



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

CANDIDATE  
NAME

CENTRE  
NUMBER

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**BIOLOGY**

**5090/02**

Paper 2 Theory

**May/June 2007**

**1 hour 45 minutes**

Candidates answer Section A on the Question Paper

Additional Materials: Answer Booklet/Paper

**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 pencil for any diagrams, graphs or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.  
**DO NOT WRITE IN ANY BARCODES.**

**Sections A**

Answer **all** questions.  
Write your answers in the spaces provided on the Question Paper.

**Section B**

Answer **all** the questions including questions 6, 7 and 8 **Either** or **8 Or**.  
Write your answers on the separate Answer Paper provided.  
Write an E (for Either) or an O (for Or) next to the number 8 in the grid below to indicate which question you have answered.

You are advised to spend no longer than one hour on Section A and no longer than 45 minutes on Section B.  
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.

For Examiner's Use	
<b>Section A</b>	
<b>Section B</b>	
<b>6</b>	
<b>7</b>	
<b>8</b>	
<b>Total</b>	

This document consists of **13** printed pages and **3** blank pages.

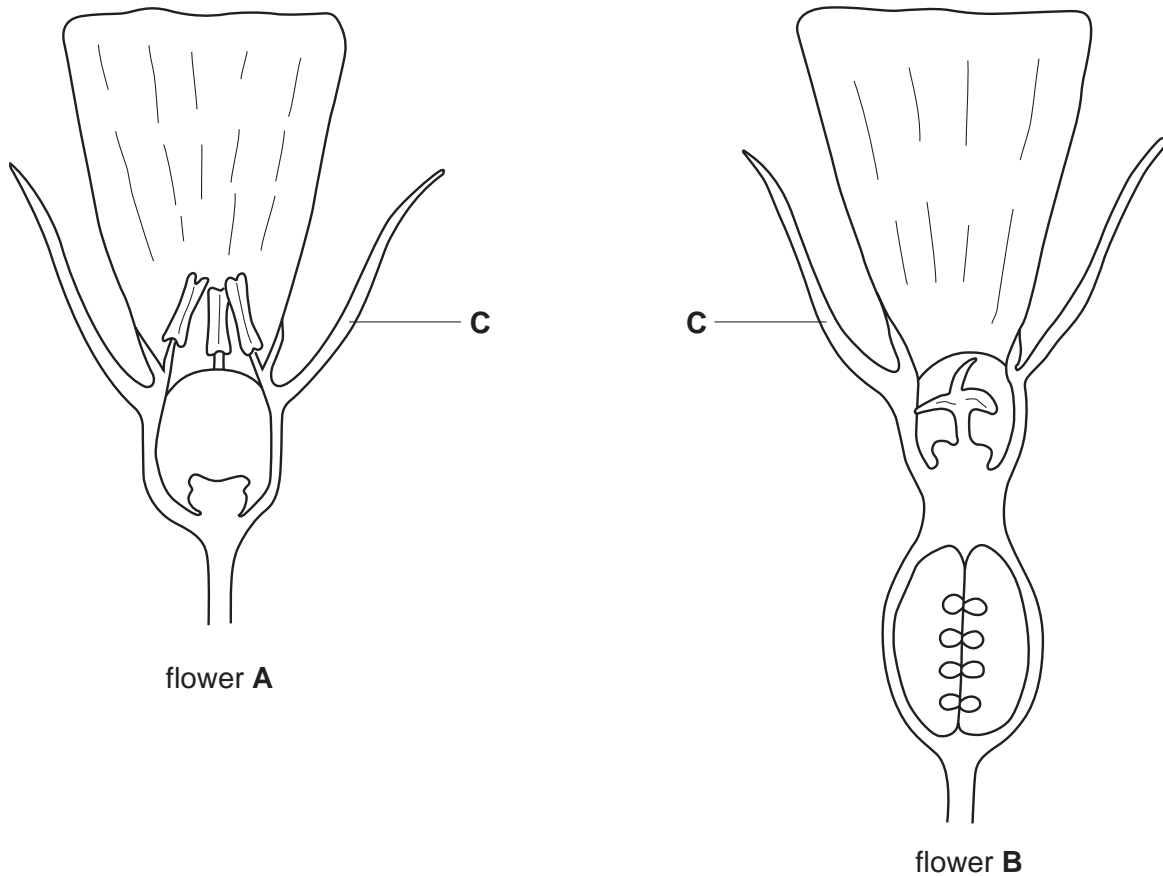


**Section A**

Answer **all** the questions in this section.

Write your answers in the spaces provided.

- 1 Fig. 1.1 shows sections through two different flowers, **A** and **B**, that are found on the same plant. One flower is male, the other is female.



**Fig. 1.1**

(a) Identify **C** on Fig. 1.1 .....[1]

(b) State which flower is the male flower and give a reason.

flower .....

reason .....[1]

(c) (i) State the method of pollination in this plant and give two reasons for your answer.

method of pollination .....

reason 1. ....

2. .... [3]

(ii) State two other possible features, **not** visible on Fig. 1.1, that are likely to be present in these flowers.

1. ....

2. .... [2]

(d) In some species, plants with only male flowers occur while other plants have only female flowers. Explain the advantages of this to the species.

.....

.....

.....

.....

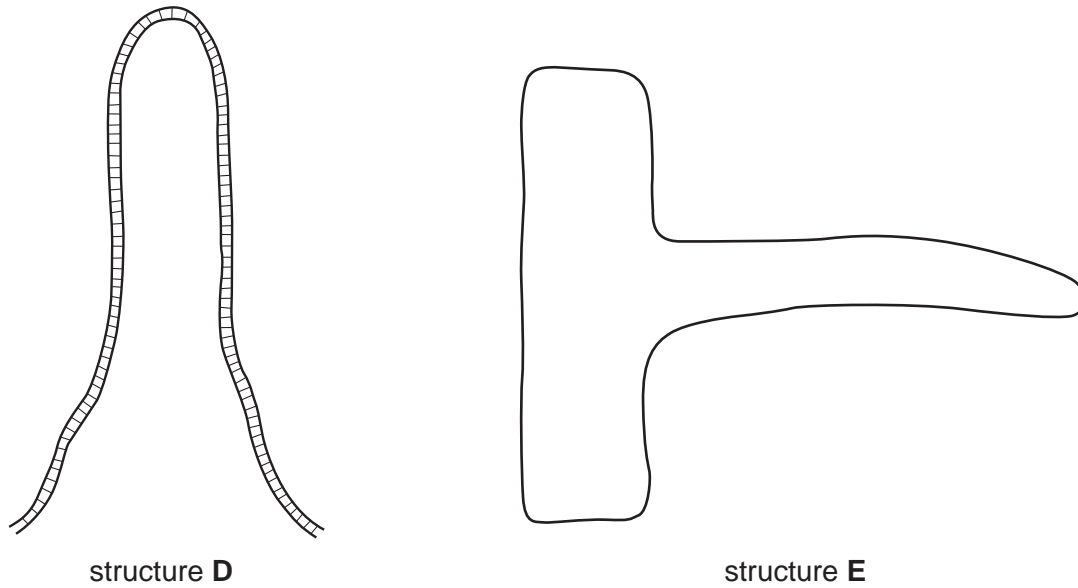
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.....

..... [3]

[Total: 10]

- 2 Fig. 2.1 shows two microscopic structures that are adapted for absorption, one from an animal and the other from a plant. The structures are not drawn to the same magnification.



**Fig. 2.1**

- (a) State **one** feature that these two structures have in common that helps them to carry out their function.

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

- (b) Identify each structure and, for each one, name two chemical substances that are absorbed by it.

structure D: name .....

chemical substance 1. ....

2. ....

structure E: name .....

chemical substance 1. ....

2. ....[6]

(c) (i) Structure **E** in Fig. 2.1 is a single cell. **Draw in and label**, on Fig. 2.1, a feature that helps the cell to carry out absorption. [1]

(ii) Explain how the feature you have drawn and labelled helps the cell to carry out absorption.

.....

.....

.....

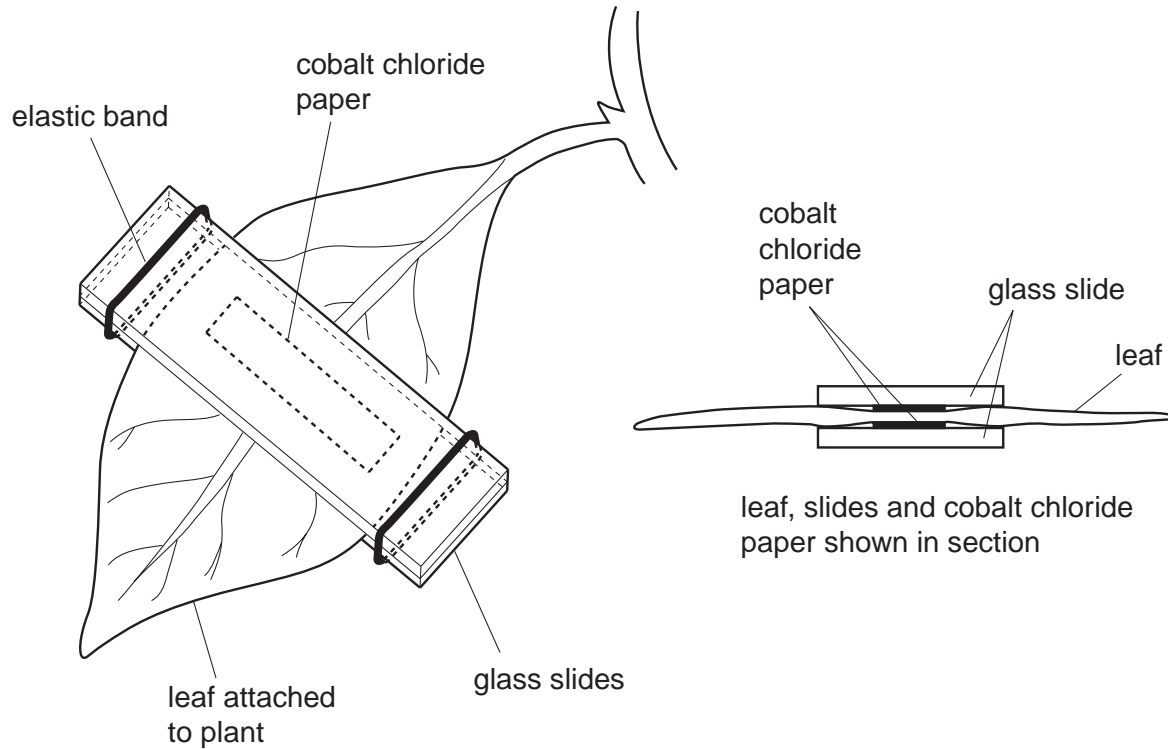
.....

.....[2]

[Total: 10]

- 3 When a strip of filter paper is soaked in cobalt chloride solution, it is pink when damp and turns blue when dry.

Fig. 3.1 shows strips of dry cobalt chloride paper on the upper and lower surfaces of a leaf, pressed between dry glass slides.



**Fig. 3.1**

A student used this method to investigate the time taken for strips of cobalt chloride paper to turn from blue to pink. The experiment was performed five times. The results are shown in Table 3.2.

**Table 3.2**

experiment number	time (in minutes) taken for paper to change from blue to pink	
	upper surface	lower surface
1	10	3
2	13	4
3	4	3
4	11	4
5	12	3

(a) (i) State the most likely conclusion that could be drawn from the results of experiments 1, 2, 4 and 5.

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

(ii) Suggest an explanation for the results of these experiments for the upper surface of the leaf,

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

for the lower surface of the leaf.

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

(b) Suggest two possible reasons for the result obtained for the strip attached to the upper surface of the leaf in experiment 3.

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

(c) Suggest how the student could improve the reliability of this experiment.

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

(d) Suggest how the student could show that the concentration of water vapour coming out of a leaf is greater than its concentration in the atmosphere.

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

[Total: 10]

4 Microorganisms can be grown in the laboratory on agar (a jelly-like medium) in a Petri dish. Nutrients required by the microorganisms are added to the agar.

(a) Name a nutrient that should be added to ensure the maximum rates of

(i) respiration .....

(ii) growth ..... [2]

(b) Respiration and growth are enzyme-controlled processes.

A student is provided with a Petri dish containing agar with the optimum concentration of nutrients. Explain how the student could speed up the rate of growth of microorganisms growing in this Petri dish.

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

Fig. 4.1 shows the stages in an experiment to show the effect of different antibiotics on microorganisms.

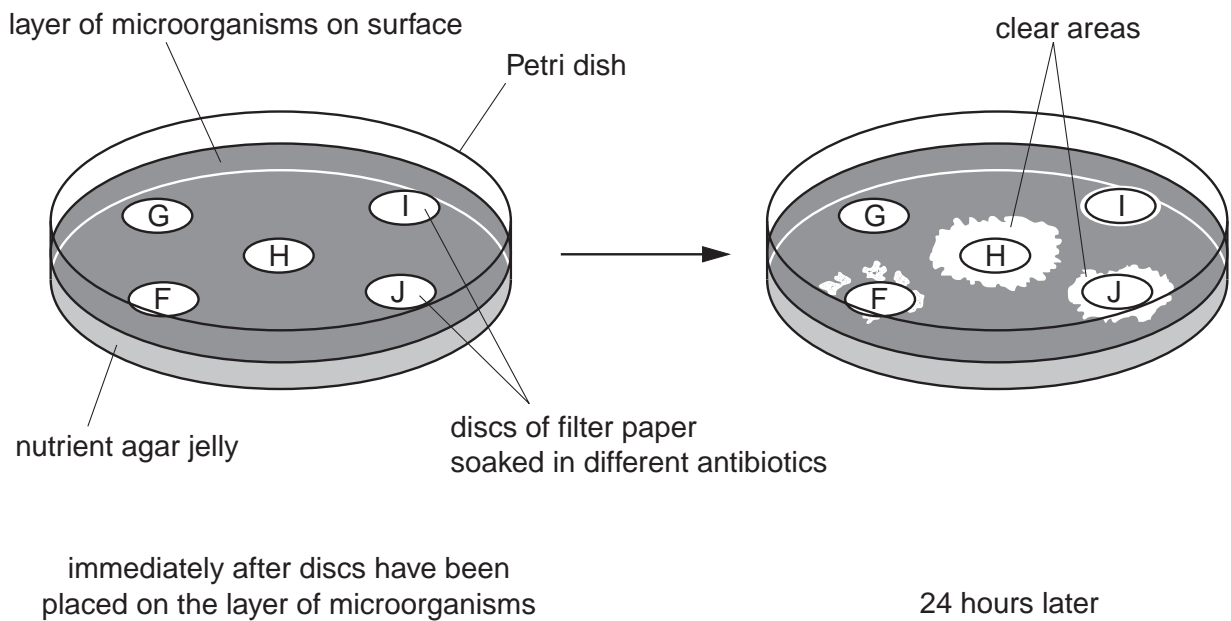


Fig. 4.1

The microorganisms originally came from the throat of a person suffering from a throat infection.



(c) Using the information in Fig. 4.1,

(i) identify by letter the antibiotic which might be best for treating the infection,

..... [1]

(ii) state which type of microorganism was probably causing the throat infection and give a reason for your answer.

type of microorganism .....

reason ..... [2]

(d) Antibiotic **F** used to be the most effective in treating the infection. Suggest and explain why it has become less effective.

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

[Total: 10]

- 5 Fig. 5.1 shows some food just before it enters the stomach and the same food as it leaves the stomach four hours later.

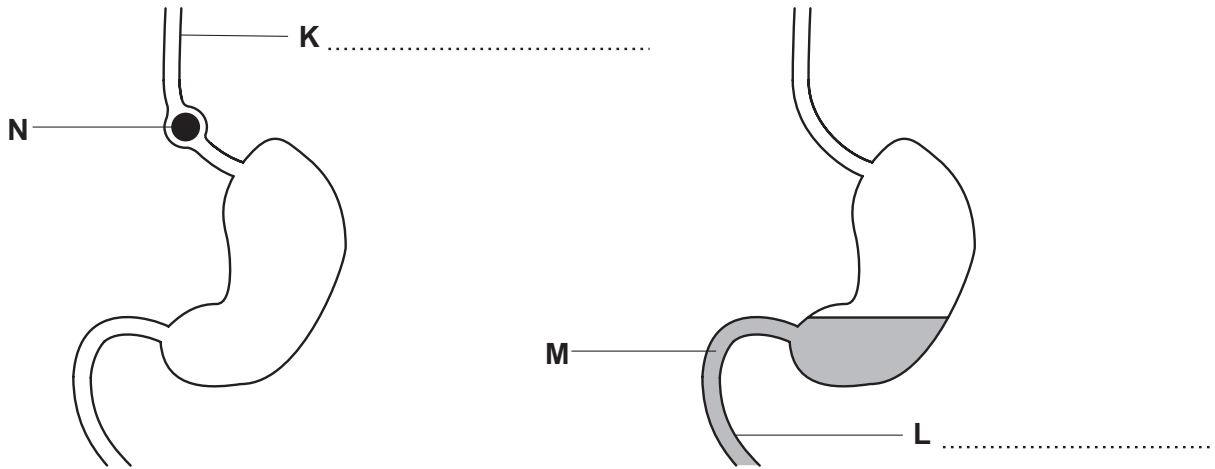


Fig. 5.1

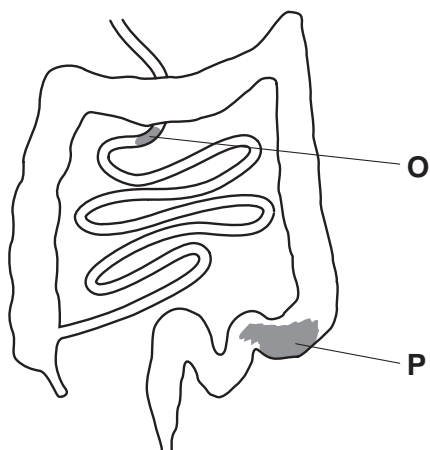
- (a) On Fig. 5.1, label structures **K** and **L**. [2]
- (b) The food consisted solely of meat and potatoes. By placing ticks (✓) in the appropriate boxes in Table 5.2, show how the major components of the food compare at positions **M** and **N**.

Table 5.2

	more at M than at N	less at M than at N	almost the same at M and N
starch			
protein			
fibre			

[3]

Fig. 5.3 shows the same food at **O**, and 24 hours later, at **P**.



**Fig. 5.3**

**(c) (i)** Explain what has happened to the protein between **O** and **P**.

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

**(ii)** Name the region of the alimentary canal which will contain fibre in the highest proportion and give reasons for your answer.

region of alimentary canal.....  
 reasons .....

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

[Total: 10]

## Section B

Answer **all** the questions including questions 6, 7 and 8 **Either** or 8 **Or**.

Write your answers on the separate answer paper provided.

6 Fig. 6.1 shows parts of some natural cycles in the environment.

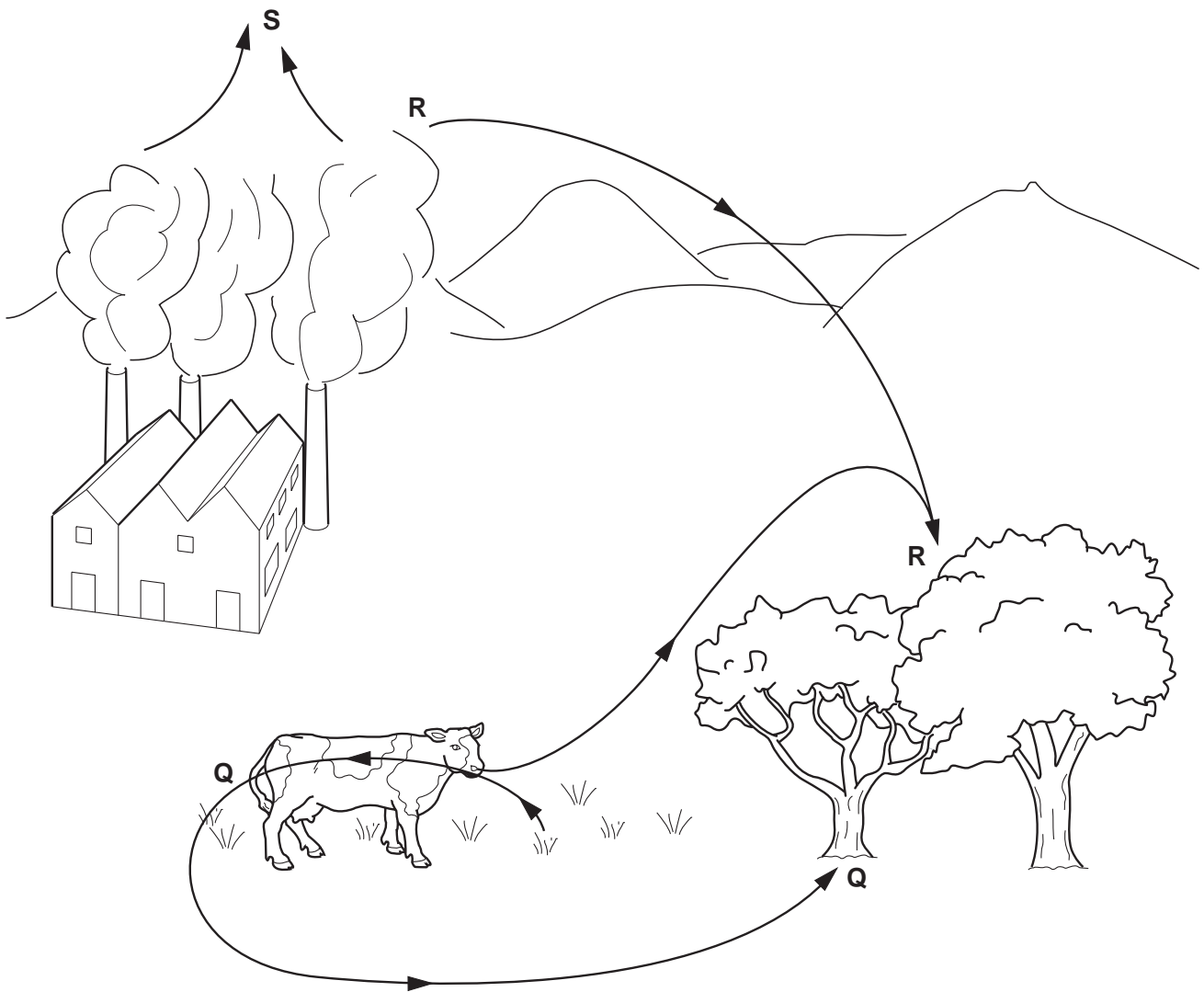


Fig. 6.1

- (a) With reference to the carbon and nitrogen cycles, explain what is happening at **Q** and **R**. [7]
- (b) Identify two gases that may be released at **S** and describe the possible harmful effects they may have on the environment. [3]

[Total: 10]

- 7 (a) With reference to the circulatory system, name an example of each of the following:
- (i) a cell,
  - (ii) a tissue and
  - (iii) an organ. [3]
- (b) Name the main blood vessels carrying blood to and from the liver and describe any differences that there may be between the composition of the blood as it enters and leaves the liver. [7]
- [Total: 10]

Question 8 is in the form of an **Either/Or** question. Answer only question 8 **Either** or question 8 **Or**.

- 8 **Either** (a) Define a *drug*. [2]
- (b) Explain the effects of the abuse of:
- (i) alcohol, and
  - (ii) heroin. [8]
- [Total: 10]

- 8 **Or** Explain why smoking is no longer regarded as
- (a) advisable for the maintenance of good health, [8]
  - (b) socially acceptable. [2]
- [Total: 10]





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