

Centre Number	Candidate Number	Name
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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**SCIENCE** **5125/04, 5126/04**

Paper 4 Biology October/November 2004

Additional Materials: Answer Paper **1 hour 15 minutes**

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.  
Write in dark blue or black pen.  
You may use a soft pencil for any diagrams, graphs or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

**Section A**  
Answer **all** questions.  
Write your answers in the spaces provided on the question paper.

**Section B**  
Answer any **two** questions.  
Write your answers on the separate answer paper provided.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

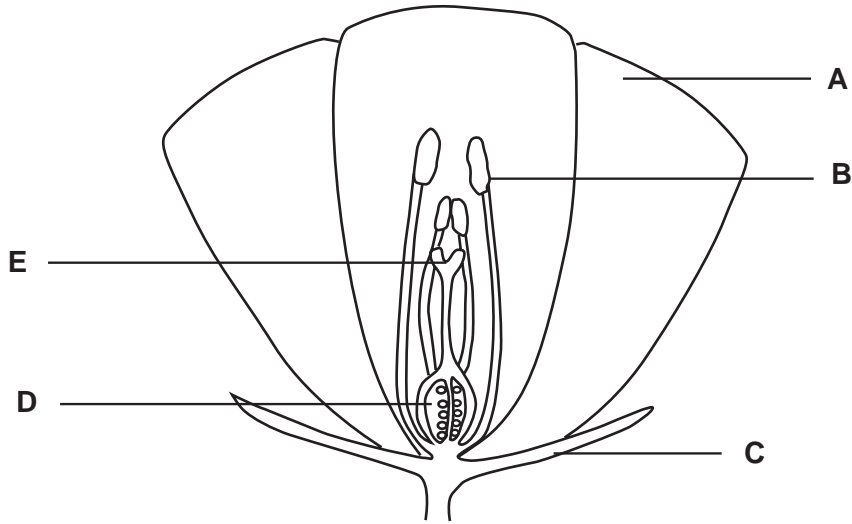
Stick your personal label here, if provided.

For Examiner's Use	
Section A	
Section B	/
<b>Total</b>	

**Section A**

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

1 Fig. 1.1 shows a section through a flower.



**Fig. 1.1**

(a) (i) Name the part of the flower labelled

**A**, .....

**B**, .....

**C**.....[3]

(ii) Describe the function of the part labelled **B**.

.....[1]

(b) Which feature in Fig. 1.1 shows that this flower is insect-pollinated?

.....[1]

(c) Pollen grains land on the stigma labelled **E**.

Explain how the ova are fertilised in the ovary, labelled **D**.

.....

.....[2]

2 Fig. 2.1 shows a food chain in a river.

algae → water fleas → small fish → large fish

Fig. 2.1

(a) (i) Name the producer in this food chain.

.....[1]

(ii) Name a carnivore in this food chain.

.....[1]

(b) An accident at a nuclear processing factory released some radioactive nitrate into the river.

Scientists caught fish from the river and measured the amount of radioactivity per unit mass that the fish contained.

The results of their investigation are shown in Fig. 2.2.

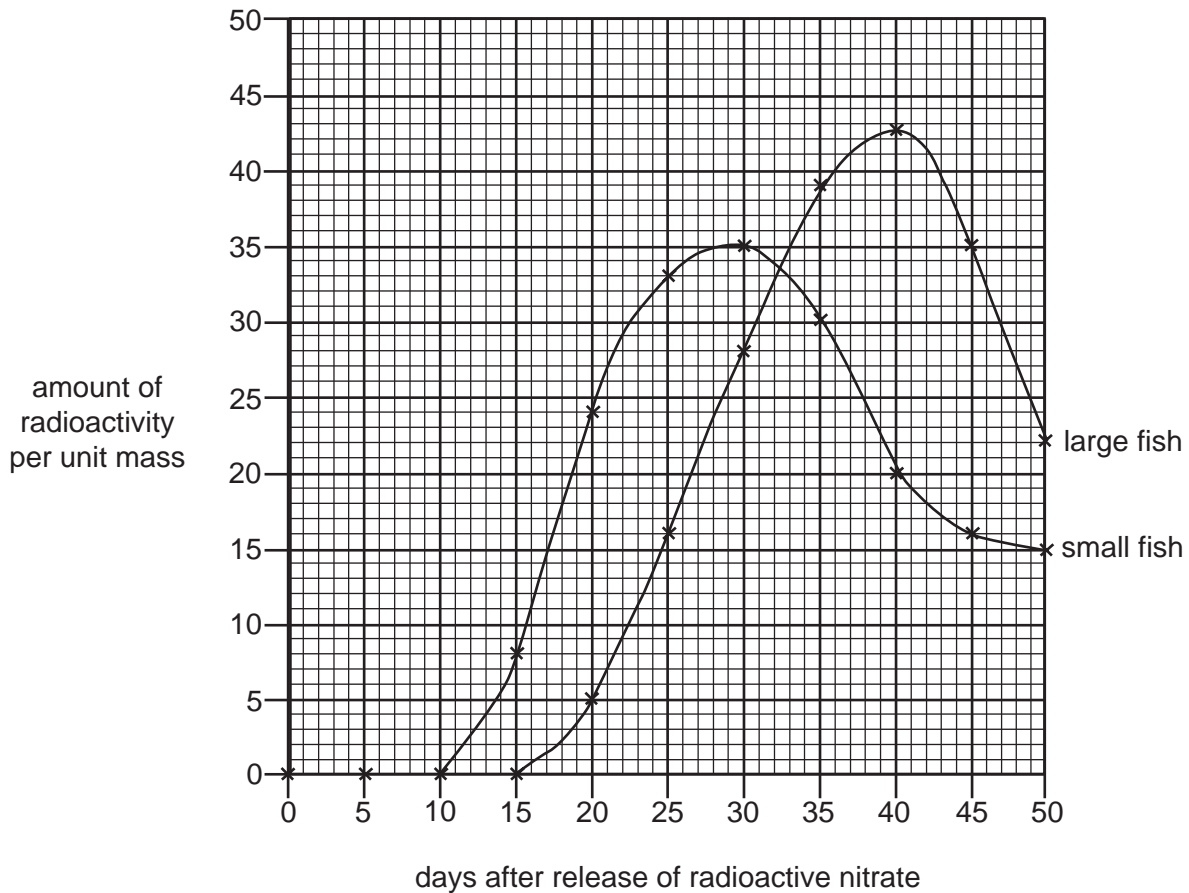


Fig. 2.2

(i) Suggest how the fish became radioactive.

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

(ii) Suggest why the radioactivity per unit mass in the large fish was higher than in the small fish.

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

(iii) Suggest why the radioactivity decreased with time in both small and large fish.

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

- 3 A student used the apparatus shown in Fig.3.1 to study water loss from shoots. He measured the water lost by each shoot, X and Y, each day.

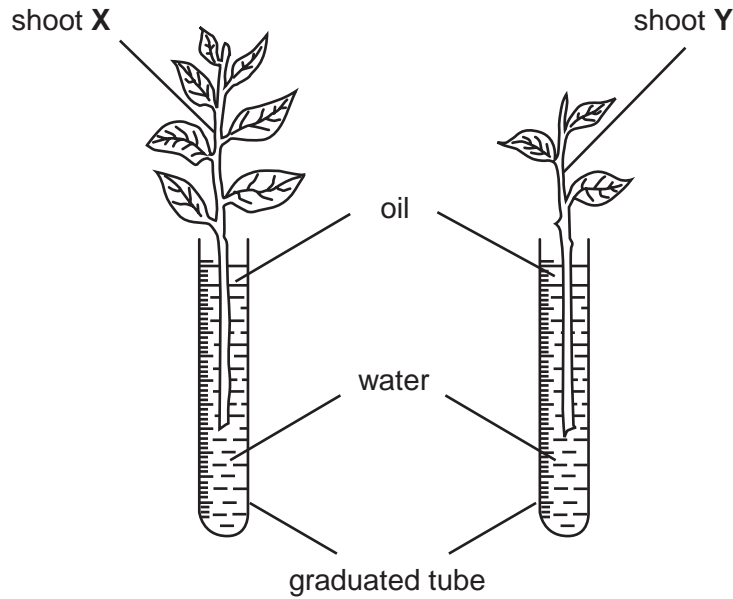


Fig.3.1

- (a) Why was oil placed on top of the water in each tube?

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

- (b) Explain how water moves from the tube, through the shoot and into the air.

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

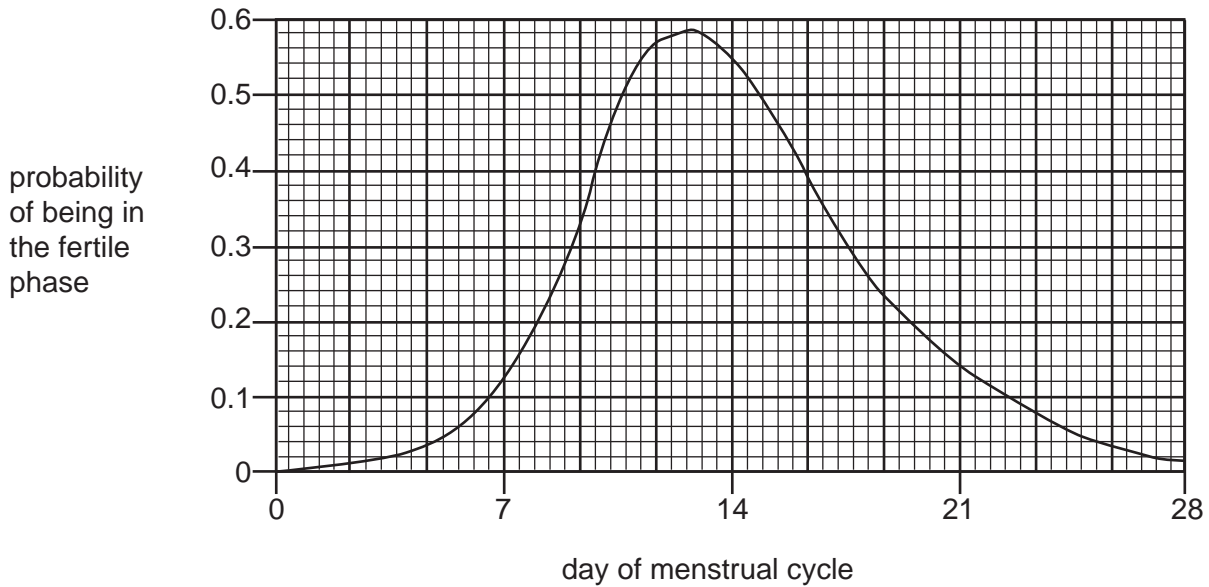
- (c) (i) Which shoot would you expect to lose the most water each day?  
Explain your choice.

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

- (ii) The student noticed that on a sunny day both shoots lost more water than when the weather was dull.  
Suggest reasons for this.

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

- 4 Most women have six days during their menstrual cycle when intercourse is likely to result in pregnancy. These six days are called the fertile phase, and consist of five days before the egg is released and the day when the egg is released from an ovary. Fig. 4.1 shows the probability of a woman being in the fertile phase on each day of her menstrual cycle.



**Fig. 4.1**

- (a) (i) Why can the woman not become pregnant on any of the 28 days of her menstrual cycle?

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

- (ii) What does the length of the fertile phase show about the lifespans of sperms and eggs?

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

**(b)** Using the natural method of birth control, a woman with a regular menstrual cycle abstains from intercourse for the six days of the fertile phase.

**(i)** Explain why this woman may still become pregnant using this method of birth control.

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

**(ii)** How could the woman be more sure of avoiding pregnancy?

.....[1]

**(c)** Another woman has an irregular menstrual cycle.

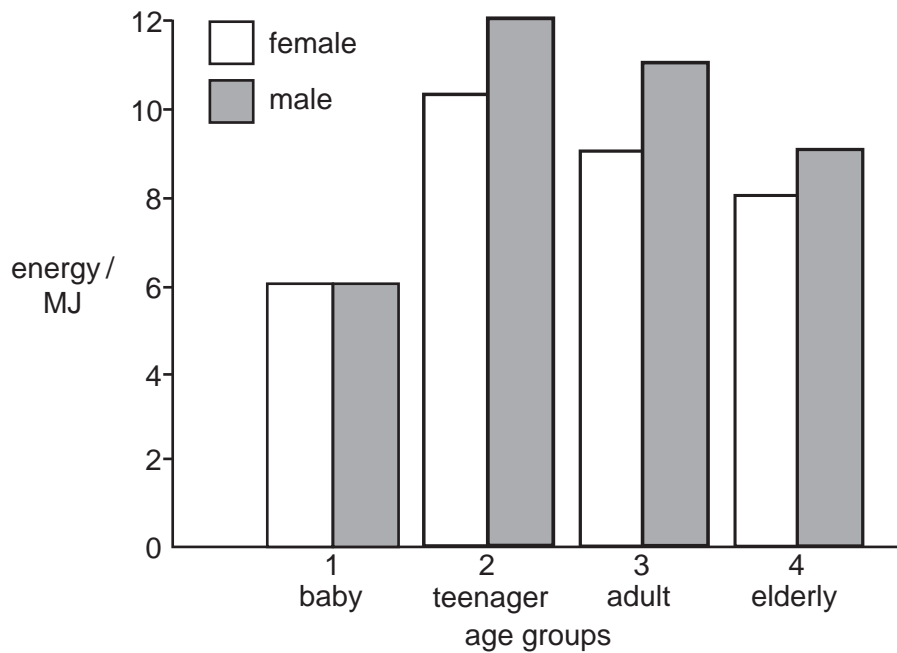
**(i)** What effect could this have on her fertile phase?

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

**(ii)** What might be the cause of her irregular menstruation?

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

5 Fig. 5.1 shows average daily energy requirements in people of four different age groups.



**Fig. 5.1**

(a) (i) Explain why teenagers require the most energy.

.....

.....

.....[2]

(ii) Suggest reasons for the differences between energy requirements of males and females in age groups 2, 3 and 4.

.....

.....

.....[3]

(b) The bar chart gives average energy requirements. Explain why a farm worker may require more energy than the average value and an office worker less.

.....

.....[2]



6 Penicillin and alcohol are both drugs.

(a) Define the term *drug*.

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

(b) Describe the use of the drug penicillin.

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

(c) State three effects on the human body of excessive consumption of alcohol.

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

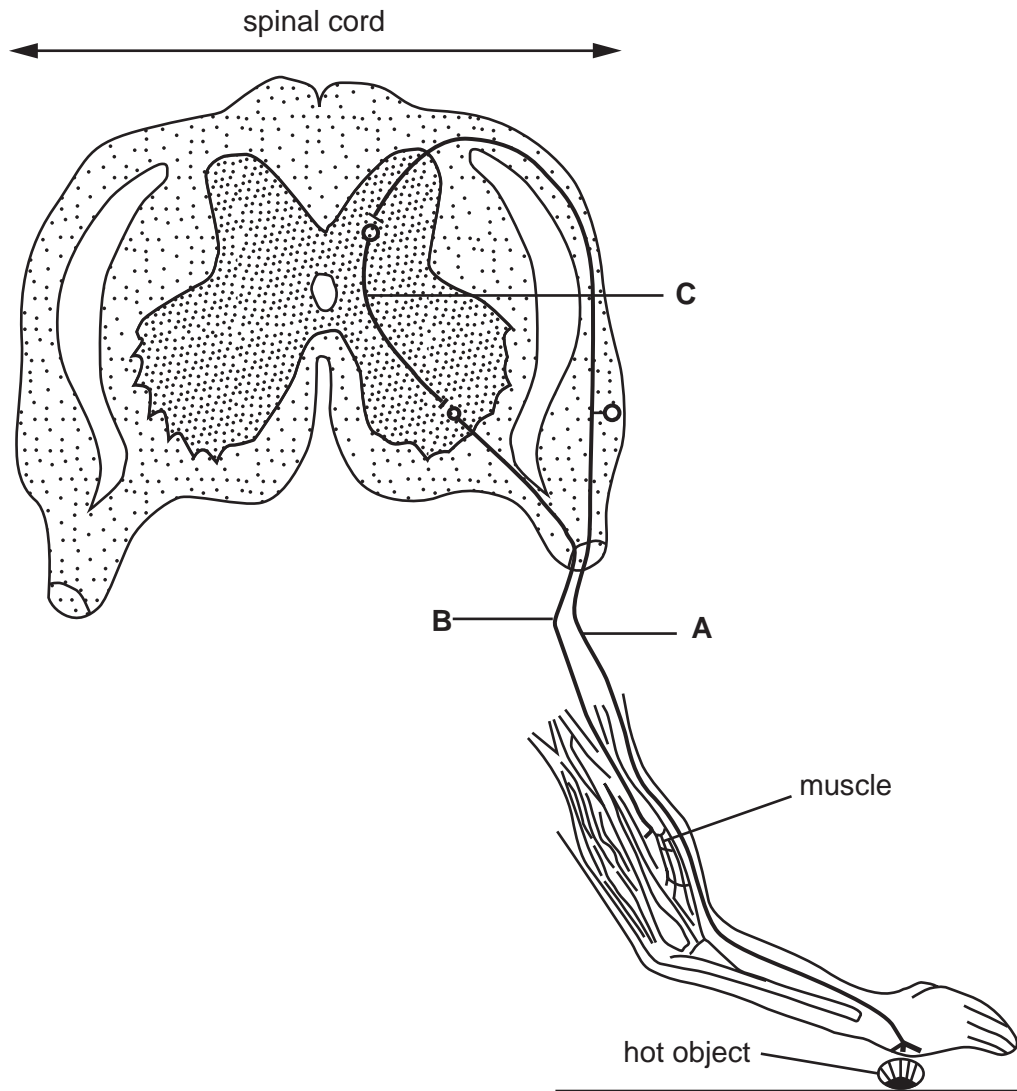
**Section B**

Answer **two** questions from this section.

Write your answers on the separate answer paper provided.

- 7** Some people are unable to taste a substance known as PTC. The ability to taste PTC is an inherited characteristic controlled by a dominant allele. A man and woman, who are heterozygous for this characteristic and can both taste PTC, have two children, a heterozygous son who can taste PTC and a daughter who cannot.
- (a)** Use appropriate diagrams to help you explain these facts.  
Use the symbol **T** for dominant alleles and **t** for recessive alleles. [6]
- (b)** The son marries a woman with the genotype **tt**.  
Work out, using an appropriate diagram, the probability of one of their children being able to taste PTC. [4]

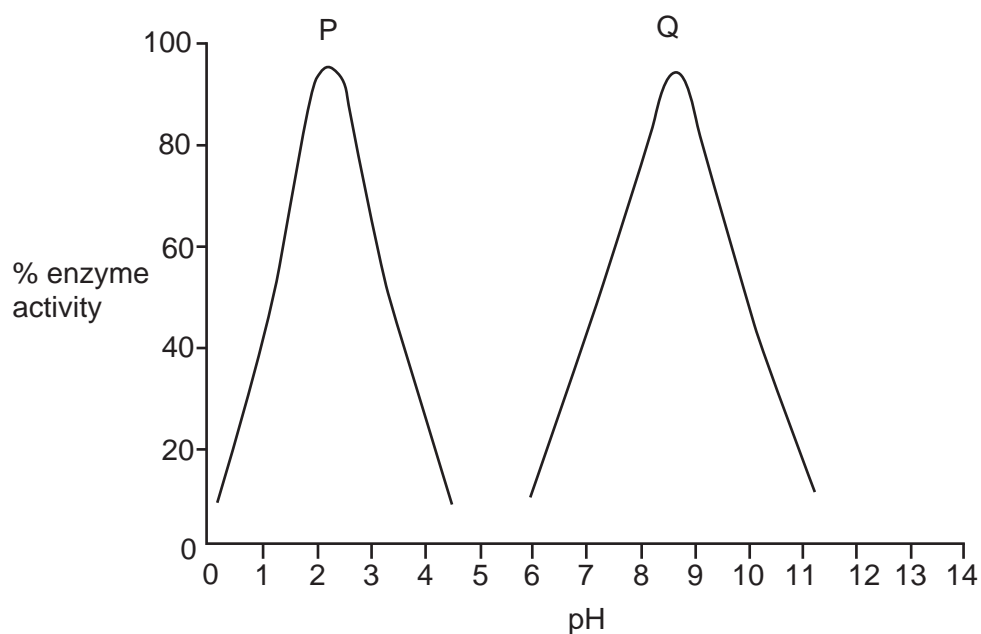
- 8 A person touches a hot object and quickly moves his hand away. This is a reflex action. The reflex arc involved in this action is shown in Fig. 8.1.



**Fig. 8.1**

- (a) Using the correct names for the parts labelled **A**, **B** and **C**, describe how this action takes place. [5]
- (b) Define the term *hormone* and give a named example. Using the reflex action in Fig. 8.1 and your named hormone as examples, describe two differences between nerve action and hormone action in the body. [5]

- 9 Fig.9.1 shows how the activity of two human digestive enzymes, **P** and **Q**, varies with pH.



**Fig.9.1**

- (a) Describe and explain how the activity of these enzymes varies with change in pH. Suggest, with reasons for your choices, in which part of the alimentary canal each enzyme is active. [6]
- (b) Enzyme activity is also affected by temperature. Describe how you would carry out an experiment to investigate the effect of temperature on enzyme activity. [4]