

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

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General Certificate of Secondary Education
June 2006



SCIENCE: SINGLE AWARD B (CO-ORDINATED)
Paper 1
Foundation Tier

3463/1F
F

Wednesday 7 June 2006 1.30 pm to 2.15 pm

<p>For this paper you must have:</p> <ul style="list-style-type: none"> a ruler <p>You may use a calculator.</p>
--

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.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want marked.

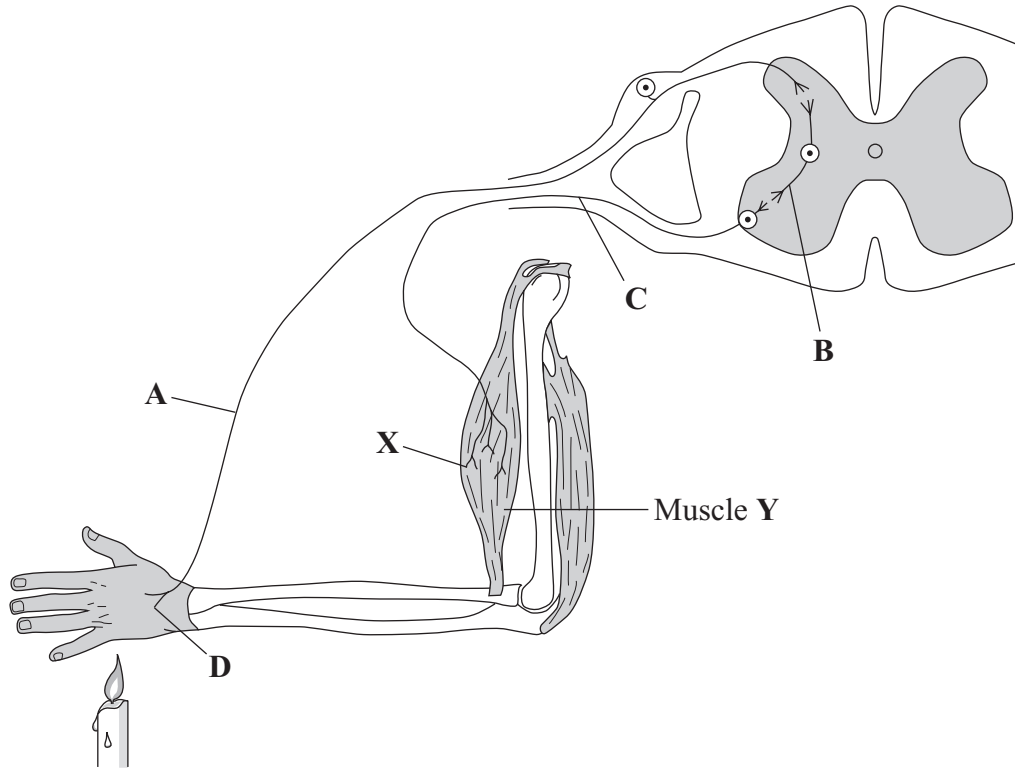
Information

- The maximum mark for this paper is 45.
- The marks for questions 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		6	
2		7	
3		8	
4			
5			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

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

1 The diagram shows the parts of the nervous system which act when the hand touches a hot object.



(a) Which **letter, A to D**, shows:

- (i) the sensory neurone;
 - (ii) the motor neurone;
 - (iii) the receptor?
- (3 marks)*

(b) What happens to muscle **Y** when impulses arrive at point **X**?

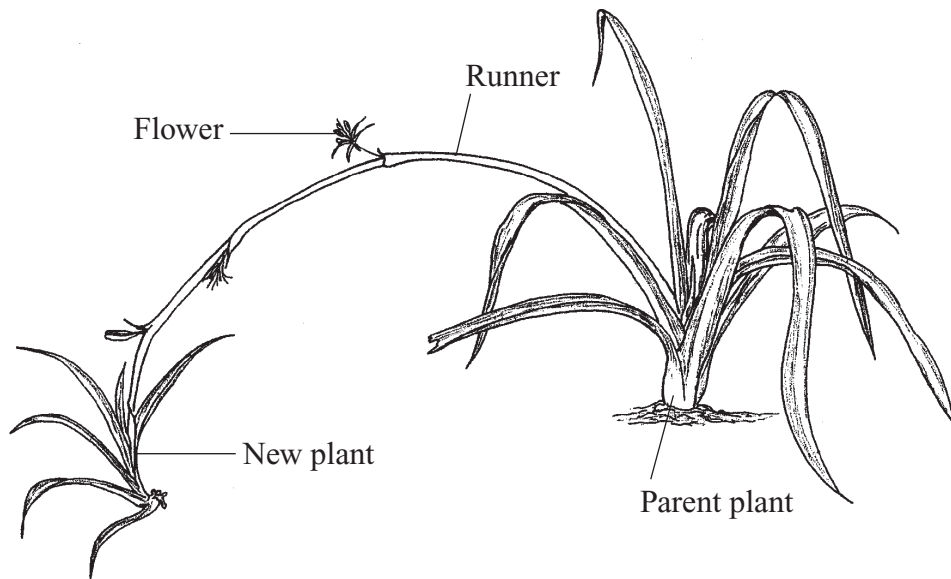
.....
(1 mark)

(c) Moving the hand away from the hot object is a reflex action. What is a reflex action?

.....
.....
.....
.....

(2 marks)

2 The diagram shows a house plant.



Complete the sentences about reproduction in this plant. Choose the correct words from the box.

asexual	clones	different	families
gametes	identical	sexual	

This plant reproduces in two different ways:

EITHER New plants may grow from the ends of the runners. Many new plants can form in this way. This is an example of reproduction. All the offspring plants will be genetically Scientists call groups of offspring produced in this way

OR In the flowers, male and female will fuse together and grow into seeds. This is an example of reproduction. All the offspring plants grown from the seeds will be genetically

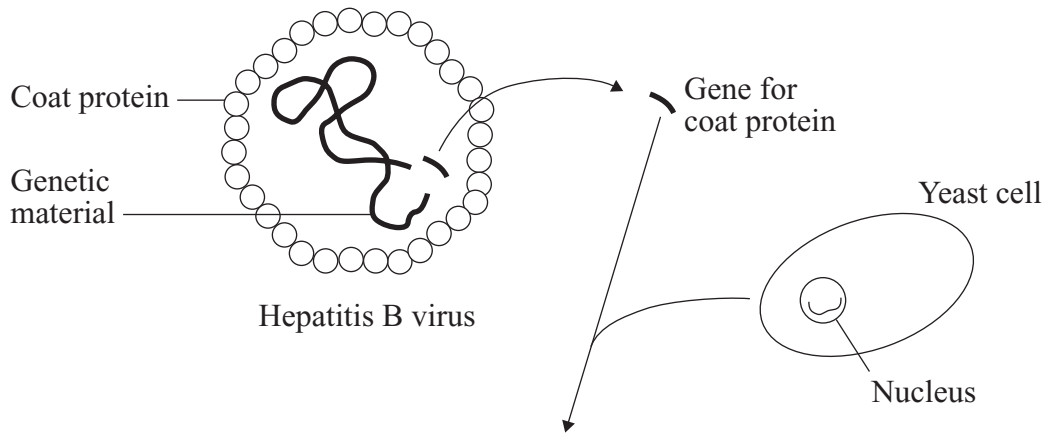
(6 marks)

6

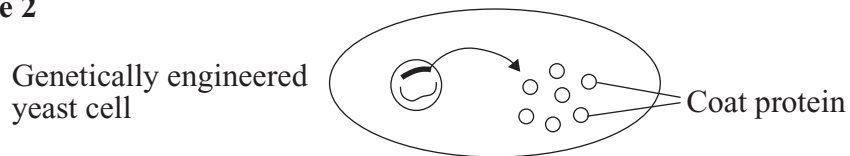
Turn over ►

- 3 Hepatitis B is a dangerous human disease. It is caused by a virus. The diagram shows how a vaccine against hepatitis B can be made by genetic engineering.

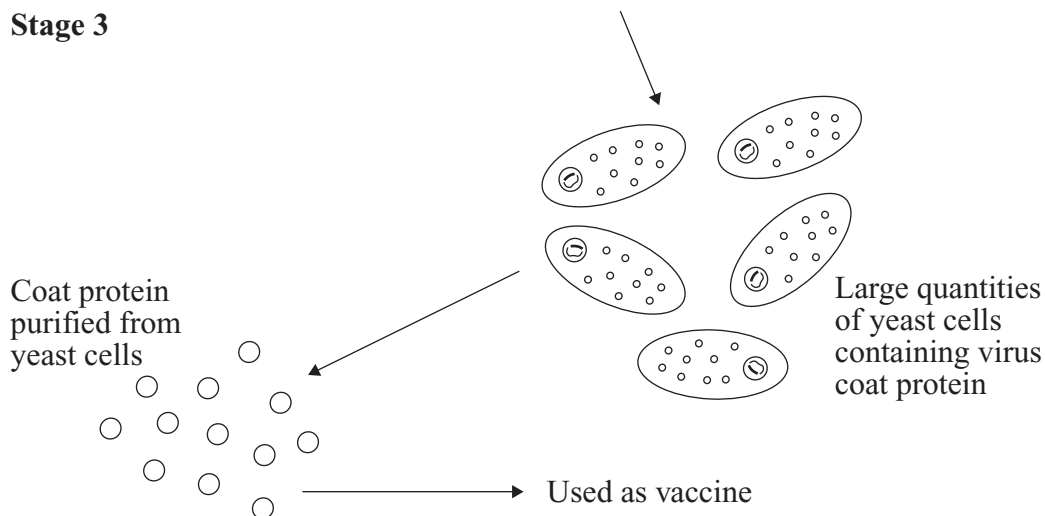
Stage 1



Stage 2



Stage 3



- (a) Use the diagram to answer the following questions.

- (i) What part of the virus is put into the yeast cell at **Stage 1**?

.....
(1 mark)

- (ii) What part of the virus is produced by the yeast cell at **Stage 2**?

.....
(1 mark)

(b) In each of parts (i), (ii) and (iii), draw a ring around **one** answer.

A vaccine is injected into a person. The vaccine helps fight the disease.

(i) Which cells respond to the vaccine?

platelets **red blood cells** **white blood cells**

(1 mark)

(ii) Which substance is produced by the cells in part (b)(i)?

antibiotics **antibodies** **mucus**

(1 mark)

(iii) Following vaccination, the hepatitis B virus may enter the body again. If this happens, the substance in part (b)(ii) will be produced

at the same rate. **more rapidly.** **more slowly.**

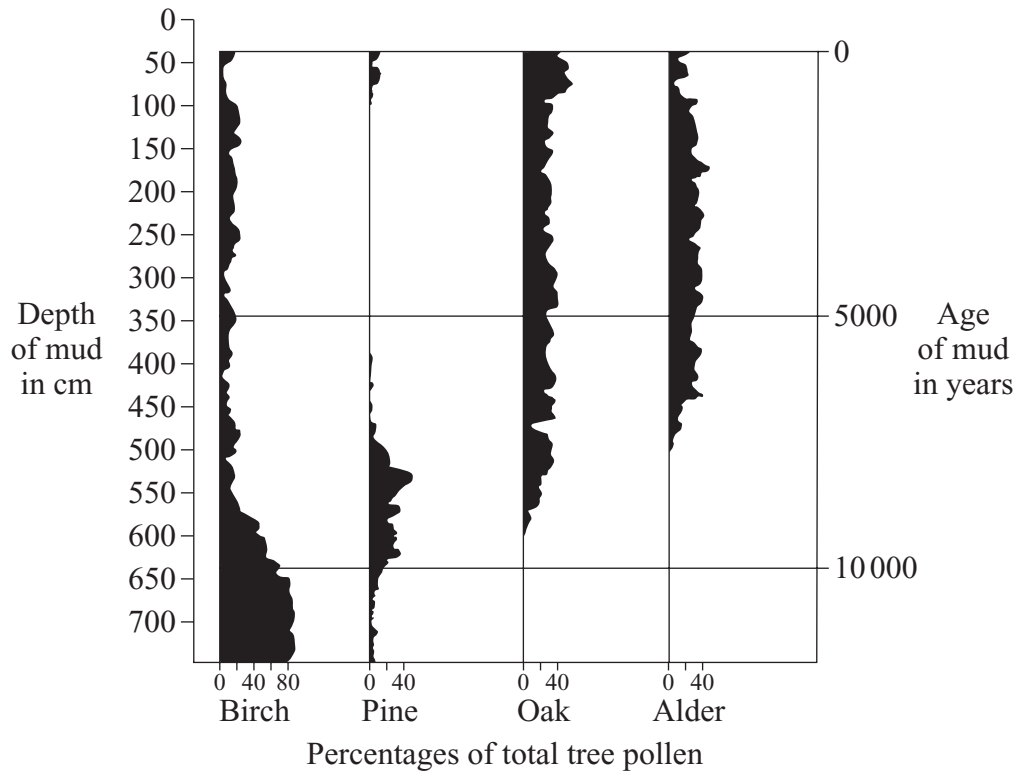
(1 mark)

5

Turn over for the next question

Turn over ►

- 4 Pollen grains from trees which grew long ago can be found buried in the mud at the bottom of lakes. The diagram shows the percentages of pollen grains from different tree species which were found at different depths in the mud at the bottom of a lake.



- (a) The pollen from trees which grew a long time ago is found deeper in the mud than pollen from trees which grew more recently.

Explain why.

.....

.....

.....

.....

(2 marks)

(b) In each of parts (i) and (ii), draw a ring around **one** answer.

(i) Which species of tree was most common 10 000 years ago?

birch **pine** **oak** **alder**

(1 mark)

(ii) How many years ago were pine trees the most common?

700 **2 300** **8 200** **11 200**

(1 mark)

(c) Trees like birch and pine require less water to grow than oaks and alders. Use the pollen data to suggest:

(i) what the climate was like 9000 years ago;

.....

.....

(1 mark)

(ii) what the climate was like 5000 years ago.

.....

.....

(1 mark)

6

Turn over for the next question

Turn over ►

- 5 The table gives information about urine and sweat produced by a person on two different days. On one day the weather was cold and on the other it was hot. The person did the same amount of exercise, and ate and drank the same, on each day.

	Cold day	Hot day
Volume of sweat in dm^3	0.62	1.22
Volume of urine in dm^3	1.50	0.90
Concentration of salt in urine in grams per dm^3	9.50	12.80

- (a) (i) The person sweats more on the hot day.

Why is this helpful?

.....

 (1 mark)

- (ii) Why is the volume of urine lower on the hot day?

.....

 (1 mark)

- (b) The person took in the same amount of salt in food and drink on both days.

Why is the salt concentration of the urine higher on the hot day?

.....

 (1 mark)

- (c) Give **one** other way by which a large amount of water is lost from the human body each day.

.....

 (1 mark)

6 A slice of bread contains 300 kilojoules of energy.
A typical teenage girl needs 10 200 kilojoules of energy each day.

(a) A girl eats only bread and drinks only water for one day.
How many slices of bread must she eat to supply her energy needs for the day?

Show clearly how you work out your final answer.

.....
.....

..... slices of bread
(2 marks)

(b) Most of the carbohydrate in bread is starch.

(i) Name **one** part of the digestive system where starch is digested.

.....
(1 mark)

(ii) Name the enzyme which digests starch.

.....
(1 mark)

(iii) Name **one** product of starch digestion.

.....
(1 mark)

(iv) Name **one** part of the digestive system where the products of starch digestion are absorbed into the blood.

.....
(1 mark)

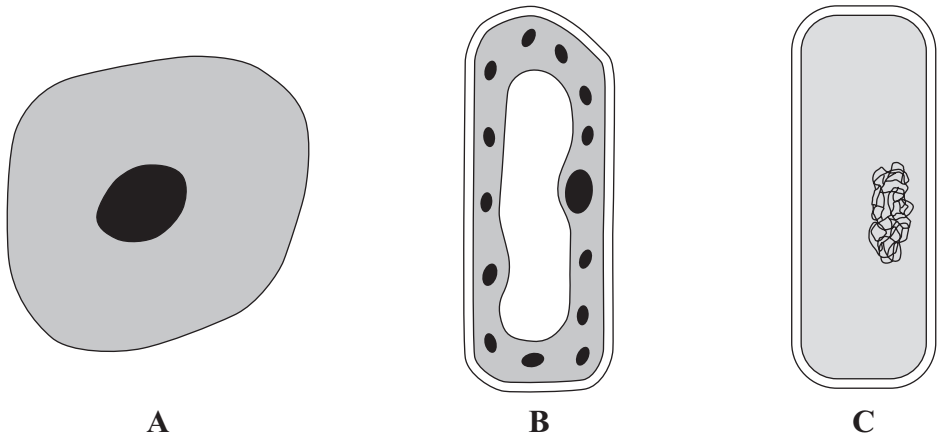
6

Turn over for the next question

Turn over ►

7 Tuberculosis (TB) is a disease caused by a bacterium.

(a) The diagram shows three types of cell.



(not to scale)

(i) Which cell, **A**, **B** or **C**, is a bacterium?
(1 mark)

(ii) Describe **one** feature you can see in the diagram which helps you to identify this cell as a bacterium.
.....
(1 mark)

(b) TB is spread by coughs and sneezes. It is more common when people live together in crowded conditions. TB usually affects the lungs first, although other organs may later become infected.

(i) Why is TB more likely to spread when people live in crowded conditions?
.....
.....
(1 mark)

(ii) Why does TB affect the lungs first?
.....
.....
(1 mark)

(iii) How could TB later spread to other regions of the body?
.....
.....
(1 mark)

- (c) The human body has several natural defences against bacteria. Some of these prevent bacteria from entering the body. Others act once the bacteria have entered.

Give **two** ways in which the body stops bacteria from entering.

1

2

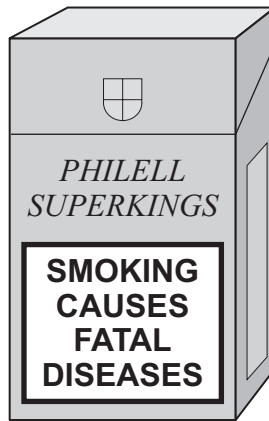
(2 marks)

7

Turn over for the next question

Turn over ►

8 The following warning was printed on a packet of cigarettes.



Explain how cigarette smoking can cause fatal diseases.

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.

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(5 marks)

5

END OF QUESTIONS

ACKNOWLEDGEMENT OF COPYRIGHT-HOLDERS AND PUBLISHERS

Question 4 Source: adapted from WEST, *Studying the past by pollen analysis*, Oxford University Press, 1971, after GODWIN, *History of the British Flora*, Cambridge University Press, 1956

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