OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

HUMAN BIOLOGY 2857

Growth, Development and Disease

Tuesday **10 JANUARY 2006** Morning 1 hour

Candidates answer on the question paper.
Additional materials:
Electronic calculator
Ruler (cm/mm)

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 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	6	
2	11	
3	8	
4	15	
5	10	
6	10	
TOTAL	60	

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

Registered Charity Number: 1066969
[Turn over

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Answer all the questions.

1 Mitosis is a type of nuclear division.

(a) State the importance of mitosis in the life-cycle of a human.

.....

.....

..... [2]

(b) Fig. 1.1 is a photomicrograph showing two stages of mitosis, P and Q.

Fig. 1.1

(i) Name the stages of mitosis shown in Fig. 1.1.

P .....

Q ..... [2]

(ii) Explain how a human cell divides at the end of mitosis.

.....

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..... [2]

[Total: 6]

2 The photograph in Fig. 2.1 was obtained from an ultrasound scan, where reflected high frequency sound waves are used to build up an image of the foetus in the mother's uterus.

Such images can be used to monitor the growth of the foetus by measuring the crown to rump length of the back.

An image has been removed due to third party copyright restrictions

Details: An image of a foetus in the mother's uterus taken from the Science Photo Library

2 cm

scale

Fig. 2.1

Table 2.1 shows some of the changes in the mean foetal crown to rump length during gestation (pregnancy).

Table 2.1

A table has been removed due to third party copyright restrictions

Details: A table showing some of the changes in the mean foetal crown to rump length during pregnancy

(a) Use the information in Fig. 2.1 and Table 2.1 to calculate the approximate age of the foetus shown in the photograph.

Marks will be awarded for showing the stages of your calculation.

Answer = ... weeks [3]

(b) State **one other** measurement, which may be taken from an ultrasound scan, that can also be used to monitor foetal growth.

..... [1]

(c) The actions of the mother during pregnancy may affect the unborn child.

(i) State **three** possible effects on the unborn child of its mother smoking heavily throughout the pregnancy.

1 .....

2 .....

3 ..... [3]

(ii) Explain why the effects stated in **(i)** occur.

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..... [4]

[Total: 11]

3 In this question, one mark is available for the quality of use and organisation of scientific terms.

Sir Macfarlane Burnet, the 1960 Nobel Laureate in medicine, defined immunity as the ability to recognise foreign material and activate cells to help remove the foreign material efficiently.

With reference to this statement, describe the immune response that follows the entry of pathogens into the body via a wound.

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..... [7]

Quality of Written Communication [1]

[Total: 8]

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4 By law, cigarette packets are required to carry health warnings about risks such as lung cancer.

(a) Describe the changes that occur in a cell to cause it to become cancerous.

.....

.....

.....

..... [2]

Fig. 4.1 shows the lung cancer incidence and mortality rates in Great Britain between 1975 and 2001.

A graph has been removed due to third party copyright restrictions

Details: A graph showing the lung cancer incidence and mortality rates in Great Britain between 1975 and 2001, taken from Cancer Research UK

Fig. 4.1

(b) (i) Describe the trends shown by the data in Fig. 4.1.

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(ii) Explain the trends shown by the data in Fig. 4.1.

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[5]

(c) Describe **two** pieces of **epidemiological** evidence linking lung cancer to smoking.

1 .....

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2 .....

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..... [2]

(d) Explain how each of the following methods may be used in the treatment of lung cancer:

(i) radiation therapy;

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..... [2]

(ii) chemotherapy;

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..... [2]

(iii) complementary therapies.

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..... [2]

[Total: 15]

5 Fig. 5.1 shows a transmission electron micrograph of a MRSA bacterium magnified 100 000 times.

MRSA is resistant to most antibiotic drugs and is of serious concern in hospitals, particularly in wards for elderly patients. The spread of MRSA is very difficult to control.

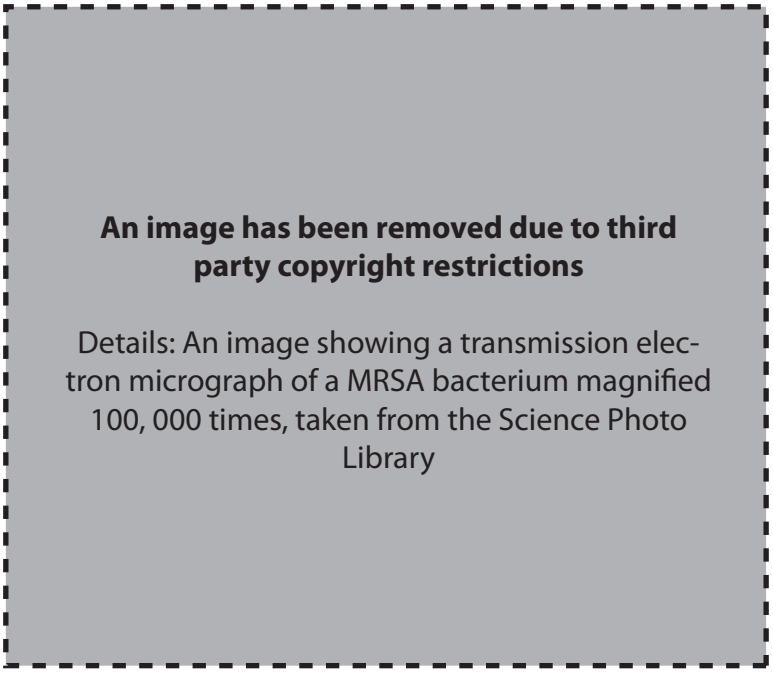

Fig. 5.1

(a) State what is meant by antibiotic resistance.

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..... [1]

(b) Outline three precautions which should be taken to reduce the spread of antibiotic resistant bacteria in hospitals.

1 .....

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2 .....

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3 .....

..... [3]

(c) Why is MRSA infection of particular concern in wards for elderly patients?

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..... [2]

(d) When patients are prescribed a course of antibiotics to treat a bacterial infection, they are told that it is important to complete the course, even if the symptoms of the infection have gone.

Explain how failing to follow this advice may lead to the development of resistant strains of bacteria such as MRSA.

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..... [4]

[Total: 10]

6 Fig. 6.1 shows some of the events occurring during the first stage of protein synthesis.

Fig. 6.1

(a) State the term given to the length of DNA labelled X on the diagram.

..... [1]

(b) Describe what is happening during the stage of protein synthesis shown in Fig. 6.1.

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..... [3]

(c) Explain how a strand of mRNA results in a specific sequence of amino acids in a polypeptide.

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..... [3]

(d) A metabolic pathway is a series of reactions catalysed by enzymes. Many genetic disorders are caused by a change in one nucleotide base of a DNA strand.

This mutation results in a 'metabolic block', where one of the reactions in the pathway cannot take place.

(i) State the name given to this type of mutation.

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..... [1]

(ii) Suggest how this type of mutation could lead to a 'metabolic block'.

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..... [2]

[Total: 10]

END OF QUESTION PAPER

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