

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

Leave blank

General Certificate of Secondary Education
June 2005



**SCIENCE: SINGLE AWARD (CO-ORDINATED) 3463/1H
HIGHER TIER
Paper 1**

H

Monday 6 June 2005 1.30 pm to 2.15 pm

In addition to this paper you will require:
a ruler.
You may use a calculator.

Time allowed: 45 minutes

Instructions

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want marked.

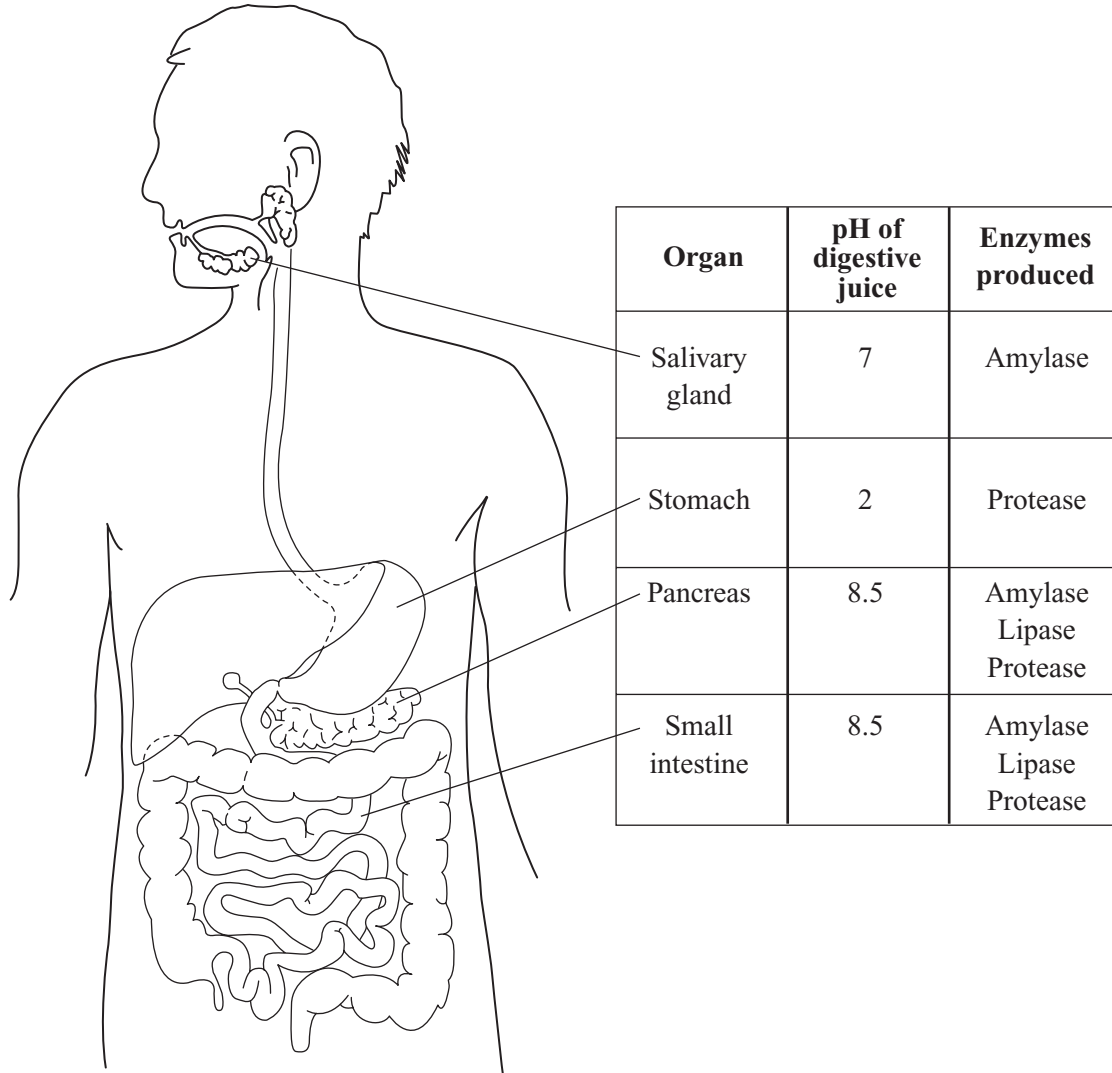
Information

- The maximum mark for this paper is 45.
- Mark allocations are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use			
Number	Mark	Number	Mark
1		4	
2		5	
3		6	
		7	
		8	
Total (Column 1)	→		
Total (Column 2)	→		
TOTAL			
Examiner's Initials			

Answer **all** questions in the spaces provided.

1 The diagram gives information about some parts of the human digestive system.



(a) (i) Name the organ which **makes** bile.

.....
(1 mark)

(ii) Label this organ with the letter **X** on the diagram.

(1 mark)

Information in the table may help you to answer parts (b) and (c).

(b) Name **two** parts of the digestive system where protein is digested.

1

2

(2 marks)

(c) Suggest **two** reasons why starch is not digested in the stomach.

1

.....

2

.....

(2 marks)

(d) The contents of the small intestine are liquid but the faeces are much more solid.

Explain what causes this to happen.

.....

.....

.....

.....

.....

.....

(3 marks)

9

TURN OVER FOR THE NEXT QUESTION

Turn over ►

2 (a) Fossils provide evidence for evolution.

(i) What is a fossil?

.....
(1 mark)

(ii) How do fossils provide evidence for evolution?

.....
.....
.....
.....
(2 marks)

(b) Doctors give antibiotics to patients to kill bacteria in their bodies.

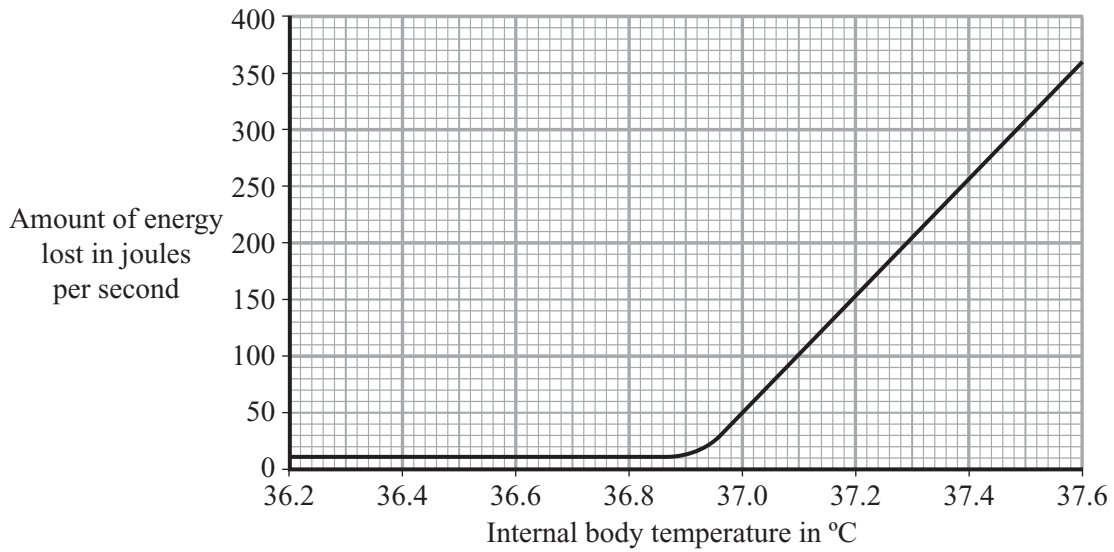
Explain how the overuse of antibiotics has led to the evolution of antibiotic-resistant bacteria.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

.....
.....
.....
.....
.....
.....
(3 marks)

6

- 3 The internal body temperature determines how much a person sweats. The graph shows the effect of different internal body temperatures on a person's rate of energy loss by sweating.



- (a) How much more energy was lost from the body each second by sweating when the body temperature was 37.6°C than when it was 36.6°C? Show clearly how you work out your final answer.

.....

Amount of energy = joules per second
 (2 marks)

- (b) Explain why a person would feel more thirsty when the body temperature was 37.6°C than when it was 36.6°C.

.....

(2 marks)

- (c) Explain how sweating helps to control body temperature.

.....

(3 marks)



Turn over ►

4 (a) (i) Name the red pigment found in red blood cells.

.....
(1 mark)

(ii) Describe, in detail, the function of this red pigment.

.....
.....
.....
.....
(2 marks)

(b) Describe **one** other way in which the structure of a red blood cell is different from the structure of a white blood cell.

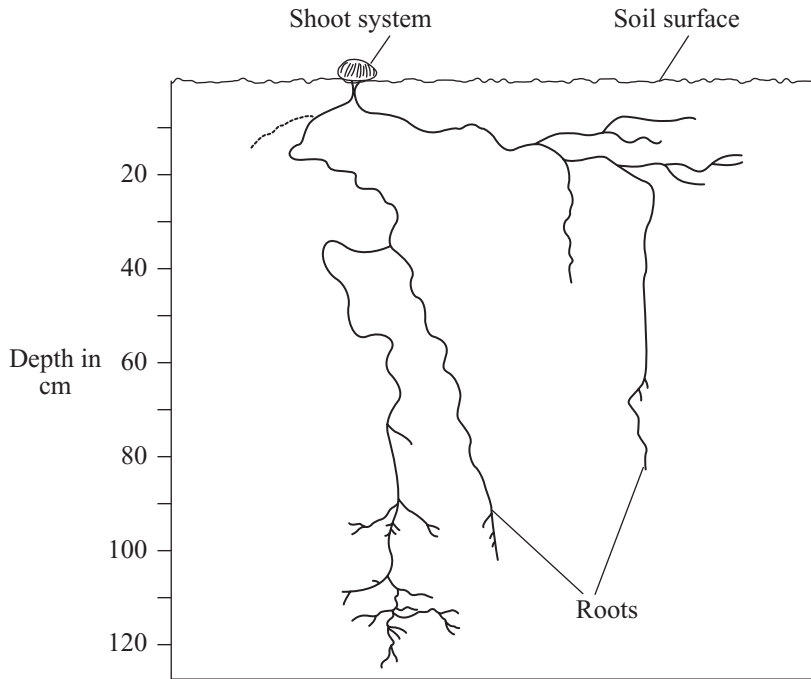
.....
.....
(1 mark)

(c) Cigarette smoke contains carbon monoxide. A woman smoked cigarettes throughout her pregnancy.

Explain how the carbon monoxide in cigarette smoke could harm her developing fetus.

.....
.....
.....
.....
.....
.....
(3 marks)

5 The diagram shows the desert plant, *Fredolia*.



Describe and explain **three** adaptations of *Fredolia*, which you can see in the diagram, that help it to survive in dry conditions.

- 1
- 2
- 3

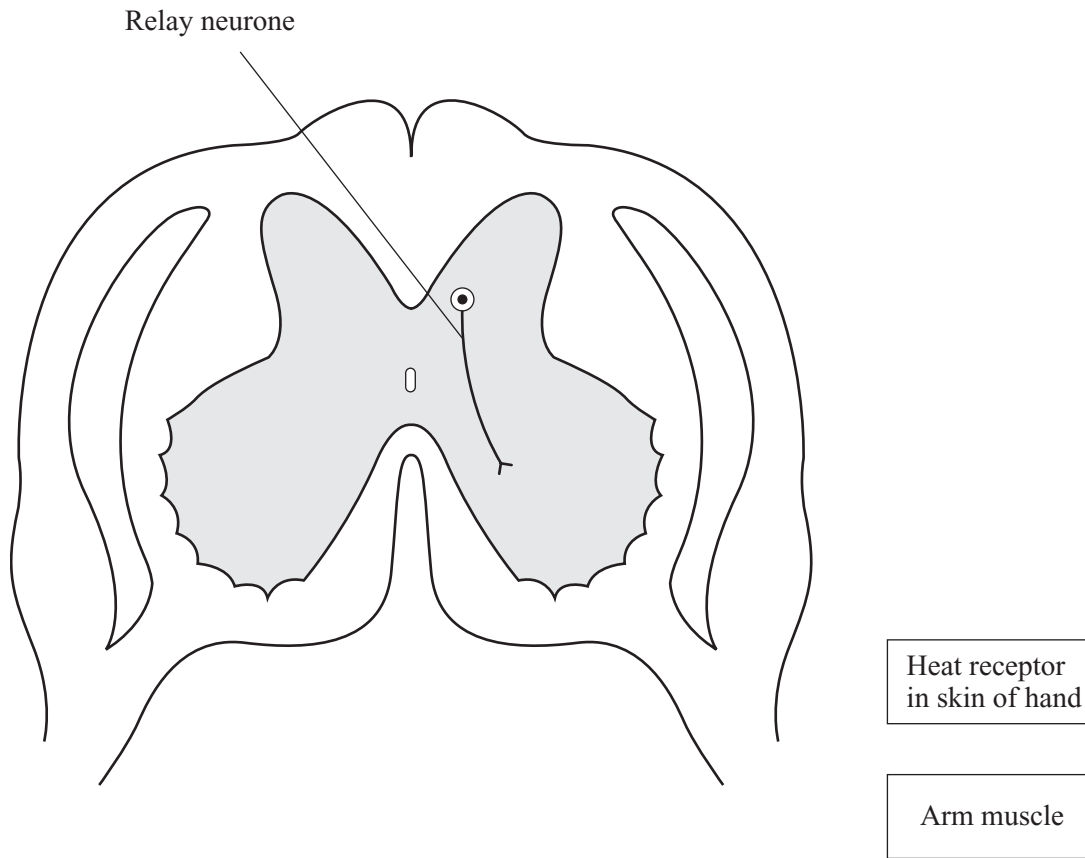
(3 marks)

3

TURN OVER FOR THE NEXT QUESTION

Turn over ►

6 The diagram shows a section through the spinal cord.



(a) Coordination of a reflex movement of the arm, in response to the hand touching a hot object, involves three neurones. One of these, the relay neurone, is shown in the diagram. Complete the nerve pathway between the receptor and the muscle on the diagram by drawing and labelling:

- (i) the sensory neurone;
- (ii) the motor neurone.

(2 marks)

(b) The nerve pathway linking the heat receptor in the hand with the arm muscle is about 1.5 metres in length. It would take the nervous impulse 0.02 seconds to travel this distance along a neurone. However, it takes about 0.5 seconds for the arm to start moving during the reflex response to the heat stimulus.

Explain the difference.

.....

.....

.....

.....

(2 marks)

7 Oestrogen, luteinising hormone (LH) and follicle stimulating hormone (FSH) work together to coordinate the menstrual cycle. A woman will be infertile if her pituitary gland does not release enough follicle stimulating hormone (FSH).

Explain how injections of FSH could increase her chances of having a baby.

.....

.....

.....

.....

.....

.....

.....

.....

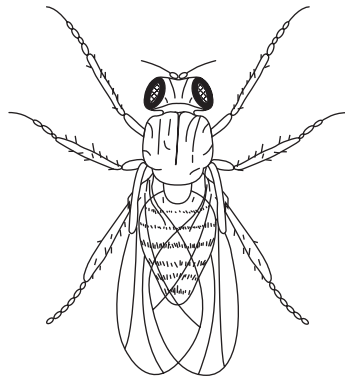
(3 marks)

3

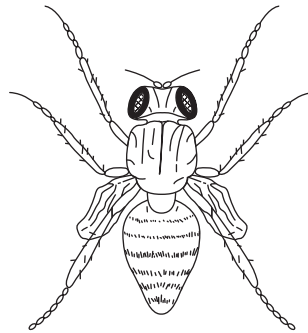
TURN OVER FOR THE NEXT QUESTION

Turn over ►

- 8 The fruit fly, *Drosophila*, has either long wings or vestigial wings, as shown in the diagram.



Long-winged fly



Vestigial-winged fly

The size of the wings is determined by a pair of alleles: **A** and **a**.
Long-winged flies have one of two possible genotypes: **AA** or **Aa**.
Vestigial-winged flies have only one genotype: **aa**.

- (a) (i) What is the genotype of a heterozygous fly?

.....
(1 mark)

- (ii) Why can vestigial-winged flies only have the genotype **aa**?

.....
(1 mark)

- (b) A male and a female long-winged fly were crossed. They produced 96 offspring. 72 of the offspring had long wings and 24 had vestigial wings. Use a genetic diagram to explain this.

(4 marks)

6

END OF QUESTIONS

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE