edexcel
advancing learning, changing lives

Examiners' Report January 2007

GCE

GCE O Level Human Biology (7042)

Edexcel Limited. Registered in England and Wales No. 4496750
Registered Office: One90 High Holborn, London WC1V 7BH

A PEARSON COMPANY

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information please call our Customer Services on 0870 240 9800, or visit our website at www.edexcel.org.uk.

January 2007

Publications Code UO018822

PAPER 1

General comments

The paper was more 'mark yielding' than in some years. Few questions presented major problems to the majority of candidates. Most candidates appeared to have no difficulty in completing the paper in the time allowed and very few questions were left entirely blank. The overall standard appeared high, with many scoring in excess of 65 (some far above this level) but there was a real, though small 'tail'. Candidates in the latter group seemed to struggle with their language skills and found difficulty where explanations were required.

Question 1

Many candidates scored full marks on the diagram. The major error was to identify a type of white blood cell in (b) rather than a substance produced. Those who did identify antibodies sometimes found difficulty in explaining how they destroyed bacteria.

Question 2

This was a very high scoring question for many candidates. The main errors were to fail to identify the incisors as the teeth that carried out the function of biting, and to identify the substrate for amylase as carbohydrate which was considered too vague.

Question 3

Part (a) was usually well answered, but in (b) many failed to realise that iodine solution, not the solid element, is used in the starch test. A significant minority suggested that Biuret or Benedict's solution could be used. Candidates need to be reminded that a positive starch test produces a blue / black colouration not purple or even just blue. The only errors in the rest of the question were responses that were too vague to gain credit, such as 'protection' as a reason why fat is needed in the body.

Question 4

In (a) most identified the type of joint as a ball and socket joint and realised that this gave movement in all three planes. The range of movement at a hinge joint was not so well described with many incorrectly stating that it could only move in one direction, not one plane. Very few candidates knew that the pectoral girdle is attached to the vertebral column (bone to bone) by ligaments. Most knew that cartilage and synovial fluid were involved in reducing friction at a moveable joint but fewer could explain how this is achieved.

Question 5

This question produced the weakest responses on the paper and it was quite clear that many candidates lacked detailed knowledge of the functioning of the eye. The diagram was often poorly completed and in some cases label lines crossed over each other in such a manner that it was difficult to see what was intended. The pupil was placed in the middle of the aqueous humour by some candidates, and even inside the lens by others. In (b), many failed to mention that the muscles involved were the iris muscles, although they did know the changes that would occur in the pupil. In (c), many thought that there are both radial and circular muscles in the ciliary body although changes in the shape of the lens were usually correctly described.

Question 6
Few candidates were able to identify all five structures in (a) correctly, although most managed three or four. Some candidates had difficulty in explaining their ideas in (b) and (c). The benefits of the larger heart were rarely appreciated and some tried to link this to an increase in oxygen uptake rather than an increase in stroke volume. In (c), there were frequent references to heart attacks but not to the increased risk of such attacks. Many did not really answer the question but simply stated that fat would 'clog up' the arteries.

Question 7
This was generally a high scoring question. Most candidates knew the parts of the male reproductive system although there was some mis-spelling of urethra. The commonest error was to name sperm rather than semen as one of the liquids in (b). In (c), most knew that a vasectomy was a form of birth control but many were unable to explain clearly how it works. A number thought that it prevented the production of sperm.

Question 8
Some candidates made unnecessary difficulties for themselves by attempting to quote actual figures in (a) rather than using the terms provided. A minority of candidates failed to note that (b) was about inhaling air and quoted the internal intercostals muscles rather than the diaphragm as contracting. Part (c) required an explanation and a one-word response such as 'epiglottis' was not sufficient. Part (d) was well-known although a number of candidates still think that cilia trap and remove bacteria unaided.

Question 9
Some candidates constructed a diagram which showed features of both sensory and motor neurones, but most produced accurate drawings of a high quality. Candidates need to be warned that label lines must touch the structure intended, not finish somewhere near to it. In (c)(ii), some named a neurotransmitter, rather than stating a process.

Question 10
A significant number of candidates gave the number of chromosomes in a body cell of a woman as 23 rather than 23 pairs or 46. In (b), the differences required in (i) and (ii) were often inadequately explained. A number of candidates named meiosis as the process that turns an egg cell into a zygote. In (c), many candidates still present genetic cross diagrams with no labelling so that they gain little credit.

Question 11
Almost all candidates constructed accurate graphs. Those who failed to gain full credit usually plotted a wrong set of data or failed to read the question, and constructed a bar graph. Very few candidates could offer an adequate explanation for the use of 'deaths per thousand people' rather than quoting actual figures. A number did not know how to carry out the calculation in (c). In (d), many described every fluctuation in each graph rather than the overall trends. Explanations for the changes shown were often rather vague, although most recognised the importance of vaccination in reducing the incidence of poliomyelitis.

PAPER 2

General comments

Candidates continue to encounter difficulties in the production of clear labelled / annotated diagrams. This was especially true in answers seen to the question on genetics where a failure to label parents, offspring phenotypes and appropriate ratios was noted. On many occasions, the examiners were left to interpret what the candidate meant. Small, poorly-drawn diagrams add nothing to an answer particularly if they are inadequately labelled.

Question 1

This was not a popular question with candidates and overall was poorly answered. In (a), there was a failure to appreciate the general nature of the question with respect to enzyme structure and function and, as a result, a number of candidates wrote in detail about the role of enzymes in digestion. Few referred to the component amino acids or to the folding of the polypeptide chains. Synthesis of proteins was poorly understood. There was little knowledge demonstrated by the majority of candidates with respect to transcription and translation. Most answers made vague reference to DNA and the role of the ribosomes in supporting synthesis. Most candidates were unable to give a concise systematic approach to the process. Part (c) was usually well answered but, despite the question asking for a named enzyme, many candidates chose to state protease, which is the name given to a group of protein digesting enzymes. A number omitted to mention the conditions best suited to the activity of the enzyme. Enzyme denaturation was well understood although many candidates insisted, irrelevantly, in describing the effect of the whole temperature range on enzyme activity. Some candidates did not go beyond mention of the term denaturation and failed to explain its mechanism.

Question 2

The general comments made about diagrams apply particularly to this question. Many failed to mention the term antagonistic and few gave any account as to how the muscles transfer the force of contraction to move the lower arm. References to the point of attachment of the muscles were scanty. Most candidates could adequately describe the protective function and many went on to state the function of support but failed to expand upon this answer by giving specific details. A number of candidates mentioned the role of the skeleton in producing blood cells. Many candidates did not describe the role of diet adequately. Although the importance of calcium ions and vitamin D was mentioned, there was often no reference to their roles apart from vague comments about making the skeleton strong. Protein was usually not mentioned and when it was there were vague references to growth rather than a detailed comment about its role in cell production. Comments on a poor diet were often restricted to references to poor growth of the skeleton rather than to specific references to rickets, inadequate cell production and brittle bones.

Question 3

This was a popular and well-answered question with the exception of (c). Most candidates scored maximum marks by giving a correct definition of an endocrine gland. Most were also able to state the location of the adrenal glands on top of the kidneys and then go on to list a number of effects caused by its secretion. Very few candidates, however, referred to the secretion of cortisone or its effect. Candidates found greater difficulty in describing the location of the pancreas: a simple reference to its position below the stomach would have been adequate. A number of candidates insisted upon describing the exocrine role of the pancreas, thereby wasting time, before going on to describe its endocrine function. Some candidates ignored the endocrine function completely. Part (c) proved to be beyond the capabilities of virtually every candidate. A simple reference to homeostasis would have secured a mark and a brief mention of a change in condition causing a change in the level of hormone secretion was all that was required.

Question 4

The functions of the liver were not very well known. In (a), a common mistake was to refer to excess protein rather than to excess amino acids. Few candidates mentioned the combination of the amino group with carbon dioxide to form urea. In (b), the formation of bile pigments was even less well understood. Even those candidates who recognised that the breakdown of old red blood cells was involved usually failed to mention the resulting breakdown of haemoglobin with the subsequent storage of iron for further use. The answers to (c) usually comprised a sentence including the term detoxification. Some candidates, however, were able to quote an example, other than urea, of a toxic substance to be metabolised. Alcohol was the commonest example in this category. Very few went on to say that the role of the liver was to break down the toxic substance or to modify it to render it less toxic. Part (d) was usually much more mark-yielding with maximum marks for (i) very common. In (ii), many candidates failed to mention that urea is not reabsorbed from the filtrate, unlike glucose and amino acids, and is therefore excreted in the urine.

Question 5

Candidates focussed insufficiently on what was asked in parts (a) and (b) with the consequence that points relevant to one section were included in the other section. The structure of the placenta was not well known. Few referred to it being disc shaped. Whilst there were some candidates who referred to the presence of villi and their role in increasing surface area, fewer made any reference to the good blood supply and even fewer to the point that it is a thin barrier. It was unusual to see any reference to the significance of the placenta as an area of exchange of substances. Few candidates were able to give a comprehensive account in answer to part (b). Vague references to substances passing from the mother to the fetus were as far as many candidates were able to develop their argument. Reference to named examples of soluble food materials was required as was the need to describe movement down a concentration gradient. Reference to the movement of oxygen from the maternal haemoglobin to the fetal haemoglobin was seldom seen. Part (c) was usually well answered with many referring to the role of the amniotic sac and fluid. Few referred to the mucus plug preventing the entry of bacteria or to the role of the pelvic girdle. A failure to annotate genetic cross diagrams was the biggest source of error in the answers to the two parts of (d). It is essential that where genetic crosses are given as part of the answer, parental genotypes, the gametes produced the point of fertilisation and the offspring phenotypes should all be clearly labelled. Ratios should always be given whether or not the question specifically asks for them to be included.

Question 6

The use of a well-labelled diagram would have been appropriate as part of the answer to (a): this was, however, seldom seen. Although many candidates referred to the presence of DNA / RNA (though not always as a strand) and there was often a mention of a capsid or protein coat; hardly any candidate described points of attachment to other cells or the means of host penetration. Few candidates made the point that a virus can only reproduce inside a living cell. The answers to (b) often omitted the site of infection, though the disease and method of infection were usually well documented. The role of vaccination as providing immunity was rarely stated in answers to (c) (i). The fact that the vaccine does not lead to symptoms of the disease developing was usually not mentioned, nor was the role of the vaccine in acting as an antigen. Candidates did not seem to appreciate that vaccination leads to the development of memory cells, which allows a rapid production of antibodies on subsequent re-infection, preventing the development of symptoms. Other preventative measures tended to focus on AIDS prevention, which were well known.

Question 7

Questions on water purification always seem to cause difficulties and this one was no exception. Answers were often muddled with the process of sewage treatment and the various methods of water purification confused. The role of microorganisms in the process was rarely mentioned. The importance of chlorine to the purification process was well-known, though a sizeable number of candidates failed to state that it was added to the water. Few candidates mentioned that the purified water needed to be stored in closed tanks or containers, though many mentioned its distribution through pipes. Control of the mosquito as a vector of malaria was well known by the majority of candidates. However, in describing the measures that could be taken, some candidates failed to mention how a particular method employed served to control the incidence of the disease. Many also referred to vaccination, which is not appropriate.

Question 8

Whilst many candidates were able to give a full account of the process of blood clotting, some confused the stages. The release of thrombokinase by disintegrating platelets was not often mentioned. In addition, there was often a failure to mention that fibrin is insoluble and forms a meshwork over the wound. The need for calcium and vitamin K was also often overlooked. The role of phagocytes and lymphocytes was usually well-known though a common omission was to fail to give specific names to these white blood cells and just vaguely refer to white blood cells. Many candidates failed to mention that the blinking action of the eye in answer to (c) is a reflex action that is, therefore, rapid. The role of tears was well documented but many candidates insisted on describing the role of lysozyme, which has no relevance in dealing with a particle of dust. The production of melanin by the skin's Malpighian layer was mentioned frequently. However, few went on to say that this pigment absorbed the ultra violet light and thereby protects the skin cells.

Question 9

This was often the highest scoring question on the paper. The answers to (a) often omitted the production of glucose as the first product of photosynthesis. In addition, there was often a failure to mention that the chlorophyll traps light or that the process is a conversion of light energy into chemical energy. Often, irrelevant details about the absorption of water and carbon dioxide were included in accounts but, at the same time, omitting to mention that the process takes place in the leaves. References to the manufacture of food and plants forming the base of a food chain were common; and in answer to (iii) most candidates were able to produce an appropriate food chain though a number had arrows pointing in the wrong direction. Candidates knew full details of preparing a chicken hygienically for eating but were less certain of the range of temperatures at which refrigerators operate. Surprisingly, many of the answers to (b) (ii) omitted to mention the possibility of houseflies landing on uncovered food and depositing bacteria. It is regrettable that many candidates referred to germs and it is worth emphasising yet again that this term will gain no credit for the candidate. Only a minority referred to food poisoning.

HUMAN BIOLOGY 7042, GRADE BOUNDARIES

Grade	A	B	C	D	E
Lowest mark for award of grade	142	125	108	98	80

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

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481

Email publications@linneydirect.com

Order Code UO018822 January 2007

For more information on Edexcel qualifications, please visit www.edexcel.org.uk/qualifications
Alternatively, you can contact Customer Services at www.edexcel.org.uk/ask or on 0870 240 9800