

**ADVANCED SUBSIDIARY GCE
BIOLOGY**

Human Health and Disease

MONDAY 4 JUNE 2007

2802

Morning

Time: 1 hour

Additional materials: Electronic calculator
Ruler (cm/mm)



Candidate
Name

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [] at the end of each question or part question.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

FOR EXAMINER'S USE

Qu.	Max.	Mark
1	8	
2	10	
3	12	
4	10	
5	10	
6	10	
TOTAL	60	

This document consists of **12** printed pages and an insert.

Answer **all** the questions.

- 1 (a) Table 1.1 shows a number of categories of disease, a definition of each category and one example of a disease that fits into each category.

Complete the table.

Table 1.1

category	definition of disease category	one example
deficiency	diseases caused by poor diet	scurvy
.....	diseases caused by a genetic fault passed from the parents	cystic fibrosis
degenerative	Huntington's disease
infectious	diseases that are transmitted by a pathogenic organism which invades the body
.....	diseases caused by changes to the mind	schizophrenia
physical	asthma

[5]

(b) Epidemiology is the study of patterns of disease and the factors that affect their occurrence and spread.

State **three** ways in which members of the medical profession can use information about how diseases spread.

1

.....

2

.....

3

..... [3]

[Total: 8]

2 Fig. 2.1 is provided for you on an insert.

The different parts of the gaseous exchange system, such as the bronchi, show structural adaptations to their functions. Fig. 2.1 shows a section through the wall of a bronchus as seen with a light microscope.

(a) (i) State **one** function for each of the following components of the bronchus wall.

goblet cell

.....

cartilage

..... [2]

(ii) State **two** ways in which the **structure** of the wall of the bronchus would be different in a long-term smoker.

1

.....

2

..... [2]

(b) Gaseous exchange occurs across the walls of the alveoli.

Explain why the walls of the alveoli contain elastic fibres.

.....

.....

.....

..... [2]

(c) One feature of the disease emphysema is that the alveoli lose their elasticity.

Explain the effects of this loss of elasticity on the gaseous exchange system of a person with emphysema.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 10]

- 3 Fig. 3.1 shows an artery lying on the surface of living heart muscle as seen by an instrument called an endoscope. The lumen of the artery has become narrowed at the point labelled Y.

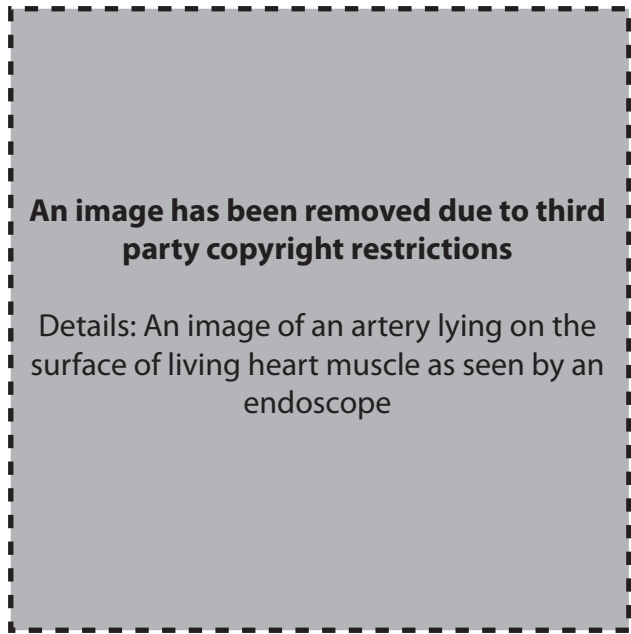


Fig. 3.1

- (a) (i) Name the artery shown in Fig. 3.1.

..... [1]

- (ii) Explain how the lumen of the artery has become narrowed at point Y.

.....
.....
.....
..... [2]

(b) (i) Describe the effects that this narrowing of the artery is likely to have on the **heart muscle**.

.....
.....
.....
.....
.....
..... [3]

(ii) State **two** symptoms that might be shown by a person whose artery has been narrowed in this way.

1
.....
2
..... [2]

(c) (i) Suggest how doctors might treat a patient with narrowing of the arteries that supply the heart muscle.

.....
.....
.....
..... [2]

(ii) Suggest **two** pieces of advice that a doctor might give to such a patient to try to reduce the likelihood of further narrowing of the arteries.

1
.....
2
..... [2]

[Total: 12]

4 (a) Milk contains a number of important nutrients including:

- proteins which contain amino acids
- fats which contain fatty acids
- minerals.

Name **two other** groups of nutrients found in a balanced diet.

1

2 [2]

(b) Some amino acids are known as essential amino acids.

(i) State what is meant by the term *essential amino acids*.

.....

..... [1]

(ii) Outline the functions of essential amino acids in the body.

.....

.....

.....

..... [2]

(c) Fig. 4.1 shows a child with kwashiorkor, a form of protein energy malnutrition.



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Fig. 4.1

(i) Describe the symptoms of kwashiorkor.

.....
.....
.....
.....
.....
..... [3]

(ii) Explain why the onset of this disease often occurs between the ages of six months and eighteen months.

.....
.....
.....
..... [2]

[Total: 10]

[Turn over

5 Table 5.1 shows:

- the percentage of people with HIV/AIDS in different regions of the world at the end of 2002
- the number of new infections with HIV between 1999 and 2002 expressed as a percentage of those with HIV/AIDS at the end of 2002.

Table 5.1

region	percentage of people with HIV/AIDS at the end of 2002	number of new infections between 1999 and 2002 as % of those with HIV/AIDS at the end of 2002
East Asia and Pacific	1	76
Eastern Europe and Central Asia	1 – 5	196
North Africa and Middle East	1	74
North America	1	16
Sub-Saharan Africa	15 – 39	52
Western Europe	1	15

(a) It has been suggested that HIV/AIDS is a greater problem in less economically developed regions than in more economically developed regions.

Describe the evidence in Table 5.1 that supports this suggestion.

.....

.....

.....

.....

.....

.....

..... [2]

6 (a) Complete the following passage.

In October 2004, scientists announced successful trials of a malaria vaccine. The vaccine was developed from proteins taken from the parasite, *falciparum*. When the proteins enter the body they act as which are recognised as foreign by the immune system. These foreign proteins activate lymphocytes called T cells which then divide to increase in numbers. Some of these newly cloned cells become cells which attack infected cells in the liver. Others become cells which release a hormone-like messenger molecule called a These molecules activate B cells to divide and produce plasma cells. The B cells also produce cells that stay in the body for a number of years. The result is an immune system prepared to make a strong attack on the parasite when it enters the body. [6]

(b) Name the molecules, released by plasma cells, that attack the parasite when it enters the body. [1]

(c) Suggest why it has been difficult to produce a malaria vaccine. [3]

[Total: 10]

END OF QUESTION PAPER

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