

# Examiners' Report Summer 2008

GCE

## GCE O level Biology (7040)



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 + 44 1204 770 696, or visit our website at [www.edexcel-international.org.uk](http://www.edexcel-international.org.uk).

Summer 2008

Publications Code ?????????? (only insert if required)

All the material in this publication is copyright

© Edexcel Ltd 2008

## Contents

---

1.	7040-01 (Paper 1) Examiners' Report	Page 1
2.	7040-02 (Paper 2) Examiners' Report	Page 3
3.	Grade Boundaries	Page 10

# GCE O Level Biology

## Examiners' Report June 2008

### 7040-01 Paper 1: Short Structured Questions

#### General Comments

Once again the examining team were impressed by the range of biological knowledge and understanding shown by the candidates in this summer's examinations.

In the current specification paper 1 contains mainly questions requiring shorter answers.

**Question 1** required candidates to complete a table matching characteristics with different groups of organisms. Most answers gained some credit, but only the very best candidates gained full marks. The candidates were almost all able to give an example of each group.

**Question 2** involved filling in the gaps in a passage about osmoregulation in humans. Most were able to do this well. The most common error being the description of the collecting duct walls becoming less permeable rather than more permeable with increased secretion of ADH.

**Question 3** asked candidates about inheritance of the dominant condition, Achondroplasia. In part (a) many gave an excellent description of how dominant and recessive alleles differ. For part (b) they needed to complete a genetic diagram to show the parents, gametes, offspring genotypes and phenotypes of a cross between a heterozygous man and woman of normal height. Some responses failed to earn full credit as they did not clearly show the gametes formed in this cross. In part (c) most could gain one mark for the probability of getting a baby with achondroplasia but few mentioned genetic testing of the embryo or amniocentesis.

**Question 4** described an experiment to investigate the effect of exposing red blood cells to different concentrations of sodium chloride solution. In part (a) most answers gained full marks for their explanation of osmosis. However, some students still describe a partially permeable membrane as semi-permeable, a term no longer used. In (b) candidates were able to explain that in 3% solution the red cells would lose water and would therefore shrink or crenate. Most also recognised that in distilled water the cells would burst due to the intake of water. The better candidates were also able to explain why in 1% solution there would be no osmosis as the water potentials inside and outside the cells were equal. Finally part (c) asked the students to describe the effects of solutions on plant cells, which most were able to do.

**Question 5** gave the candidates a table describing parts of the heart and circulation system. Most could successfully complete the table matching the description to the part and almost all could place the parts in order that blood passes through them.

**Question 6** required candidates to remember the elements found in carbohydrate and describe the test for glucose. Again most responses gained full credit with the most frequent error being using iodine or Biuret. In part (c) most could give a function of iron but in (d)(i)

only the best responses gained full credit for explaining that glucose is required for respiration to produce energy and that it can be stored as glycogen. Few candidates gained full marks in (d)(ii) for explaining that carbohydrate is required to maintain blood glucose levels which would maintain energy levels and aid concentration.

**Question 7** asked candidates to complete a table showing features of gas exchange surfaces in humans and flowering plants. Most responses could name diffusion as the process by which flowering plants absorb gases and inhalation as the process used in humans. They were also largely successful in identifying the leaf and the alveoli as increasing gas exchange surfaces and describing the location of the moist surface membranes. Almost all candidates could name two waste gases released from a flowering plant. Part (b) asked candidates to explain why a small animal like a flatworm does not need a transport system. The very best answers could gain full marks for describing the large surface area to volume ratio that a thin organism such as this has, as no cell is far from the surface which means that diffusion alone can meet its gas exchange needs.

**Question 8** gave candidates a food chain and they were required to identify the secondary consumer and the source of energy for the producers. Most were able to do this and most also gained full credit for drawing the corresponding pyramid of numbers for the food chain. Part (c) proved more challenging with only the best candidates gaining full credit for suggesting why food chains rarely have more than five organisms. The examiners were expecting a description of the loss of energy between each and the reason for the energy loss and an understanding that the cumulative losses would mean little energy reaching the fifth level.

**Question 9** part a) asked about the reasons for concern over the use of pesticides and most responses were able to describe concerns over pollution, damage to food chains, harm to other organisms. Part (b) asked for a description of biological control and an example. A variety of examples were credited but some student attempts suggested that this had not been covered at their centres.

**Question 10** proved to be the most challenging for many candidates. The first parts, (a) and (b)(i) concerning cross pollination and identifying differences between the forms, gave candidates little difficulty. Part (b)(ii) asked for a suggestion as to why pin and thrum forms make cross-pollination more likely. The best candidates were able to relate the position of the stigma and anther in the forms with the likelihood of insects transferring pollen from one form to the other. Part (b)(iii) was answered better with many gaining full marks describing how cross-pollination increases genetic variation and enables adaptation to a new environment. Part c) also proved less difficult with most candidates gaining good marks.

**Question 11** was about a shoot's response to light and gravity and most responses gained credit for identifying gravity and light as the two stimuli and describing the shoot's response to these. Part (b) asked for suggestions as to why plant responses are slower than human responses to stimuli. Again the best responses described that a plant response is a growth rather than a muscle response and that plant responses rely on diffusion of a growth substance such as auxin rather than an electrical impulse carried through neurones.

# GCE O Level Biology

## Examiners' Report June 2008

### 7040-02 Paper 2: Structured Questions & Essays

#### Question 1

This comprehension served to discriminate extremely well. Defining artificial selection was not a problem for most candidates but interpreting the passage thereafter proved more challenging. The more able candidates appreciated that providing better food would only improve milk yield if the cows had the genetic capability or were not going to continue being frightened. Adrenaline as the "fright or flight" hormone was recalled by most and many appreciated that being fearful of other animals instigates behaviour, such as running away, that promotes survival. In part (d), candidates tended to reiterate the story of artificial selection, failing to link the concept to the comprehension. Male parents that produced high meat yield were irrelevant. Male parents that had fathered high milk yielding cows or had come from high milk yielding mothers were expected. Answers that mentioned choosing males that were not easily frightened or that had the appropriate genetic material were also accepted.

Candidates again failed to link their answers to the information in the passage when discussing the pros and cons of high oil and low oil maize. High oil for cooking or biofuel was seldom mentioned, and only the better candidates discussed the health benefits of eating food with low oil content. Pleasingly, many candidates understood that mutation was an unlikely factor in part (f) as they are rare and only a small number of plants were involved in the study.

#### Question 2

This question examined knowledge and understanding of two diseases, HIV and TB. Most candidates were able to gain high marks, showing sound understanding of the data and excellent recall of the control measures in place to reduce the spread of these diseases. The calculation in part (b)(i) posed a challenge and candidates are reminded of the need to show their working. A wrong answer could still gain one mark if the number 674 appeared anywhere in their working. In part (e), only the better candidates seemed to be aware of the link between HIV and the damage done to the immune system.

#### Question 3

The standard of graph plotting was extremely good despite the complicated table from which the correct data had to be obtained. The main errors were plotting incorrectly and labelling the vertical axis with the term "high CO<sub>2</sub>". Marks were given for using at least half of the grid in both directions, using a ruler to join the points, getting the axes correctly orientated and labelling them with a minimum of "rate of photosynthesis" and "light intensity", and, finally, a key to each line had to be apparent. In part (b)(i) many candidates appreciated that an increase in LI increase the rate of photosynthesis but then lost a mark by saying that the rate stopped at high LI which is untrue. Careful choice of wording is important when describing

trends. In (b)(ii) most realised that there is an increased rate at 30 °C, but very few appreciated that there is no difference at low LI or that both lines level off at high LI. In (c), only the better candidates appreciated that there is only a very slight difference in the rates at low CO<sub>2</sub>. Part (iv) was difficult for most candidates as it explored their understanding of limiting factors in a highly complex manner. It was hoped that candidates would realise that at high CO<sub>2</sub> temperature was a limiting factor but that at low CO<sub>2</sub>, carbon dioxide was a limiting factor. Very few answers to (c) mentioned burning of fossil fuels, but the examiners accepted any answer that showed CO<sub>2</sub> would be produced. Part (d) posed problems too with very few appreciating that an outline drawn on graph paper could be used to calculate leaf area which could then be multiplied appropriately.

#### Question 4

Answers to the experiment design are improving and many candidates use the CORMS method to structure their answers. So, for C: plus or minus vitamin D in the diet. For O: same species of mouse or same mass at the start. For R: any indication that several mice had been used in each vitamin D treatment. For M: measurement of mass or length and some indication of time as the question made a reference to rate. Measurement of growth alone was not sufficient to gain credit. Finally, for S: same diet, apart from vitamin D, or kept at the same temperature were examples of responses that gained credit.

#### Question 5

Almost all candidates knew that respiration releases energy from living cells and that carbon dioxide is the gas released when yeast ferments glucose. Lime water turning milky or hydrogencarbonate turning yellow were popular correct answers to part (a)(iii) and a pleasing number of candidates appreciated the role of the oil layer in maintaining anaerobic conditions by preventing oxygen diffusing into the solution. Candidates need to be aware that quoting information from the wording of the question is unlikely to gain credit. So, in part (b) answers that mentioned volume or temperature were not credited. Alternatively, time taken or the mass of yeast used was acceptable. Only the better candidates tuned into the term "rate" in part (c) and discussed a method of how to measure the volume of gas or to count the number of bubbles produced in a given time. Credit was also given for some indication of replication that ensures reliability. Part (d) explored limiting factors in a different context and only the better candidates gained credit for stating that more respiration can take place with increasing concentrations of glucose until a limiting factor, such as the number of yeast cells, causes the rate to level off at a maximum.

#### Question 6

This question was the least popular choice. Most candidates answered part (b) poorly. The question expected candidates to explain why bacterial and viral diseases are treated differently. The examiners were looking for an understanding that antibiotics can kill or prevent the growth of bacteria, but are ineffective against viruses. Answers that gave structural reasons to support these ideas were expected, but seldom seen. However, in contrast, malnutrition and obesity are concepts that are well understood and there were many excellent answers. It was pleasing to read prose that recalled a variety of relevant health problems caused by both malnutrition and obesity, particularly deficiency diseases and circulatory diseases.



### Question 7

Candidates have a good knowledge about digestion though the examiners did feel that more marks might have been forthcoming if candidates had used a clear structure to organise their answers. Many candidates write at length without consideration for relevance. As such, they waste time and write confusing, long-winded prose. Weaker candidates expressed considerable confusion about the correct pH in various parts of the human alimentary canal.

### Question 8

The nitrogen cycle is always problematic for students and those who opted for this question found part a) challenging. The names and roles of the bacteria involved in decomposition and denitrification were confused. Candidates did much better recalling how the deforestation caused by building a road would affect the local ecosystem, though many ignored the word 'local' and wrote at length about global phenomena. This latter point was only credited by reference to ideas relating to global warming.

The **long essays** were answered quite well with many gaining full marks. However, there are some trends that concern the examiners. Firstly, it is clear that some candidates have been taught information way beyond that expected at O level. As a result, large sections of essays contain information not on the mark scheme. These candidates do not lose out in terms of marks because they always mention the simpler facts. However, they do lose out on time during the examination and also time during the course, time that might be spent doing practical work perhaps. The second concern relates to the length of essay that many candidates write. There is no need to require any more pages than those provided in the examination booklet. In fact, the examiners feel that the best answers could be written in a page or a page and a half. Candidates should be encouraged to write erudite accounts that will save time and still gain marks. To this end, candidates should be given opportunities to plan their essays and to write them in a more concise style.

### Question 9

This question was extremely popular and many candidates gained full marks. The role of plasma, red blood cells and white blood cells was well understood, and the better candidates also wrote knowledgeably about the role of platelets. Occasionally, candidates were confused about the type of white blood cell that produced antibodies and the type that ingested and digested. Some candidates included university-level knowledge of the different types of white blood cells, something that is not needed.

### Question 10

This question explored genetic modification, a topic that has in the past caused some difficulty. However, it was clear from the essays seen that candidates have improved their knowledge and understanding of this process and some excellent accounts were produced. If there was a weakness, it was the fact that the part of the question concerning growth in a fermenter was given short shrift by many candidates. It tended to be the better candidates who commented on the need for oxygenation, temperature and pH control, supply of food, agitation and aseptic procedures.

## Question 11

This was the least popular choice of essay and produced a larger number of low scoring totals. Transport in plants is certainly a less understood than transport in humans! The mark scheme allowed opportunities to gain marks by describing water uptake by root hair cells, and then describing the movement of water through xylem vessels until leaving the leaves by transpiration. The role of phloem in transporting sucrose from leaves to all parts of a plant was the most difficult part of this essay for candidates.

## BIOLOGY 7040, GRADE BOUNDARIES

---

Grade	A	B	C	D	E
Lowest mark for award of grade	140	120	100	90	65

**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 UK Regional Offices at [www.edexcel.org.uk/sfc/feschools/regional/](http://www.edexcel.org.uk/sfc/feschools/regional/)  
or International Regional Offices at [www.edexcel-international.org/sfc/academic/regional/](http://www.edexcel-international.org/sfc/academic/regional/)

For more information on Edexcel qualifications, please visit [www.edexcel-international.org/quals](http://www.edexcel-international.org/quals)  
Alternatively, you can contact Customer Services at [www.edexcel.org.uk/ask](http://www.edexcel.org.uk/ask) or on + 44 1204 770 696

Edexcel Limited. Registered in England and Wales no.4496750  
Registered Office: 190 High Holborn, London WC1V 7BH