Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

8895086406

BIOLOGY **5090/22**

Paper 2 Theory **May/June 2018**

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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

Section A
Answer **all** questions in this section.
Write your answers in the spaces provided on the Question Paper.

Section B
Answer **both** questions in this section.
Write your answers in the spaces provided on the Question Paper.

Section C
Answer **either** question 8 **or** question 9.
Write your answers in the spaces provided on the Question Paper.

You are advised to spend no longer than one hour on Section A.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

This document consists of **16** printed pages.

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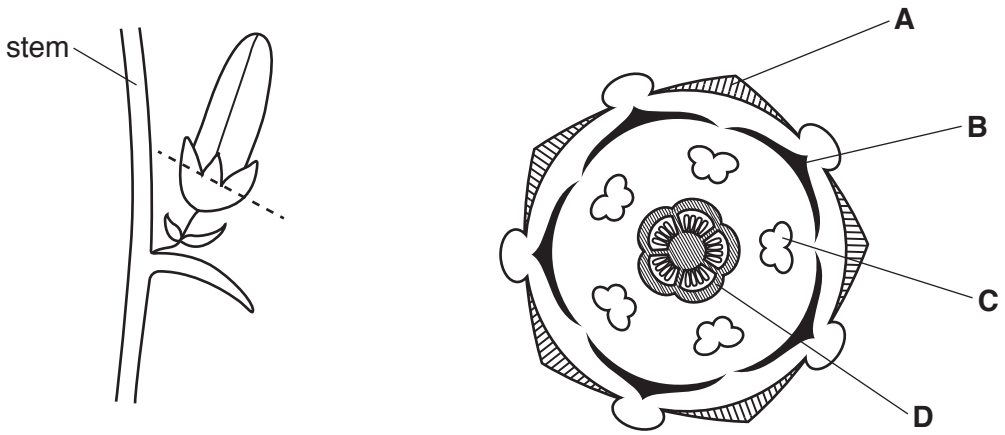
CAMBRIDGE International Examinations

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 The diagrams show the bud of an insect-pollinated flower and a magnified transverse section through the same flower bud. The transverse section was taken at the position shown by the dotted line.

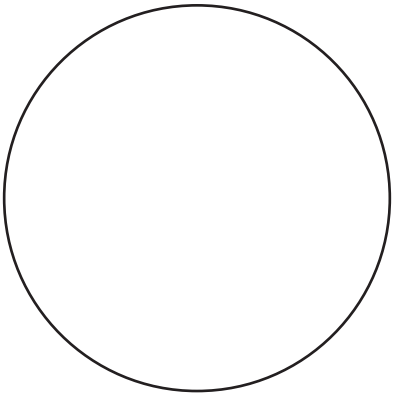


(a) Complete the table to show the name of each of structures **A** to **D** and to state **one** function of each structure.

letter	name of structure	function
A		
B		
C		
D		

[8]

(b) The diagram shows an incomplete transverse section through the stem of this plant.



(i) Complete the diagram by drawing and labelling the positions of each of the following tissues:

- xylem,
- phloem. [2]

(ii) State **one** function of xylem tissue.

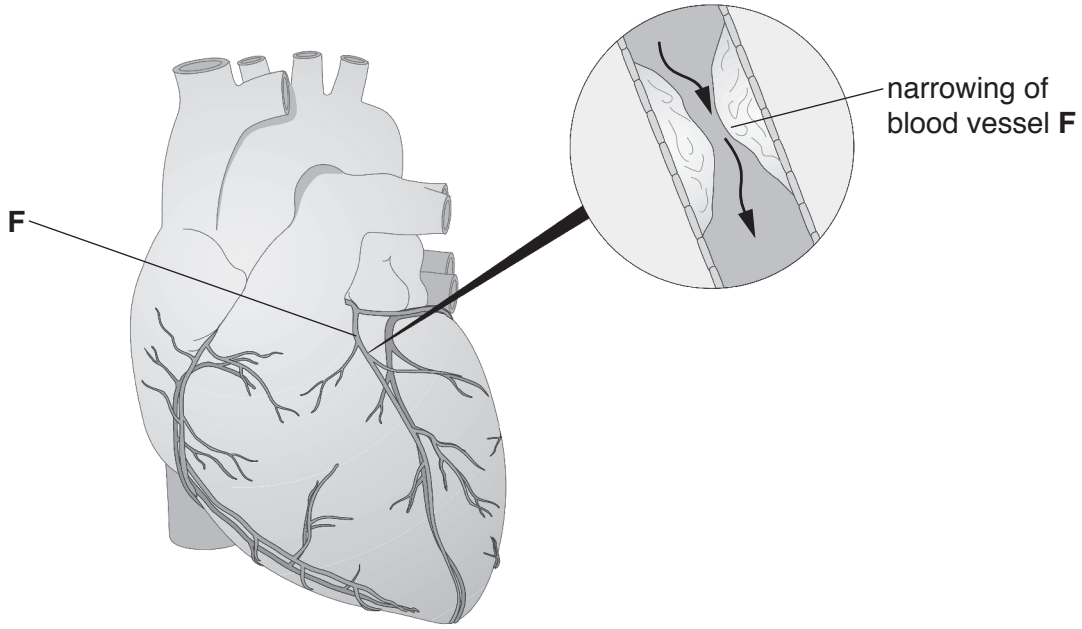
.....

.....[1]

[Total: 11]

2 The diagram shows the human heart.

The blood vessel labelled **F** may become narrowed as shown.



(a) **(i)** Name blood vessel **F**.

..... [1]

(ii) Name the disease caused by the narrowing of this blood vessel.

..... [1]

(iii) State **three** factors that may lead to the narrowing of this blood vessel.

1 .....

2 .....

3 .....
[3]

(iv) Suggest and explain how a person might be affected by the disease caused by the narrowing of blood vessel **F**.

.....

.....

.....

.....

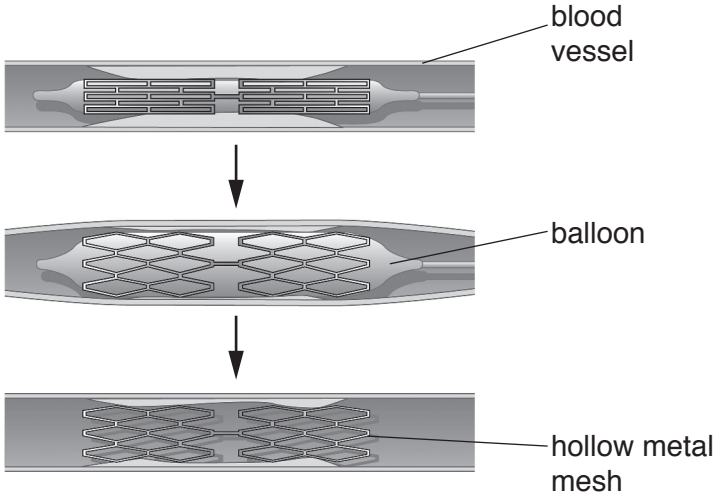
.....

.....[5]

(b) It is possible to treat the disease caused by the narrowing of blood vessel **F**, by carrying out an operation.

In the operation:

- a balloon surrounded by a metal mesh is inserted into the blood vessel and inflated,
- the balloon is then deflated and removed, leaving the metal mesh in place.



Suggest the purpose of each of the following:

inflating the balloon,

.....

.....

.....

leaving the hollow metal mesh in the blood vessel.

.....

.....

.....
[3]

[Total: 13]

3 The table shows how the thickness of the lens of the eye changes when focussing on an object at different distances from the front of the eye.

distance from eye/cm	thickness of lens/mm
10	4.0
20	3.6
30	3.2
50	2.9
100	2.7
150	2.6
200	2.6

(a) **(i)** Describe the pattern shown by the data in the table.

.....

.....

.....[2]

(ii) Explain how **named** components of the eye change the thickness of the lens when focussing on an object as it moves further from the front of the eye.

.....

.....

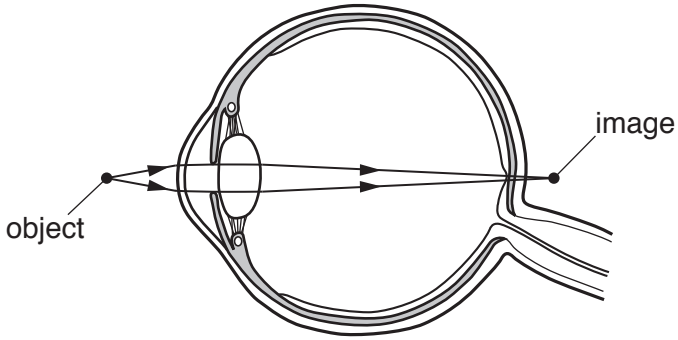
.....

.....

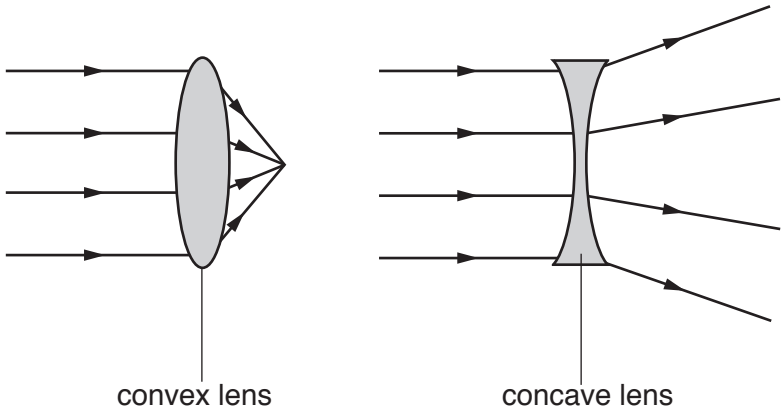
.....

.....[4]

(b) As a person becomes older, the lens of the eye becomes harder and less elastic. This results in the person seeing an image of a close object that is out of focus.



The diagram below shows how light is refracted by two types of artificial lens that may be used to manufacture spectacles (glasses).



Suggest and explain which type of lens would be most suitable for this older person.

.....

.....

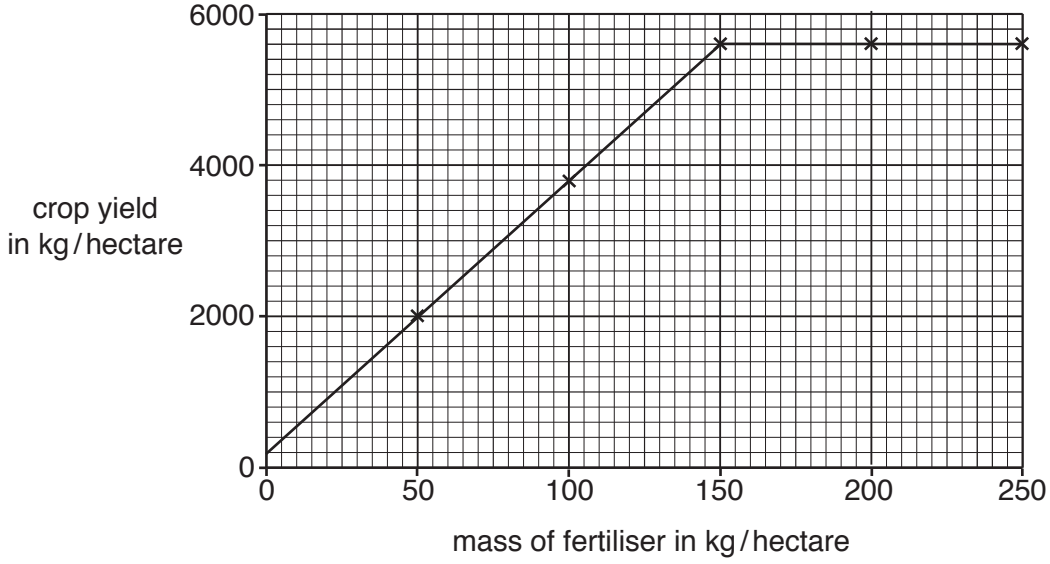
.....

.....

.....[3]

[Total: 9]

4 The graph shows the effect on crop yield (amount harvested) of using fertilisers that contain nitrogen.



(a) **(i)** Use the information in the graph to describe the effect on crop yield of using an increasing mass of fertiliser.

.....

.....

.....[3]

(ii) The nitrogen in the fertiliser is in the form of nitrates.

Describe how the nitrogen in the fertiliser is absorbed by crop plants and used to give an increased yield.

.....

.....

.....

.....

.....[3]

(iii) Suggest and explain why a farmer may decide to use a mass of fertiliser per hectare which is less than that needed for a maximum crop yield.

.....

.....

.....

.....

.....[3]

(b) Name **one** type of mineral ion, other than nitrate, that is required by a plant and state its importance to the plant.

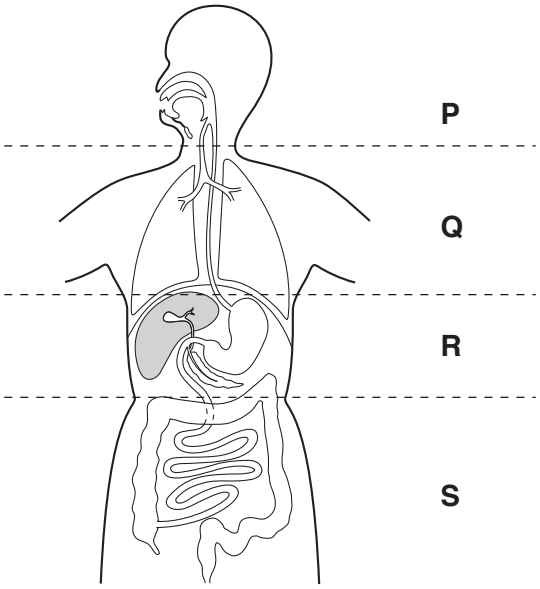
type of mineral ion .....

importance to plant .....

.....
[2]

[Total: 11]

5 The diagram shows a section through the human body divided into regions **P**, **Q**, **R** and **S**.



Complete the table below by matching the letters from the diagram to the statements in the table. There may be one or more than one letter for each statement.

contains an organ which	**region or regions**
… produces an acidic secretion	**R**
… contains villi	
… digests protein	
… produces insulin	
… contains bronchi	
… secretes amylase	
… ingests food	

[6]

[Total: 6]

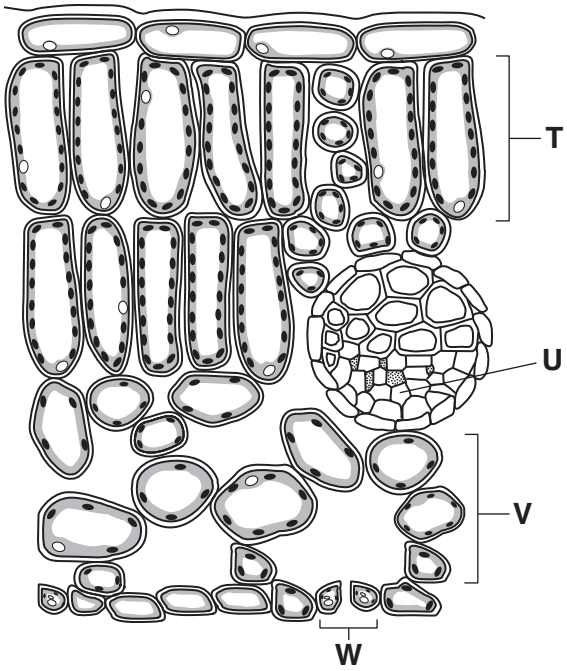
Question 6 starts on the next page.

Section B

Answer **both** questions in this section.

Write your answers in the spaces provided.

6 The diagram shows a magnified transverse section through a leaf.



Name each of **T**, **U**, **V** and **W** and explain the importance of each in the process of photosynthesis.

T .....

.....

.....

.....

U .....

.....

.....

.....

V .....

.....

.....

.....

W .....

.....

.....

.....
[10]

[Total: 10]

7 **(a)** Describe the cause of each of the following:

Down's syndrome,

.....

.....

.....

.....

sickle cell anaemia.

.....

.....
[3]

(b) **(i)** Parents, one with blood group B and the other with blood group A, have a child with blood group O.

The parents decide to have another child.

Complete the genetic diagram to show the possible blood groups for the second child of these parents.

genotypes of parents ..... x .....

gametes ....

possible genotypes of child ....

possible blood groups of child ....
[4]

(ii) State the probability of each of the following for the second child of these parents:

being the same sex as the first child .....

having the same blood group as the first child ..... [2]

(iii) Name the type of inheritance shown by the alleles that produce the blood group AB.

..... [1]

[Total: 10]

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Section C

Answer **either** question 8 **or** question 9.

Write your answers in the spaces provided.

8 **(a)** Outline the role of a **named type** of microorganism in the production of each of the following products:

yoghurt .....

.....

.....

.....

.....

bread .....

.....

.....

.....

.....
[6]

(b) Describe how a **named type** of microorganism can be used to produce human insulin on a commercial scale.

.....

.....

.....

.....

.....

.....

.....[4]

[Total: 10]

9 **(a)** Explain why most foods eaten by a human must be digested.

.....

.....

.....

.....

.....

.....

.....[4]

(b) Describe, with reference to the function(s) of **named** substances produced, the importance of each of the following organs in the process of digestion:

liver .....

.....

.....

.....

.....

.....

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pancreas .....

.....

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.....

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.....

.....

[6]

[Total: 10]

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