OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced Subsidiary GCE

BIOLOGY 2802

Human Health and Disease

Monday **2 JUNE 2003** Morning 1 hour

Candidates answer on the question paper.
Additional materials:
Electronic calculator

Candidate Name	Centre Number	Candidate Number

TIME 1 hour

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 blue or black ink, in the spaces on the question paper.
- Read each question carefully before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks 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	6	
3	12	
4	12	
5	12	
6	10	
TOTAL	60	

This question paper consists of 12 printed pages.

Registered Charity Number: 1066969

Answer **all** the questions.

1 **(a)** State the word or phrase that best describes each of the following.

(i) The volume of air taken in with each breath.

.....[1]

(ii) The type of muscle tissue in the walls of the bronchi.

.....[1]

(b) Explain why the **resting** pulse rate is often used as a measure of physical fitness.

.....

.....

.....

.....[2]

(c) Explain why breathing does not return to normal immediately after the end of strenuous exercise.

.....

.....

.....

.....[2]

(d) State **two** long-term effects of regular exercise on muscle tissue, such as that in the legs.

1 .....

.....

2 .....

..... [2]

[Total: 8]

2 **(a)** The following statements have been made in leaflets aimed at stopping people smoking.

Beneath each statement, name the substance in tobacco smoke that is responsible for the effect described. Name a different substance in each case.

(i) 'Tests on smokers have found that their blood oxygen levels are low.'

.....[1]

(ii) 'When you inhale, your blood vessels constrict, your blood pressure rises and your heart has to work harder than it should.'

.....[1]

(iii) 'It forms a brown sticky coat over the lining of your lungs.'

.....[1]

(b) Describe how it can be shown experimentally that tobacco smoke contains cancer-causing substances (carcinogens).

.....

.....

.....

.....

.....

.....[3]

[Total: 6]

3 Fig. 3.1 is a scanning electron micrograph of a phagocytic white blood cell engulfing a cell of the pathogenic yeast, *Candida albicans*.

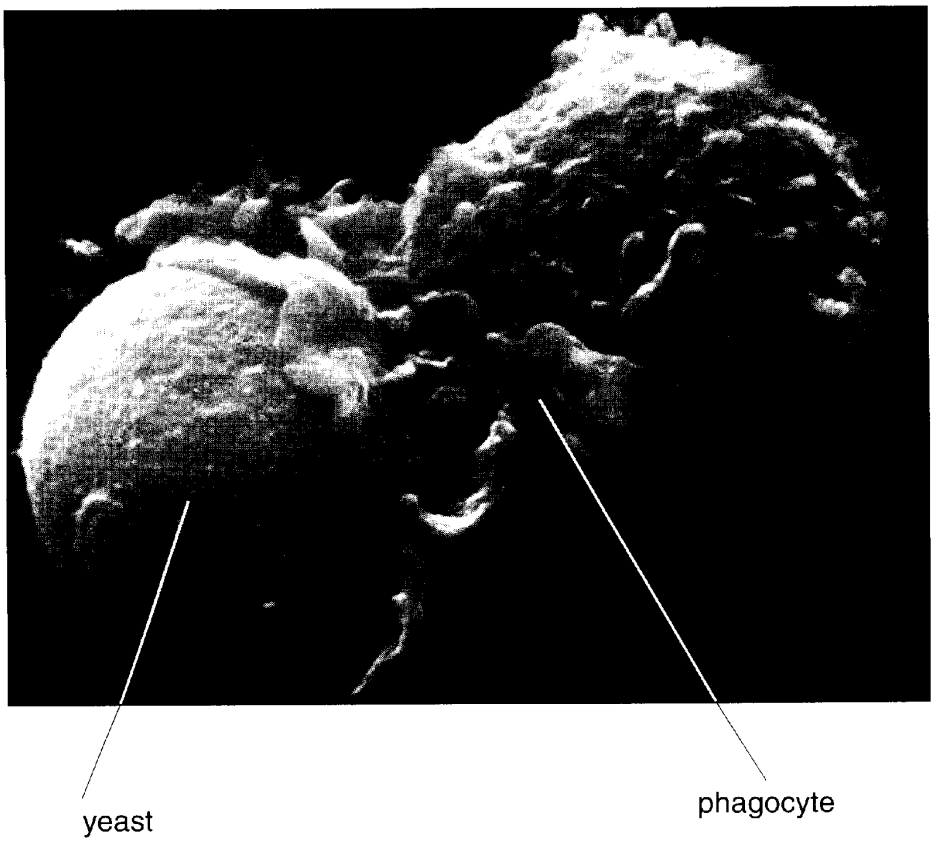

Fig. 3.1

(a) State the site of origin of phagocytes in the body.

.....[1]

For Examiner's Use

(b) Describe what happens inside the phagocyte after pathogens, such as *Candida albicans*, have been engulfed.

.....

.....

.....

.....

.....

.....

.....

.....[4]

(c) Fig. 3.2 shows the structure of an antibody molecule.

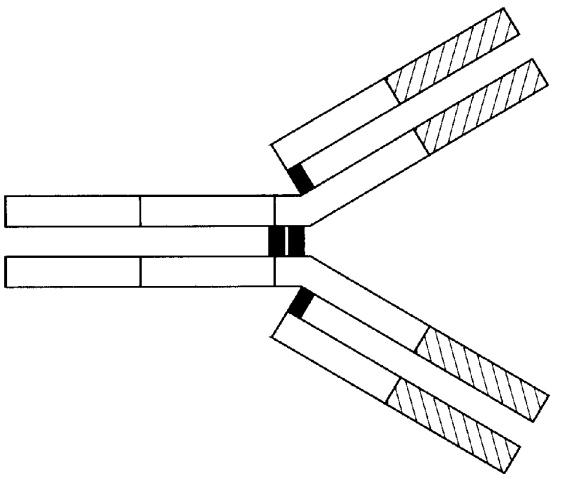

Fig. 3.2

Explain how the structure of an antibody is related to its function.

.....

.....

.....

.....

.....[2]

(d) There are four different types of immunity.

- natural active
- artificial active
- natural passive
- artificial passive

Complete the table below by indicating the type of immunity that is gained in each example given.

example	type of immunity
receiving an injection of a serum containing antibodies, e.g. against tetanus	
taking an oral vaccine for polio	
catching and recovering from a disease, such as measles	
receiving an injection of a weakened strain of a disease-causing bacterium	
babies feeding on breast milk	

[5]

[Total: 12]

4 Genetic factors are known to play an important role in the development of coronary heart disease (CHD).

One inherited condition that increases the risk of developing CHD is known as familial hypercholesterolaemia (FH). In FH, the blood cholesterol concentration is raised much higher than normal because of poor metabolism of cholesterol in the liver. Blood cholesterol concentrations greater than 250 mg 100 cm^{-3} are considered to be high.

(a) Explain why people with FH are especially at risk of coronary heart disease.

.....

.....

.....

.....

.....

.....[4]

(b) State the **dietary** advice that would be given to people with FH.

.....

.....

.....[2]

[Turn over

(c) Explain how coronary heart disease may be treated by surgery.

.....

.....

.....

.....

.....

.....[3]

(d) The Human Genome Project has identified a number of genes that influence human health.

Explain how genetic tests could help people who might be at risk of degenerative diseases, such as coronary heart disease.

.....

.....

.....

.....

.....[3]

[Total: 12]

5 Tuberculosis (TB) is one of the world's greatest killers. There is a pandemic of TB and this poses great threats to the world's population. It is a disease that is proving very difficult to eradicate.

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

.....[1]

(b) Explain what is meant by the term *pandemic*.

.....[1]

(c) In this question, one mark is available for the quality of written communication.

Discuss the problems that are involved in eradicating tuberculosis (TB) from the world.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

For Examiner's Use

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[9]

Quality of Written Communication [1]

[Total: 12]

6 A survey was carried out in 1998 on the blood pressure of a sample of the population of England. High blood pressure is known as hypertension. In this particular survey, anyone with a systolic blood pressure of 18.7 kPa (140 mmHg) or over, or who was taking drugs to lower blood pressure, was recorded as having hypertension.

Some of the results of this survey are shown in Tables 6.1 and 6.2.

Table 6.1 shows the mean systolic blood pressure for all men and women surveyed and the means for each of the age groups shown.

Table 6.1

		age groups						
	all ages	**16–24**	**25–34**	**35–44**	**45–54**	**55–64**	**65–74**	**75 and over**
men mean systolic blood pressure / kPa	18.2	17.1	17.4	17.5	18.2	18.9	19.7	20.0
women mean systolic blood pressure / kPa	17.7	16.0	16.1	16.5	17.6	18.7	19.9	20.7

(a) Use the information in Table 6.1 to find the answers to the following.

(i) State the mean systolic blood pressure for all men and all women in the sample.

men ..... kPa

women ..... kPa [1]

(ii) Calculate the percentage increase in mean systolic blood pressure between the ages of 16–24 and 65–74 in women.

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

Answer = ...% [2]

[Turn over

(iii) Describe the change in mean systolic blood pressure in men with increasing age.

.....

.....

.....

.....[2]

Table 6.2 shows the percentages of all men and women surveyed who had hypertension and also the percentage for each age group.

Table 6.2

	percentage of people in each age group in the survey who had hypertension							
	all ages	**16–24**	**25–34**	**35–44**	**45–54**	**55–64**	**65–74**	**75 and over**
men	40.8	16.0	20.5	26.1	42.3	59.8	69.9	72.8
women	32.9	4.2	6.9	13.2	30.8	51.6	72.8	77.6

(b) Use the information in Table 6.1 and Table 6.2 to explain whether there is any evidence to support the suggestion that men are more at risk from hypertension than women.

.....

.....

.....

.....

.....[3]

(c) Explain the advantages to health of carrying out this survey.

.....

.....

.....[2]

[Total: 10]