

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced Subsidiary GCE

HUMAN BIOLOGY

2857

Growth, Development and Disease

Monday

10 JANUARY 2005

Morning

1 hour

Candidates answer on the question paper.

Additional materials:

Electronic calculator

Ruler (cm/mm)

Candidate Name	Centre Number	Candidate Number												
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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 provided 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	13	
2	11	
3	12	
4	6	
5	7	
6	11	
TOTAL	60	

This question paper consists of 13 printed pages and 3 blank pages.

Answer **all** the questions.

1 Breast cancer is a common form of cancer in women throughout the world.

(a) (i) Thermography is one technique that may be used to detect cancers of the breast. Outline how thermography works.

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

(ii) Suggest why thermography is not considered reliable enough to be used for routine breast screening.

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

(b) Surgery may be used to treat breast cancers. Name and describe briefly **two** surgical methods that may be used.

name

description

.....
.....

name

description

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

2 The introduction of a foreign antigen into the blood triggers an immune response.

(a) Explain the meaning of the term *immune response*.

.....

.....

.....

.....[2]

(b) Fig. 2.1 shows the change in antibody concentration in human blood, in response to the introduction of antigen X.

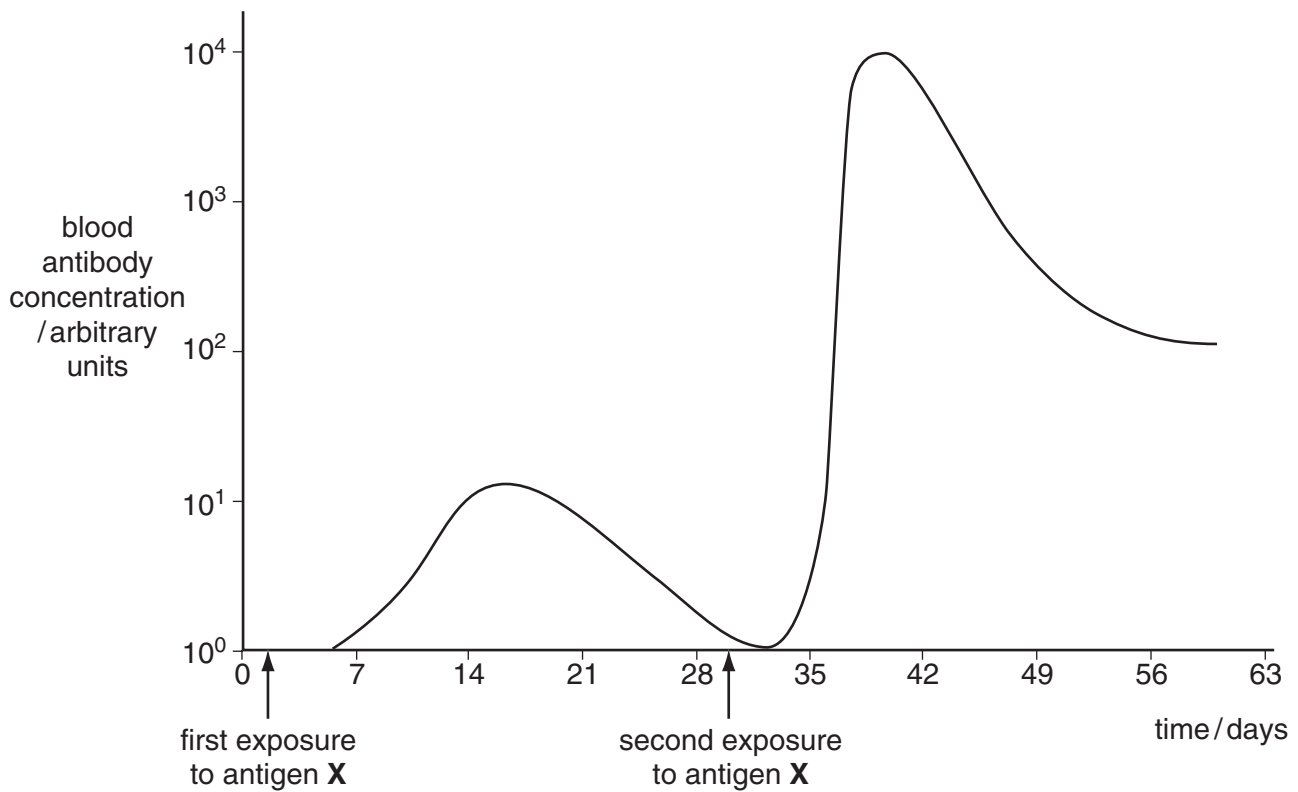


Fig. 2.1

Using the information in Fig. 2.1,

(i) describe **two** differences in the response to the first and second exposure to antigen X;

1

.....

2

.....[2]

(ii) explain how a vaccine works.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[4]

(c) Fig. 2.2 shows the structure of an antibody.



Fig. 2.2

Describe the functions of the parts labelled on Fig. 2.2.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[3]

[Total: 11]

(b) Describe how large amounts of alcohol ingested by the mother may affect the developing foetus.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[5]

[Total: 12]

4 Sickle cell anaemia is a disease caused by a change to a single amino acid in the beta polypeptide chains of haemoglobin.

- Fig. 4.1 shows the base sequence in part of the DNA coding strand for the beta chain.
- Strand **P** shows the base sequence for normal haemoglobin.
- Strand **Q** shows the base sequence for sickle cell haemoglobin.

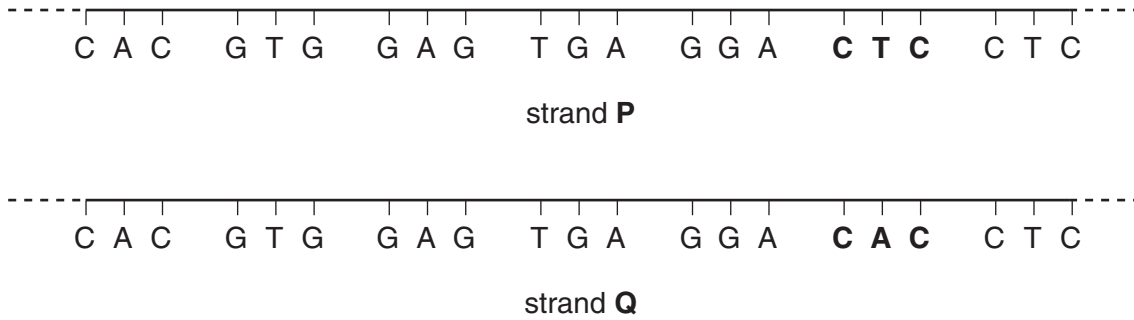


Fig. 4.1

(a) State the name given to this kind of gene (point) mutation.

.....[1]

(b) Describe the effect of this mutation on

(i) the haemoglobin produced;

.....
[1]

(ii) the red blood cells containing the mutated haemoglobin;

.....

[2]

(iii) the individual with sickle cell anaemia.

.....

[2]

[Total: 6]

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5 During the development of the embryo, cells divide by mitosis, grow and differentiate. The cells gradually become organised into tissues and organs.

(a) (i) State what is meant by the term *cell differentiation*.

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

(ii) Describe the relationship between tissues and organs.

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

(b) Fig. 5.1 shows an animal cell at different stages of mitosis.

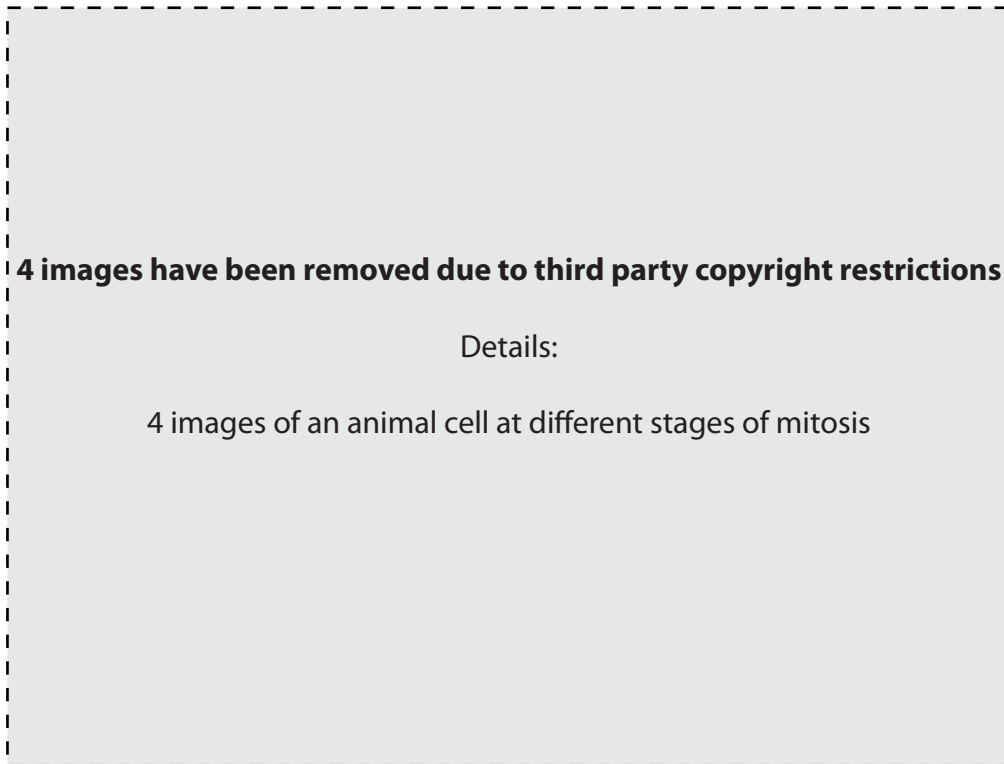


Fig. 5.1

(i) Arrange the stages shown in Fig. 5.1 in the correct order by writing the letters in the correct sequence.

..... [1]

(ii) Compare the genetic makeup of the daughter cells produced by mitosis with that of the original parent cell.

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

[Total: 7]

6 HIV / AIDS is arguably the most serious disease to spread throughout the world.

(a) Outline the relationship between HIV and AIDS.

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

(b) Describe **three** ways in which HIV can be spread by an infected human.

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

(c) Antibiotics have been used successfully to treat many infectious diseases.

Why are antibiotics **not** used to treat HIV infection?

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

(d) It is difficult to calculate accurately the number of people in the United Kingdom who are HIV positive.

It has been suggested that compulsory HIV screening should be introduced.

(i) State **two** reasons, **other than lack of compulsory screening**, why it is difficult to calculate accurately the number of people who are HIV positive.

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

(ii) Outline **two** ethical problems that could arise from compulsory screening.

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

[Total: 11]

END OF QUESTION PAPER

Copyright Acknowledgments:

Fig. 2.2 and Fig. 5.1 from Taylor, D.J. Green, N.P.O., Stout, G.W., Soper, R. (ed.) 1997. *Biological Science I & II*. Third edition. C.U.P. ISBN: 0-521-56178-7

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