

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**Advanced Subsidiary GCE**

**BIOLOGY**

**2802**

Human Health and Disease

Monday

**15 JANUARY 2001**

Morning

1 hour 30 minutes

Candidates answer on the question paper.

Additional materials:

Electronic calculator

Candidate Name	Centre Number	Candidate Number												
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**TIME** 1 hour 30 minutes

**INSTRUCTIONS TO CANDIDATES**

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers in the spaces on the question paper.
- Read each question carefully to make sure you know what you have to do before starting your answer.

**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 90.
- You will be awarded marks for the quality of written communication where an answer requires a piece of extended writing.
- You may use an electronic calculator.
- You are advised to show all the steps in calculations.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	10	
2	15	
3	16	
4	15	
5	13	
6	9	
7	12	
<b>TOTAL</b>	<b>90</b>	

**This question paper consists of 15 printed pages and 1 blank page.**

**BLANK PAGE**

Answer all questions.

1 Diseases are classified into categories. It is sometimes appropriate to classify a disease into more than one category.

(a) Complete the table below by indicating with a tick (✓) the category or categories in which each disease is classified.

disease	categories of disease		
	infectious	deficiency	degenerative
cholera			
night blindness			
lung cancer			
stroke			

[4]

(b) (i) State **one** example of an inherited disease.

.....[1]

(ii) Explain why the disease you name is classified as an inherited disease.

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

Some diseases are classified as self-inflicted diseases. Smoking is considered by the World Health Organisation to be a self-inflicted disease of epidemic proportions.

(c) State what is meant by a *self-inflicted disease*.

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

(d) Suggest why the World Health Organisation considers smoking to be a disease of epidemic proportions.

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

[Total : 10]

2 B lymphocytes are found throughout the body in the blood and in the lymphatic system. When an antigen enters the body, some of these B lymphocytes respond and change into plasma cells that secrete antibodies.

(a) State the part of the body where B lymphocytes originate.

.....[1]

(b) Explain the difference between an antigen and an antibody.

.....  
.....  
.....  
.....  
.....  
.....[4]

Fig. 2.1 shows a plasma cell and a B lymphocyte

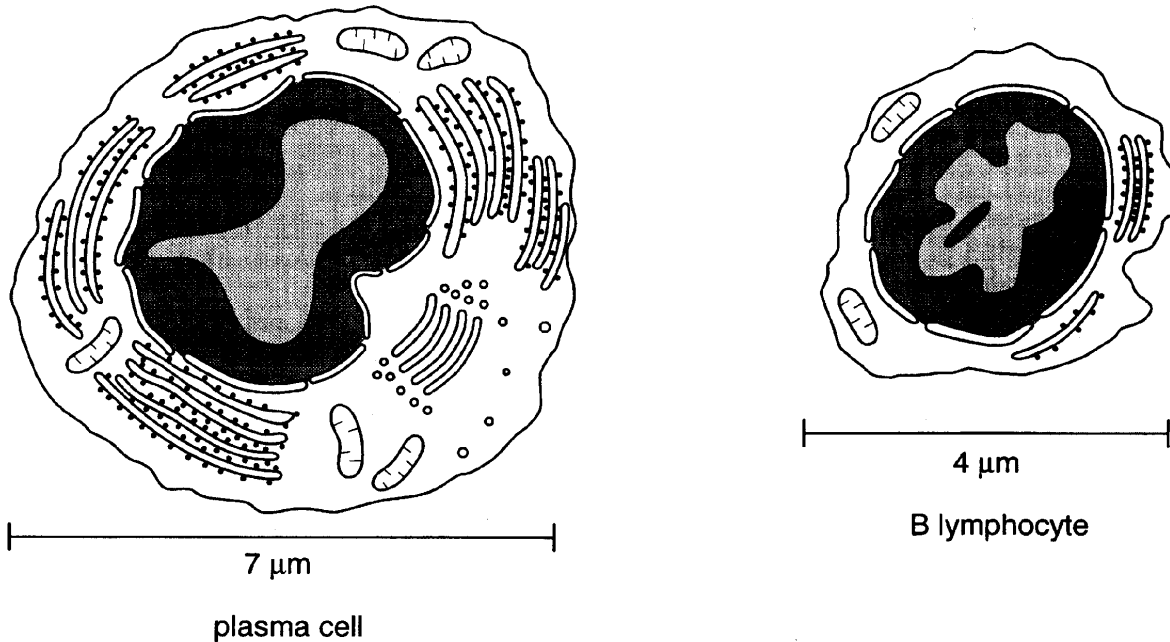


Fig. 2.1

(c) With reference to Fig. 2.1,

(i) state **three** ways in which the structure of the plasma cell differs from the B lymphocyte;

1 .....

2 .....

3 .....[3]

(ii) explain the reasons for the differences you have described.

.....

.....

.....

.....

.....

.....[3]

(d) Explain why the production of antibodies is much faster when the same antigen enters the body on a second occasion.

.....

.....

.....

.....

.....[4]

[Total : 15]

3 Proteins are digested into amino acids. Nutritionists consider some of these amino acids to be essential amino acids. A deficiency of protein in the diet can lead to significant damage to health.

(a) Explain why some amino acids are described as *essential* in the diet.

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

(b) Describe the consequences for a young child of a **very** restricted intake of protein in the diet.

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

Table 3.1 shows the daily energy requirements and some of the daily nutrient requirements for a woman aged 25 and a lactating (breast feeding) woman of the same age and body mass.

**Table 3.1**

energy or nutrients	daily requirements	
	woman aged 25	lactating woman
energy / kJ kg <sup>-1</sup>	145	185
protein / g kg <sup>-1</sup>	0.75	0.93
vitamin A / μg	600	950
vitamin D / μg	0	10
calcium / mg	700	1250



- 4 (a) Explain the difference between **systolic** and **diastolic blood pressure**.

.....

.....

.....

.....[3]

An athlete's blood pressure was monitored for a period of twenty minutes. For the first three minutes, the athlete rested. The athlete then ran on a treadmill at a steady speed for ten minutes before resting again. The results are shown in Fig. 4.1.

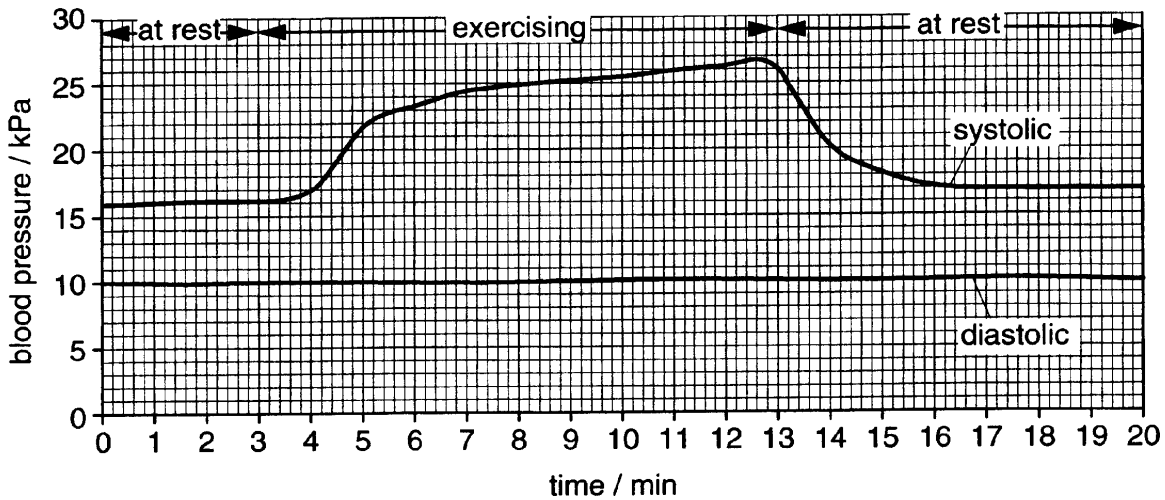


Fig. 4.1



(b) With reference to Fig. 4.1,

(i) state the resting values for systolic and diastolic blood pressure;

systolic blood pressure .....

diastolic blood pressure .....[2]

(ii) explain the change in systolic blood pressure during the period of exercise;

.....  
.....  
.....  
.....  
.....  
.....  
.....[4]

(iii) explain why the athlete's systolic blood pressure did not return to the resting value immediately the exercise stopped.

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

(c) State **three** beneficial effects of regular aerobic exercise on the heart.

1 .....

2 .....

3 .....[3]

[Total : 15]

5 People may gain active and passive immunity to disease, such as measles.

(a) Describe **two** different ways, one active and one passive, in which babies may become immune to measles.

*active* .....

.....

.....

*passive* .....

.....

.....[4]

(b) State **two** reasons why measles has not been eradicated by vaccination.

1 .....

.....

2 .....

.....[2]



- 6 Fig. 6.1 shows the heart of a person who has had a coronary artery by-pass operation. The person had suffered from coronary heart disease as a result of atherosclerosis.

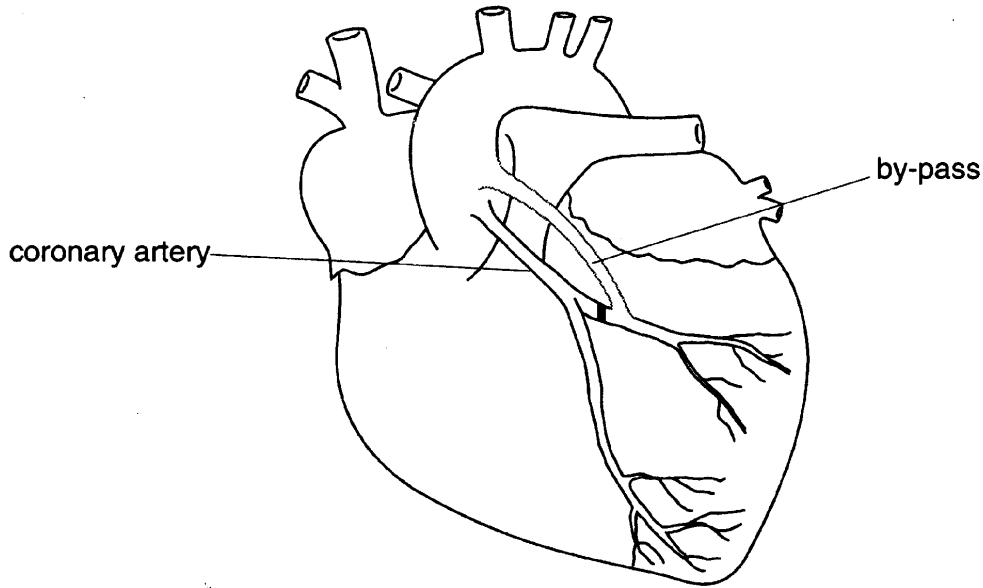


Fig. 6.1

- (a) (i) Describe what had happened in the coronary artery to make this operation necessary.

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

- (ii) Describe the likely effects on the heart muscle if the operation had not been carried out.

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

Governments promote measures to reduce the number of cases of coronary heart disease.

- (b) State **three** of these measures.

1 .....  
 2 .....  
 3 ..... [3]

[Total : 9]

7 (a) (i) Name the organism that causes tuberculosis (TB).

.....[1]

(ii) Describe how tuberculosis is spread from infected to uninfected people.

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





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*Copyright Acknowledgements:*

Question 7 Fig. 7.1 Source: Public Health Laboratory Service (PHLS)