

**ADVANCED SUBSIDIARY GCE****BIOLOGY**

Human Health and Disease

2802

Candidates answer on the question paper

OCR Supplied Materials:

None

Other Materials Required:

- Electronic calculator
- Ruler (cm/mm)

Monday 1 June 2009**Afternoon****Duration: 1 hour**

Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

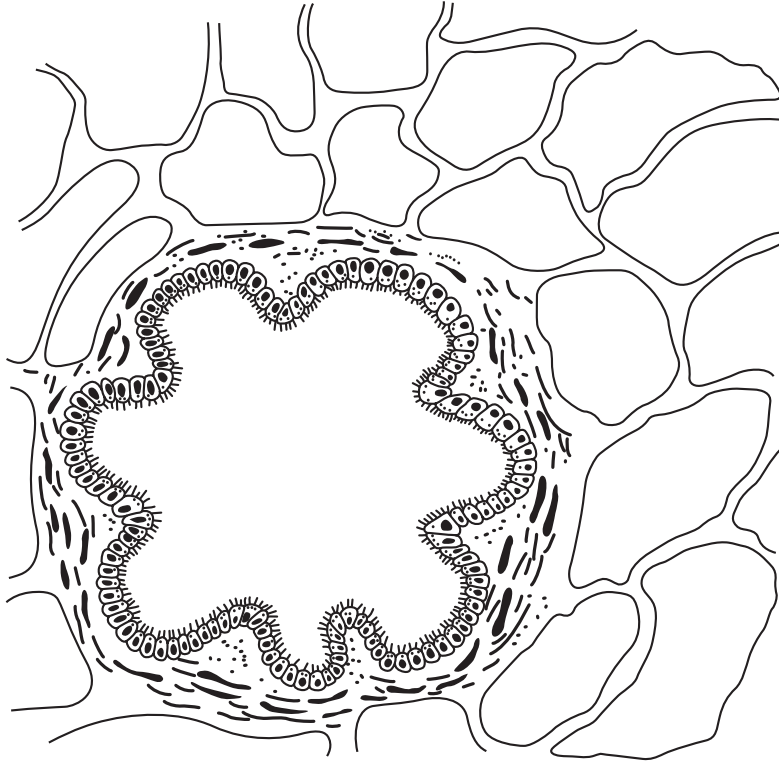
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- This document consists of **12** pages. Any blank pages are indicated.

FOR EXAMINER'S USE

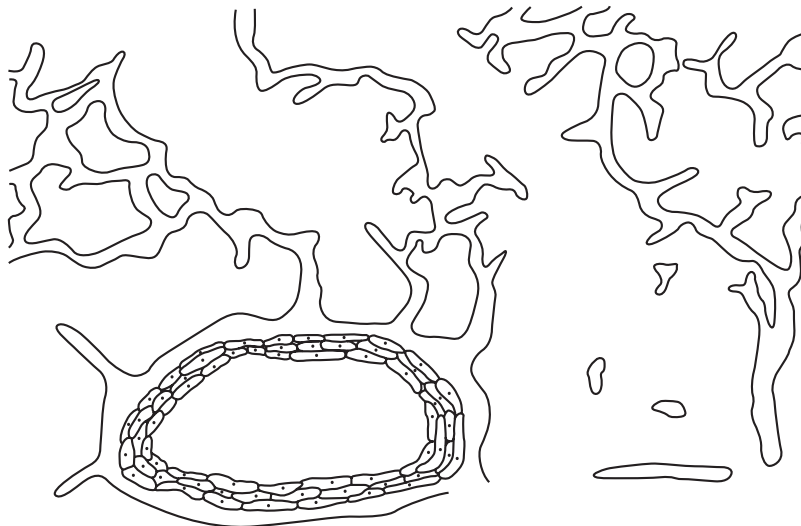
Qu.	Max.	Mark
1	8	
2	6	
3	8	
4	12	
5	11	
6	15	
TOTAL	60	

Answer **all** the questions.

- 1 Fig. 1.1 shows drawings of sections of lung tissue.



A - from a non-smoker



B - from a smoker with emphysema

Fig. 1.1

- (a) Describe how the lung tissue in **B** differs from the lung tissue in **A**.

Your answer should refer **only to features visible in Fig. 1.1**.

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..... [2]

- (b) Explain why people with emphysema find it difficult to exhale.

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..... [2]

- (c) Emphysema usually results from the presence of tar in cigarette smoke.

Outline how tar in cigarette smoke may lead to emphysema.

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..... [4]

[Total: 8]

- 2 Read the following passage and complete each sentence by writing the most appropriate word in the spaces provided.

Good health can be defined as 'a state of complete physical, and social well-being. It is not merely the absence of infirmity or'. The average young man can improve his health in a number of ways. To improve physical well-being he should eat a balanced diet in which the majority of his energy needs comes from His diet should include only small quantities of fats and more plant oils, such as olive oil. He should exercise for at least minutes on three or more occasions per week. This exercise should be at an intensity that raises his heart rate to percent of his maximum heart rate. He should not smoke at all and should avoid passive smoking.

[6]

[Total: 6]

- 3 (a) State **three** ways in which the Human Immunodeficiency Virus (HIV) is transmitted.

1

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2

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3

..... [3]

- (b) A recent study has shown that HIV/AIDS is having an increasing impact on Eastern Europe.

- (i) Suggest **three** ways in which the government of a country affected by HIV/AIDS could try to combat the spread of the disease.

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..... [3]

- (ii) An official from the World Health Organisation (WHO) suggested that there should be an equivalent study to assess the impact of TB in Eastern Europe.

Suggest why the increasing impact of HIV/AIDS in Eastern Europe also raises concerns about TB in Eastern Europe.

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..... [2]

[Total: 8]

- 4 (a) An investigation was carried out to determine the effects of increasing carbohydrate levels in the human diet. Consuming extra carbohydrate is a technique, called carbohydrate loading, often used by endurance athletes, such as long distance cyclists.

Fig. 4.1 shows the effect that different amounts of carbohydrate in the diet have on the length of time an athlete can continue exercising until exhausted.

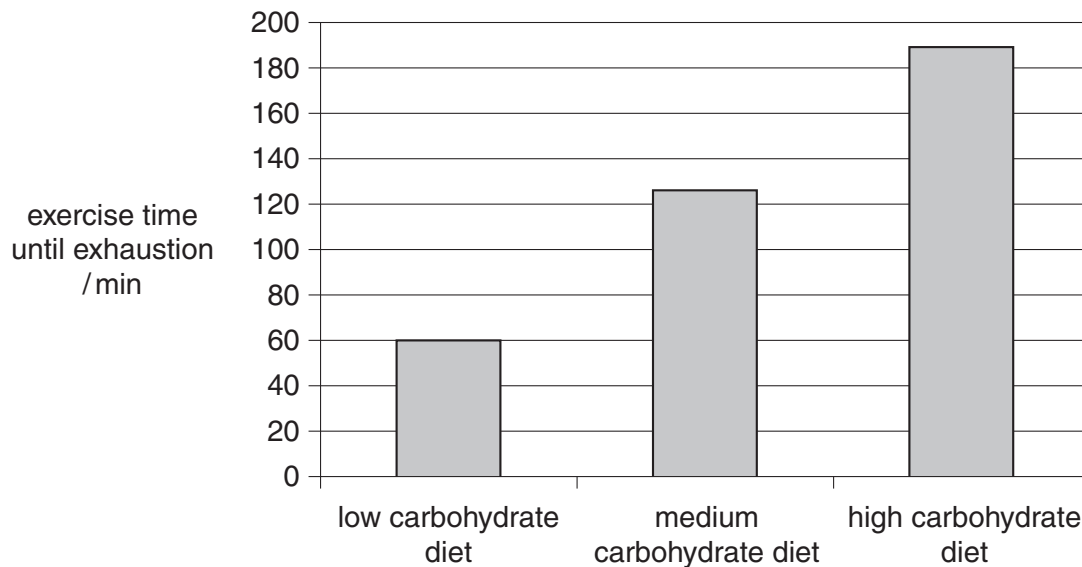


Fig. 4.1

With reference to the evidence in Fig. 4.1, describe the effect of carbohydrate loading on an athlete's performance.

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..... [2]

- (b) In this question, one mark is available for the quality and use of scientific terms.

As a result of long-term training, changes occur to the heart, lungs and circulatory system.

Describe these changes **and** explain how **each** change improves an athlete's performance in an endurance event.

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..... [9]

Quality of Written Communication [1]

[Total: 12]

Turn over

5 Fats and oils in the diet provide two essential fatty acids, linoleic acid and linolenic acid.

(a) Give **one** reason why these fatty acids are an essential part of the diet.

.....
 [1]

A 30 year old woman is concerned that she may be eating too much saturated fat.

She discovers that there are Dietary Reference Values (DRVs) for fats. Two of the DRVs are:

- the total fat in the diet should not be greater than 35% of the total energy intake per day.
- no more than 10% of the total fat intake should be saturated fat.

She has been told that her total energy intake should be 8830 kJ per day.

Each gram of fat provides 37 kJ.

(b) Calculate the maximum mass of fat, in grams, that the woman could consume per day if she is not to exceed the DRV for total fat in her diet.

Show your working and **express your answer to the nearest whole number**.

Answer = g [2]

(c) Give **four** reasons for limiting the quantity of fat in the diet.

.....

 [4]

- (d) The woman decided to find out whether it is healthier to eat fish or red meat. She compared the composition of mackerel (fish) and stewing steak (red meat).

Some of the information that she found is summarised in Table 5.1.

Table 5.1

nutrient	mass per 100 g	
	mackerel (fish)	stewing steak (red meat)
protein / g	18.7	30.9
vitamin A / μg	45.0	0.0
vitamin D / μg	25.0	0.0
calcium / mg	11.0	15.0
iron / mg	0.8	3.0

Explain, using **only** the data in Table 5.1, the **advantages** for the health of the woman of including mackerel in her diet instead of stewing steak.

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..... [4]

[Total: 11]

- 6 (a) Name the **type** of cell that produces antibodies.

..... [1]

- (b) State **two** structural features of an antibody molecule **and** explain how each feature helps the antibody to perform its function.

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..... [4]

- (c) Fig. 6.1 shows the concentration of antibodies in the blood following a first infection by a pathogen on day 0 and a second infection of the same pathogen on day 35.

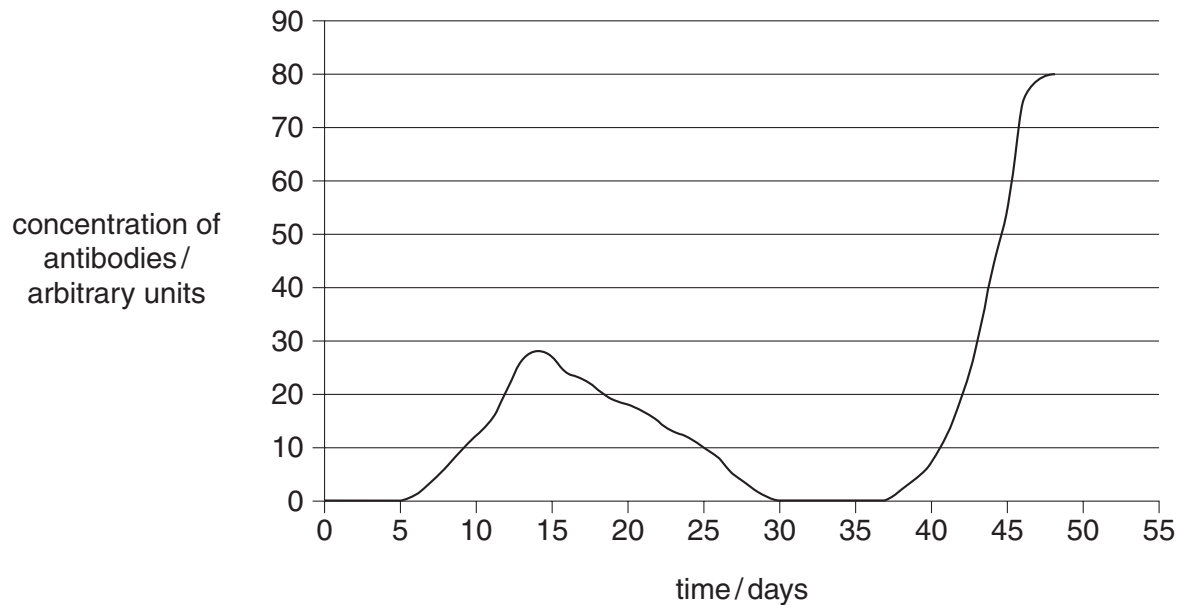


Fig. 6.1

- (i) Explain why there are no antibodies in the blood before day five.

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- (ii) Explain why the concentration of antibodies in the blood starts to rise after a shorter delay following the second infection by the same pathogen.

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..... [2]

QUESTION 6(c)(iii) BEGINS ON PAGE 12

- (iii) Explain what is meant by *active natural immunity*.

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..... [2]

- (d) Antibiotics can be used to cure some infections. However, antibiotics are not effective against all pathogens.

For each of the diseases below, suggest why antibiotics are not always effective.

HIV / AIDS

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malaria

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tuberculosis

..... [3]

[Total: 15]

END OF QUESTION PAPER



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