

**ADVANCED SUBSIDIARY GCE
BIOLOGY**

Human Health and Disease

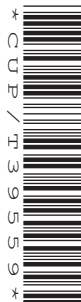
TUESDAY 3 JUNE 2008

2802

Morning
Time: 1 hour

Candidates answer on the question paper
Additional materials (enclosed): None

Additional materials (required):
Electronic calculator
Ruler (cm/mm)



Candidate
Forename

Candidate
Surname

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

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

INFORMATION FOR CANDIDATES

- The number of marks for each question 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.

FOR EXAMINER'S USE

Qu.	Max.	Mark
1	10	
2	11	
3	10	
4	13	
5	10	
6	6	
TOTAL	60	

This document consists of **15** printed pages, **1** blank page and an insert.

Answer **all** the questions.

- 1 Fig. 1.1 shows drawings of two cells, **A** and **B**, from the gaseous exchange system.

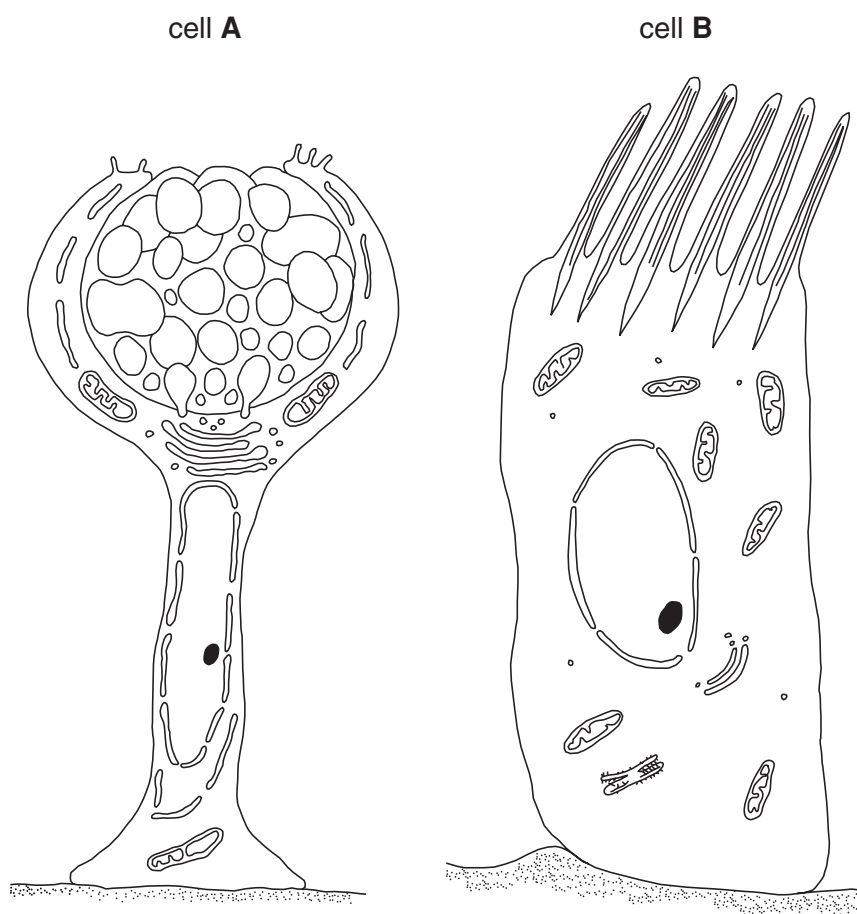


Fig. 1.1

- (a) (i) Name the **tissue** of the gaseous exchange system in which these cells are found.

..... [1]

- (ii) Name each cell and give **one** function of each.

cell **A** name

function

.....

cell **B** name

function

..... [4]

- (b) State **one** effect that tar from cigarette smoke may have on the action of cell **A** and cell **B**.

cell **A**

.....

cell **B**

..... [2]

- (c) Tar from cigarette smoke can also cause lung cancer.

Describe the symptoms of lung cancer.

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

- 2 (a) Table 2.1 lists a number of categories of disease and the names of some diseases.

For each disease tick the appropriate category or categories.

The column for Alzheimer's has been completed for you.

Table 2.1

	disease				
category of disease	Alzheimer's	rickets	measles	HIV/AIDS	coronary heart disease
mental	✓				
infectious					
degenerative	✓				
physical					
inherited					
deficiency					

[4]

Huntington's disease is an inherited disease that causes damage to nerve cells in the brain. A person with this condition usually shows no symptoms until middle age.

- (b) (i) Explain what is meant by an *inherited disease*.

.....
 [1]

- (ii) In 1993, a test was developed to determine if a person might develop Huntington's disease later in life.

A man knows that one of his parents has Huntington's disease but he has no symptoms. He does not want to be tested.

Suggest why he would need to think carefully before deciding to have children.

.....

 [2]

- (c) As a result of the Human Genome Project, scientists have the ability to test for many inherited diseases.

State **two** advantages and **two** disadvantages of the ability to test for inherited diseases.

advantages

1

2

disadvantages

1

2 [4]

[Total: 11]

6
BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

- 3 Table 3.1 shows some of the components found in a balanced diet and lists typical amounts of these components required by a 17-year-old girl in the UK.

Table 3.1

component	mass/g day ⁻¹	energy/kJ g ⁻¹
carbohydrates	190.0	16
fats	60.0	37
proteins	45.0	17
minerals	9.2	0
fibre	12.0	0
water	variable	0

- (a) (i) One important component is missing from the list in Table 3.1.

Name the important component that is missing.

..... [1]

- (ii) Name the component listed in Table 3.1 which provides the body with an immediate supply of energy.

..... [1]

- (b) A 17-year-old girl in the UK has been advised by her doctor to lose 10 kg in weight.

- (i) Name **two** components from the list in Table 3.1 that she should reduce in her diet.

1

2 [2]

- (ii) Name a disease that may result if she becomes obsessed with weight loss.

..... [1]

Fig. 3.1 compares the energy requirements of males and females of different ages in the UK. The energy requirement is expressed as an Estimated Average Requirement (EAR).

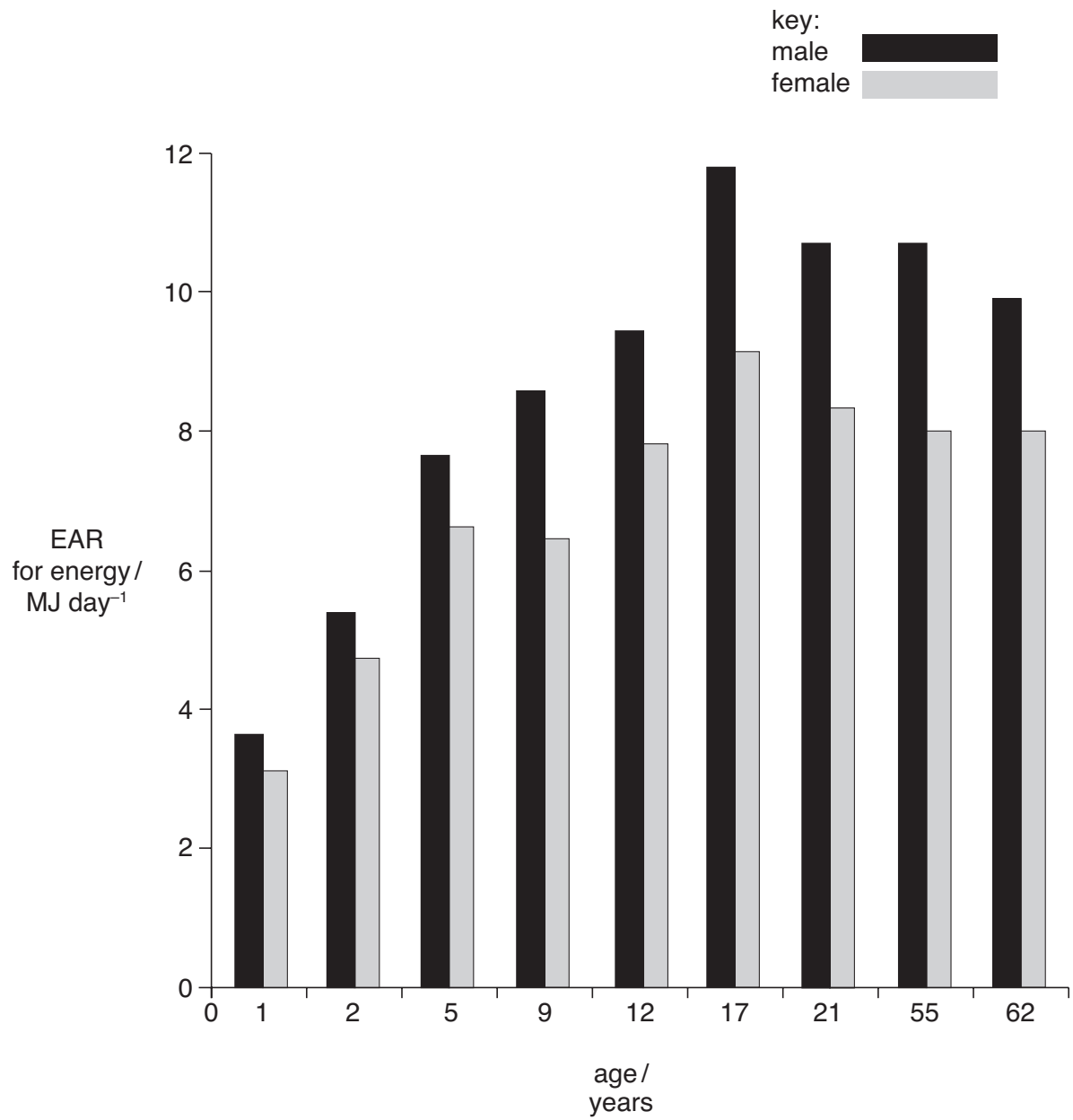


Fig. 3.1

- (c) (i) Explain what is meant by the term *Estimated Average Requirement (EAR)*.

.....

.....

..... [1]

- (ii) Suggest how a health professional might use the figures when advising the 17-year-old girl in part (b) to lose weight.

.....

.....

.....

..... [2]

- (d) The EAR for women at 21 years of age is 8.2 MJ day^{-1} .

Suggest **and** explain what happens to the EAR for women at 21 years of age who are reaching the end of pregnancy.

.....

.....

.....

..... [2]

[Total: 10]

4 Fig. 4.1 and Fig. 4.2 are provided for you **on the insert**.

(a) Fig. 4.1 is a photomicrograph of blood taken from a person with malaria.

Using Fig. 4.1, a student counted the number of whole red blood cells and noted that 16 of the 70 visible cells were infected with the malarial parasite.

From this the student concluded that in all cases of malaria, approximately 23% of red blood cells are infected.

Comment on the validity of this conclusion. You do **not** need to count the numbers of cells in Fig. 4.1.

.....

.....

.....

..... [2]

(b) Fig. 4.2 is a false colour transmission **electronmicrograph** of one red blood cell showing malarial parasites at a later stage of development.

(i) Suggest why people with malaria have less haemoglobin than normal.

.....

..... [1]

(ii) Explain why people with malaria find it more difficult to exercise than before infection.

.....

.....

.....

..... [2]

(c) In this question, one mark is available for the quality of spelling, punctuation and grammar.

Describe how the malarial parasite is transmitted from an infected person to an uninfected person **and** explain why attempts to eradicate malaria have not succeeded.

.....

.....

.....

.....

.....

..... [7]

Quality of Written Communication [1]

[Total: 13]

[Turn over

- 5 Fig. 5.1 shows the origin and development of a B lymphocyte in a tissue, X. It also shows the immune response in a lymph node following a vaccination with the measles virus.

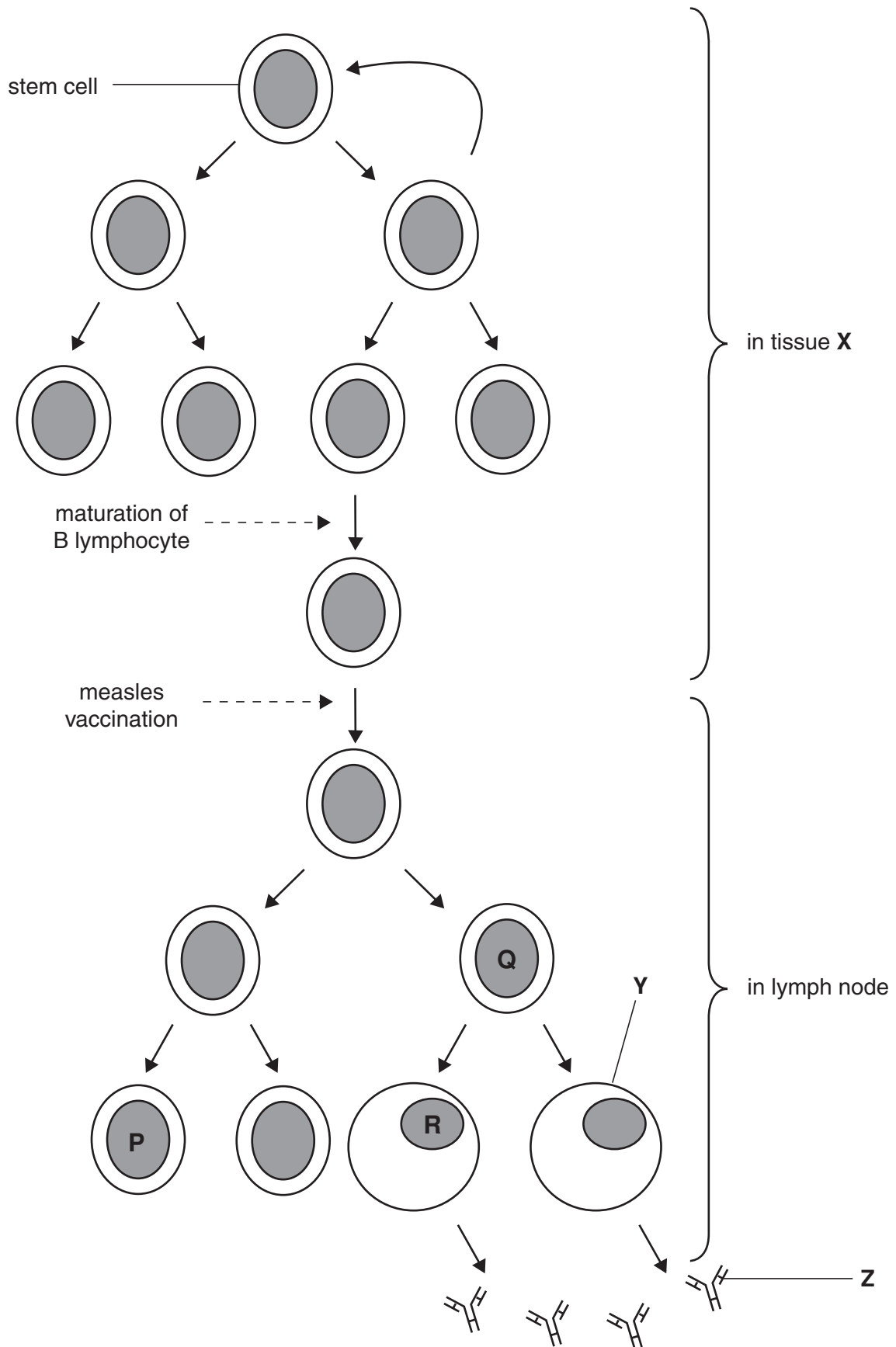


Fig. 5.1

- (a) Name tissue **X**, cell **Y** and molecule **Z**.

tissue **X**

cell **Y**

molecule **Z** [3]

- (b) Molecules found on the surface of the measles virus can stimulate an immune response.

State the term given to molecules that stimulate an immune response.

..... [1]

- (c) (i) Identify which of the cells **P**, **Q**, or **R** could become a memory cell.

..... [1]

- (ii) State **one** function of memory cells.

.....

..... [1]

- (d) Fig. 5.2 shows the concentration of molecule **Z** in the blood following a vaccination for measles at day 0.

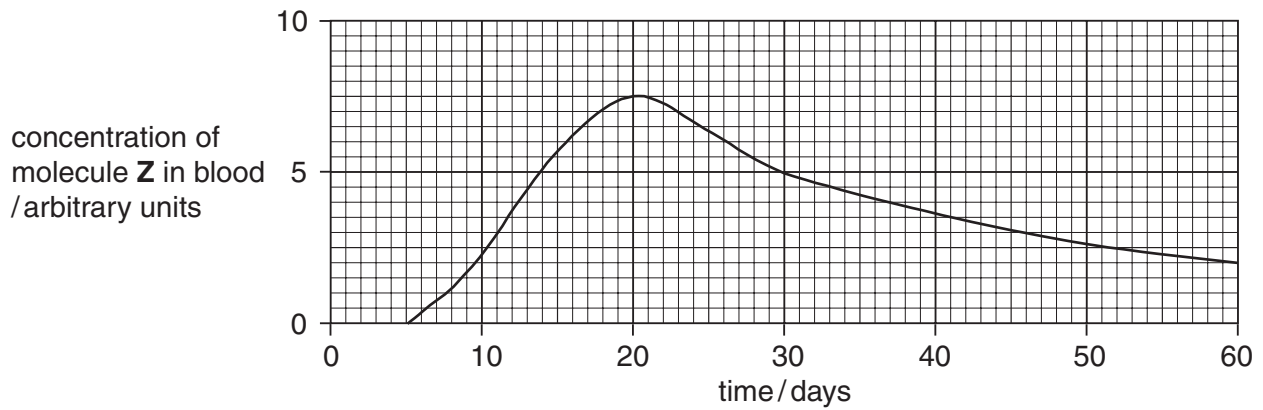


Fig. 5.2

- (i) Using Fig. 5.2, describe how the concentration of molecule **Z** in the blood changes following vaccination.

.....

.....

.....

.....

.....

.....

..... [3]

- (ii) Put a tick (✓) in the appropriate box in the table below to indicate the type of immunity provided by this vaccination.

natural passive immunity	
natural active immunity	
artificial passive immunity	
artificial active immunity	

[1]

[Total: 10]

- 6 Complete the following passage by using the most appropriate word or words.

During strenuous exercise, the breathing rate in order to supply more oxygen to the muscles. Despite this, the rate of respiration alone may still be insufficient to supply the energy needs of the muscles, and an oxygen deficit may build up. As a result, muscles carry out anaerobic respiration and produce which diffuses into the blood and is absorbed by the cells of the Here it is respired or converted into glucose. The volume of oxygen absorbed by the lungs does not return to its resting value immediately after the completion of strenuous exercise, because the body has to repay an oxygen The time taken for the breathing rate to return to the resting level is a measure of the person's

[6]

[Total: 6]

END OF QUESTION PAPER

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