Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

6383008695

BIOLOGY **5090/22**

Paper 2 Theory **May/June 2016**

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 **14** printed pages and **2** blank pages.

CAMBRIDGE International Examinations

Section A

Answer **all** questions in this section.

1 The grape plant has many flowers clustered together on each flowering head. Fig. 1.1 shows the structure of one mature grape flower.

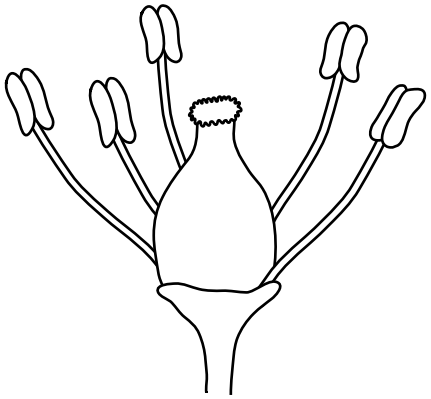

Fig. 1.1

(a) (i) Name **two** parts, normally found in other flowers, that are missing from this mature flower.

1 .....

2 ..... [2]

(ii) Suggest the type of pollination found in the grape plant and give a reason for your choice.

type of pollination .....

reason .....

.....[2]

(b) Fig. 1.2 shows a section through a fruit that develops from the same flower.

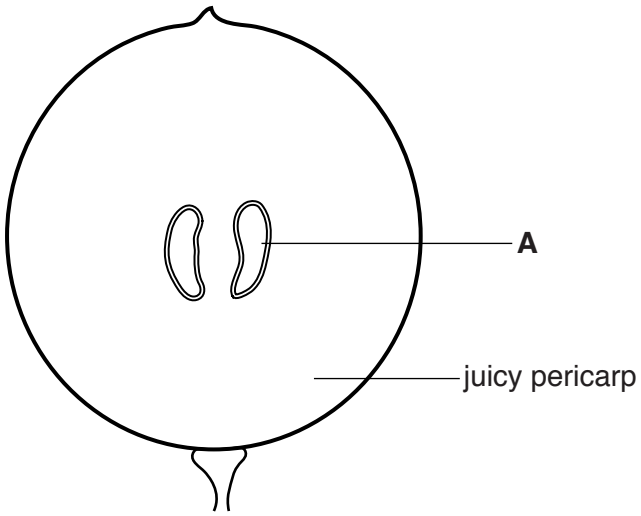

Fig. 1.2

(i) Name the structure labelled **A** in Fig. 1.2. ..... [1]

(ii) Suggest how part **A** is dispersed and give reasons for your answer.

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.....[3]

(c) The outer skin of the ripe grape fruit is covered by a powdery microorganism that is responsible for converting grape juice into wine (a drink that contains alcohol).

(i) Suggest the identity of this microorganism ..... [1]

(ii) Explain how this microorganism is involved in making wine.

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.....[3]

[Total: 12]

2 Fig. 2.1 shows a fetus developing inside its mother.

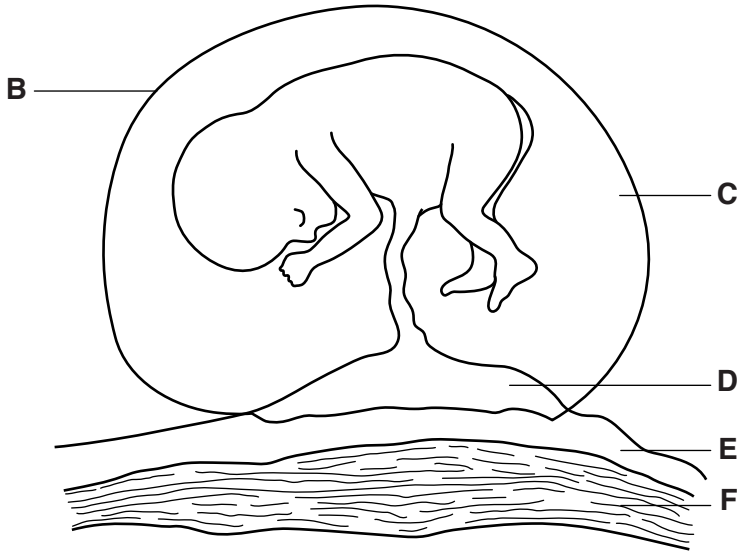

Fig. 2.1

(a) Complete Table 2.1, using letters from Fig. 2.1, to identify each of the following:

Table 2.1

	letter
a structure that contains urea released by the fetus	.....
a region that contains cells, almost all of which could be used for determining the sex of the fetus	.....
a structure that is used to expel the fetus at birth	.....
a temporary structure that would have been expelled during menstruation if pregnancy had not occurred	.....

[4]

(b) Every day, babies are born suffering from severe withdrawal symptoms as a result of their mothers taking drugs during pregnancy.

(i) Name a drug which the mother may have taken during pregnancy that might cause these withdrawal symptoms.

..... [1]

(ii) Suggest how drugs taken by the mother have been able to affect her developing fetus.

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.....[4]

[Total: 9]

3 Table 3.1 is a list of some of the constituents of a healthy human diet.

Table 3.1

constituent
carbohydrates
fats
proteins
mineral salts
fibre / roughage

(a) State one of these constituents that

(i) does not require digestion, ...[1]

(ii) is the body's main storage substance. .....[1]

(b) Name **two** dietary constituents that are missing from the list in Table 3.1 and for each state **two** reasons for its importance in the diet.

constituent: .....

1 .....

.....

2 .....

.....

constituent: .....

1 .....

.....

2 .....

.....[6]

(c) The chimpanzee is an animal whose metabolism is very similar to that of a human, but one type of chimpanzee lacks the gene responsible for the manufacture of amylase.

Suggest how this will affect the diet of this type of chimpanzee.

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.....[2]

[Total: 10]

[Turn over

4 Fig. 4.1 shows the leaves of the same plant during daylight and during the hours of darkness.

in daylight

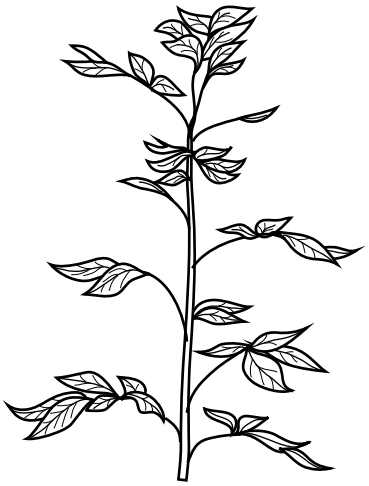

Fig. 4.1(a)

in darkness

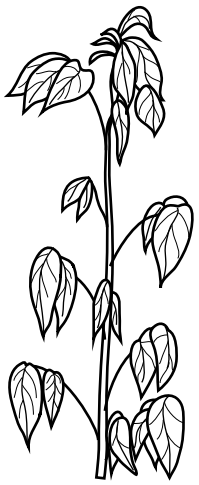

Fig. 4.1(b)

(a) Name a process that takes place in the plant in Fig. 4.1(a) only during daylight and explain how the leaves help this process.

process .....

explanation .....

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.....[3]

(b) The folding of the leaves at night, as seen in Fig. 4.1(b), is called a sleep movement.
Suggest and explain the effect of these sleep movements on the loss of water from one of these plants.

effect .....

explanation .....

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.....[4]

(c) Fig. 4.2 shows the uptake and loss of oxygen by a leaf during a 24-hour period.

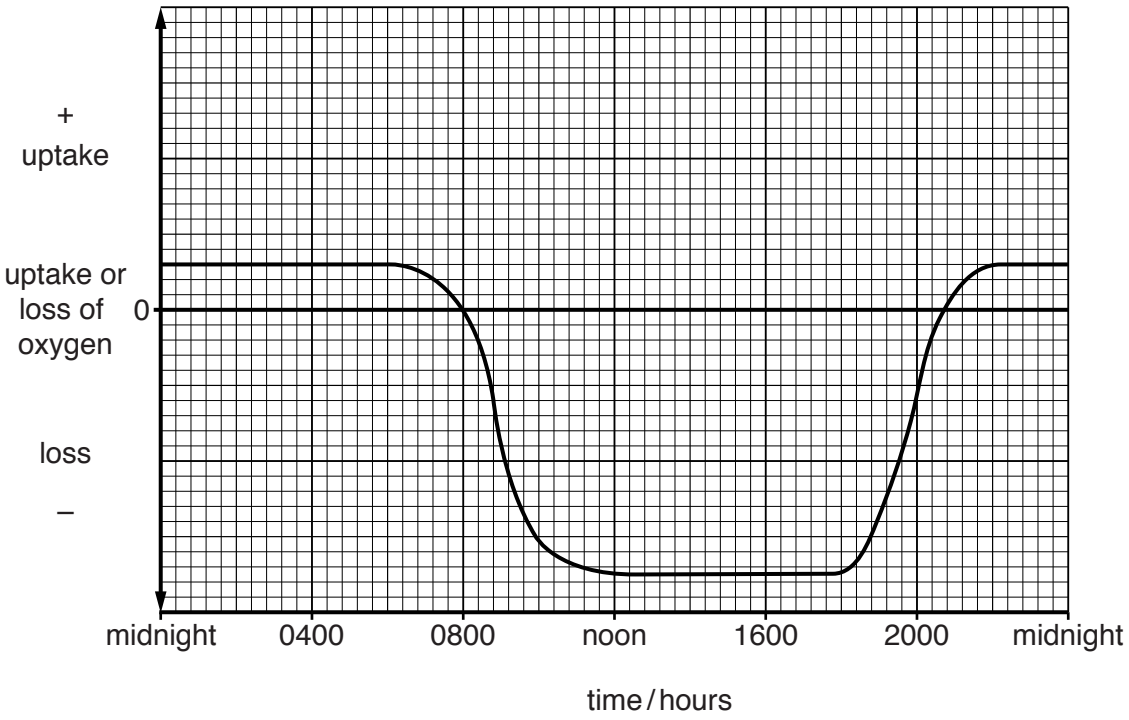

Fig. 4.2

Explain what is happening in the leaf at the following times:

(i) between 1800 hours and 2000 hours

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.....[2]

(ii) after 2200 hours.

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.....[2]

[Total: 11]

5 Table 5.1 shows a number of processes that occur in the lungs and thorax (chest cavity).

Table 5.1

process involved	✓
diffusion into red blood cells	
diffusion into the alveoli	
the diaphragm contracts	
the diaphragm relaxes	
the external intercostal muscles contract	
the internal intercostal muscles relax	
the ribs rise	
the ribs fall	
pressure in the thorax increases	
pressure in the thorax decreases	

(a) Carbon dioxide arrives at the lungs in capillaries. Place a tick (✓) in each box against a process involved in removing carbon dioxide from the blood and expelling it to the atmosphere. [4]

(b) Table 5.2 shows the percentage of oxygen in inspired and expired air of three people, J, K and L.

Table 5.2

person	% of oxygen in inspired air	% of oxygen in expired air
J	20.5	15.0
K	20.5	16.5
L	20.5	18.5

Describe the differences shown in Table 5.2 and suggest reasons for them.

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.....[4]

[Total: 8]

Section B

Answer **both** questions in this section.

6 **(a)** Describe the differences in structure and function between a cell wall and a cell membrane.

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.....[6]

(b) Explain, with examples, the relationship between cells, tissues and organs.

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.....[4]

[Total: 10]

7 **(a)** Seeds require certain conditions before they will germinate. List these conditions and, for each condition you mention, suggest how it is important in the process of germination.

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(b) Explain how a seed obtains its food store from its parent plant.

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.....[4]

[Total: 10]

Section C

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

8 **(a)** Describe the industrial manufacture of single cell protein.

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.....[8]

(b) Suggest problems of using viruses in biotechnology.

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.....[2]

[Total: 10]

9 **(a)** With reference to the inheritance of blood groups, explain what is meant by each of the following terms:

(i) *dominance*

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.....[3]

(ii) *codominance*.

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(b) Explain the difference between the number of chromosomes in a gamete and in a body cell.

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.....[4]

[Total: 10]

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