liver. The fall of blood glucose in student B was not well understood with many candidates simply repeating their answer to (a)(iv). Whilst some candidates were able to describe the use of glucose as a cellular respiratory substrate, far fewer made reference to its probable excretion and even fewer expanded upon the answer by including any comment on the failure of the kidney nephron to re-absorb the glucose from the tubular filtrate.

Question 7

Identification of the parts did not cause problems for most candidates. The answers to (a)(ii) often included details of pressure differences or directional/destination differences. Candidates must read the question thoroughly and answer the question as set. Where two differences are required and 1 and 2 are given in the paper, a separate difference should be included at each point and not two differences under 1. Mention of difference in the question requires an answer that is going to give a comparison: it is no use a candidate stating that a particular blood vessel contains blood with a lot of carbon dioxide within it and then making no further comment. A direct comparison of the carbon dioxide concentration in the blood of the second vessel is required. The use of the terms *more* or *less* and *higher* and *lower* should be encouraged and will make answers easier to write.

Differences between cardiac and skeletal muscle were well known though some candidates penalised themselves because of clumsy expression. For example, cardiac muscle cells are uninucleate as opposed to skeletal muscle fibres which are multinucleate. However, too many candidates omitted the word *cells*.

Again, differences in the thickness of the walls of the two chambers was well known but a number of candidates, whilst describing the difference in distance the blood has to travel, failed to mention the different pressure requirements of contraction to deliver the blood to their destinations. A sizeable number of candidates thought the differences were necessary to accommodate pressure differences in the blood rather than in the differences required in pressure generation.

Differences between the blood plasma and the lymph were poorly understood. Of those who could cite differences, few could go on to explain why those differences arose. The examiners were hoping for references to more fatty products in the lymph as a result of their direct absorption into the lacteals and also differences in antibody levels as a result of their production in the lymphatic system.

The problems of lymph return generated many vague answers usually centred on the blockage of blood vessels. Reference to coronary problems and the possibility of heart attacks were points that should have been made.

Question 8

Again, a comparison question that caused problems. It seems that candidates generally have difficulties with such questions and the comments made previously apply here. Compounding the problem was the demand that answers should be illustrated by the use of data. Many candidates chose to ignore that part of the question and confined themselves simply to a statement that lower HIV levels resulted in higher life expectancy. Part (a)(iii) was less problematical in that candidates correctly identified Africa as the continent and had a number of points that could be chosen to support their assertion.

The answers to (b)(i) lacked clarity because candidates were required to compare the data of X, Y and Z and failed in most cases to do that. A statement of the data from one country, on its own, does not lead to a conclusion. It is necessary to discuss the data from all three countries.

Answers to (b)(iii) were often vague, for example 'don't share sharp things'. It would be far better if candidates could give a full explanation as to the reasons why a particular course of action reduces the likelihood of the spread of the disease.

Question 9

Part (a) of the question showed no particular pattern in terms of incorrect answers. However, in (b), many candidates named substance 3 as red blood cells rather than haemoglobin and number 2 as enzyme rather than lipase. Many answers to substance 1 named molecules that are formed during the process of blood clotting rather than substances already present in the blood.

PAPER 2

General Comment

The majority of candidates managed to respond to most sections within the space provided. Problems were caused by those candidates who tried to squeeze several lines of writing into a one line space. A significant number of candidates completed responses in odd places on the paper. It was not always obvious to the examiner that there was more to the answer. Candidates who do go outside the spaces given **MUST** indicate where their answer continues if it is to be marked. About 20% of candidates completed some of their responses on separate sheets - this was often due to the inclusion of irrelevant material.

SECTION A

Question 1

Responses to this question were pleasing. Part (a) was well known by most candidates. The diagram required for (b) was presented in a far better way than when set in the past, with very few candidates offering the wrong drawing. Most labels were correct. In (c), most candidates clearly understood what was required and responded appropriately. A few confused the adaptations for long distance vision with those for near vision and there were several who talked about circular and radial ciliary muscles or tried to involve the iris.

Question 2

In this question, a number of candidates failed to read the question with sufficient care and thus produced responses that, while biologically correct, gained little credit.

In (a)(i), candidates were asked to explain changes not just to state them and in (ii) they were asked to describe how oxygen already in the blood reaches muscle cells not to describe uptake into the alveolus and the circulatory system from lungs to muscles. Part (b) was poorly answered. Once again many failed to note that the question was about how carbon dioxide levels in the blood are controlled not just how it is removed from the blood or from the body. Many failed to mention the role of parts of the brain and nervous system. Adrenaline and its effects were well known but again some candidates failed to use their knowledge to answer the question set.

Question 3

Once again thorough reading of the stem of the question might have resulted in more targeted responses

In (a), definitions were required, not unexplained examples. Not all heterozygous individuals inherit a dominant and a recessive allele. In (b), responses were very weak with only a small number of candidates actually stating the mathematical probability of the girl showing symptoms of the condition. Statements such as 'there is a good chance' were common. Explanations and diagrams usually ignored the information in the stem. In (c), candidates were expected to explain or suggest reasons for various observations, using material in the question and their own knowledge. Most failed to gain more than minimal credit here. Mutations and their causes in (d) were well known.

Question 4

This was frequently a high scoring question. In (a)(i), the diagrams were often accurate and well labelled. A minority of candidates failed to note which diagram was required and drew nephrons or sections through a kidney thus gaining little credit. In (a)(ii), descriptions of the formation of urine were usually both extensive and accurate, often gaining maximum credit. Movement of urine from the kidney to the outside was usually answered in terms of the route taken rather than the processes moving the urine along the route. Part (b) was poorly answered. In (b)(ii), many failed to note they were asked why the process was cheap and effective.

Question 5

Knowledge of the functions of parts of the skeleton was weak. Once again there was a failure to answer the question with many just stating the function of the part named.

In (a), many assumed that all that was required was something about the cranium and ignored the sense capsules, the lower jaw and the teeth. In (b), the only bones mentioned frequently were the ribs. Protection of heart and lungs was usually mentioned but little else. Part (c) was very poorly answered and the leg was often ignored completely.

SECTION B

Question 6

Knowledge of the malaria parasite and measures to control it were quite good but a significant number of candidates failed to read parts of the question with sufficient care and gave information in the wrong section where it gained little credit.

In (a)(ii), candidates were expected to use their knowledge of the life cycle of the mosquito to determine conditions necessary for it to survive. In (a)(iii), only measures that local authorities could take to break the life cycle of the mosquito were required not personal precautions such as wearing clothes with long sleeves. It was surprising that in (b) many still suggested use of vaccination before visiting a malarial region, although no such vaccine is currently available. Many also appear to think that anti-malarial drugs work by preventing the mosquito biting the visitor.

Question 7

Part (a) was poorly answered. Few realised that the application of cold water would not only clean the wound but also help to reduce blood loss. Many repeated their original response in (a)(ii) and failed to consider the risk of contamination from new sources. The processes leading to the clotting of the blood were well known. In (b)(ii), the roles of various types of white blood cells were thoroughly discussed. Many candidates seemed unfamiliar with the origins or action of antibiotics and some confused them with antibodies.

Question 8

Those candidates who chose this question frequently confined their response to the likely presence of bacteria in the excreta, although the mark distribution should have suggested that more was required. In (a)(ii), the structure of a pit latrine was usually well known, but reasons for choosing the site for the latrine were often weak. Candidates were clearly unfamiliar with the functioning of a septic tank and most of the accounts given showed confusion with a sewage works or even a water treatment plant.

Question 9

Responses to this question tended to be strong in (a) and weaker in the later parts of the question. In (a), most candidates discussed rising carbon dioxide emissions and also the link between sulphur dioxide emissions and acid rain. A few failed to note that the question was about burning fossil fuels, not about cigarette smoking or damage to the ozone layer by CFCs. Most confined their response to (b) to the risk of eutrophication from fertilisers. Few mentioned the dangers of excessive use of pesticides or the development of monocultures. In (c), many only mentioned deforestation without saying why this was occurring.

HUMAN BIOLOGY 7042, GRADE BOUNDARIES

Grade	A	B	C	D	E
Lowest mark for award of grade	134	117	100	90	74

Note: Grade boundaries may vary from year to year and from subject to subject, depending on the demands of the question paper.

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