Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

6624195225

BIOLOGY **5090/22**

Paper 2 Theory **October/November 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.

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Section A

Answer **all** questions in this section.

1 Two separate strains, **A** and **B**, of the same species of microorganism are used in the making of bread and beer (a drink that contains alcohol).

(a) (i) Name this type of microorganism .....[1]

(ii) Name the gas released by this microorganism during the production of bread and beer.

.....[1]

(b) Fig. 1.1 shows the volume of gas released by the strains while they are being used.

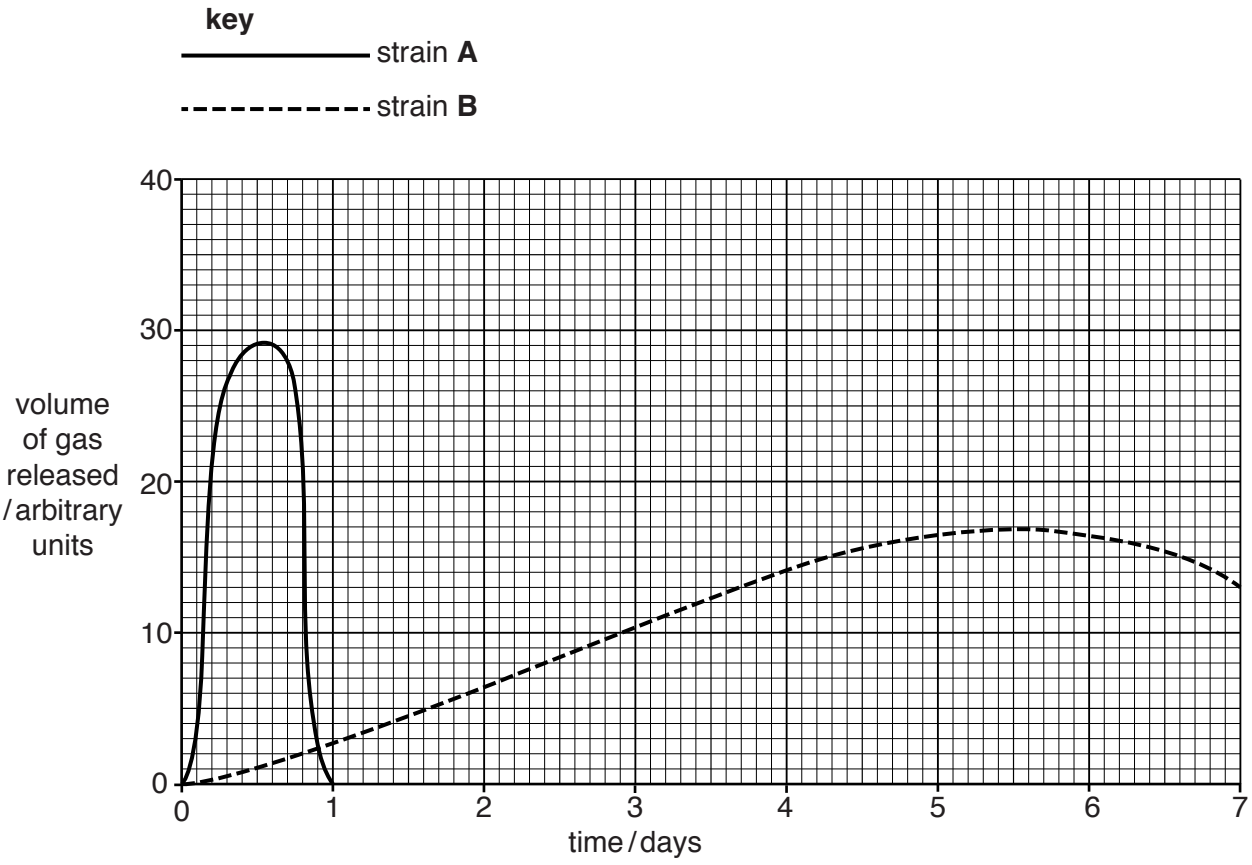


Fig. 1.1

(i) Fig. 1.1 shows the gas released by strain **B** at a temperature of 18 °C.
Draw a curve on Fig. 1.1 to show the effect on strain **B** of increasing the temperature by 10 °C. [3]

(ii) Name **two** other external factors that would change the shape of the curves shown in Fig. 1.1.

1 .....

2 .....
[2]

(c) Strain **A** has a sweet taste and strain **B** has a bitter taste.
Suggest which strain is used for making bread. Give reasons for your answer.

strain used in making bread .....

reasons .....

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.....[3]

[Total: 10]

2 Fig. 2.1 shows part of the flowering head of a small tree that grows in tropical rainforests.

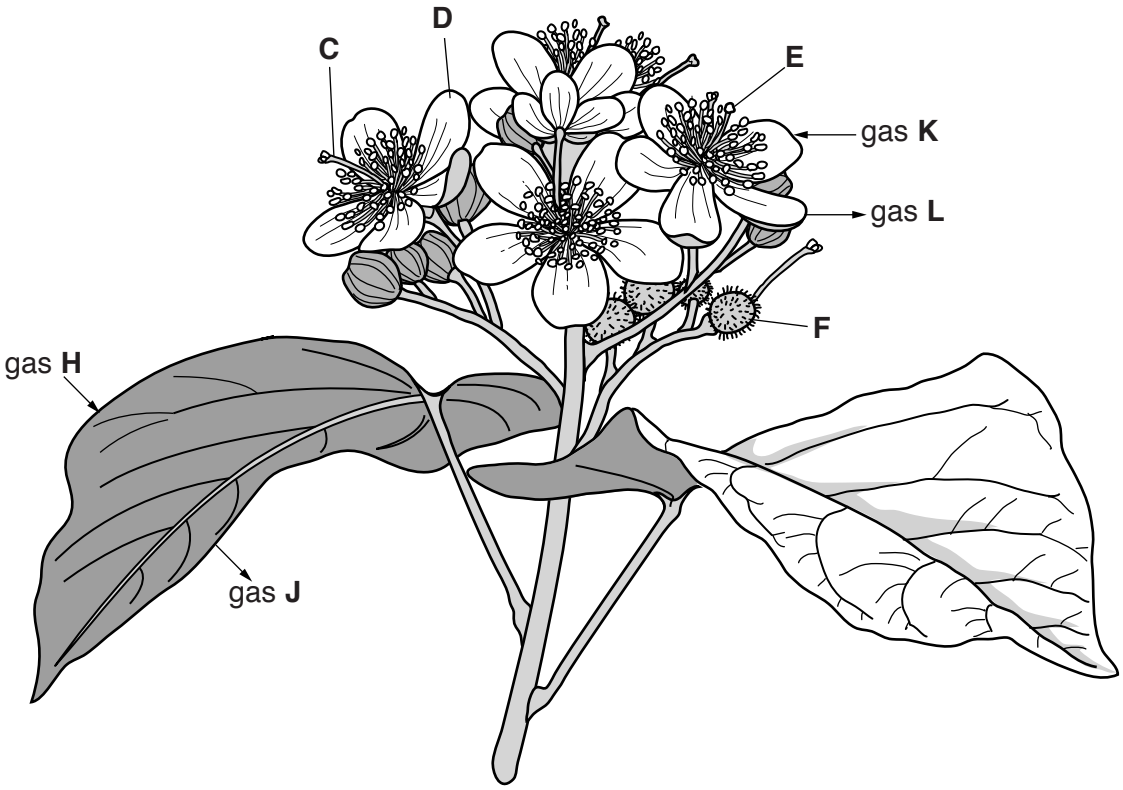


Fig. 2.1

(a) Identify the structures **C**, **D**, **E** and **F** shown on Fig. 2.1.

C .....

D .....

E .....

F ..... [4]

(b) (i) Structure **D** contains stomata similar to those found in the leaves.

H, **J**, **K** and **L** represent gases that pass into and out of the leaves and flowers during daylight hours.
Identify the gases **H** and **J**.

H .....

J ..... [2]

(ii) The flowers are very pale pink in colour. Suggest the identity of gases **K** and **L**.
Give an explanation for your answer.

K .....

L .....

explanation .....

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.....[4]

(c) Extracts from the tree have many uses in medicine. Some of the extracts are alkaline and have anti-bacterial properties.

Some stomach problems are caused by excess acid production.
Suggest why these tree extracts are sometimes used to treat such stomach problems.

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.....[2]

[Total: 12]

3 Table 3.1 shows the percentage of smokers in a particular country and the number of deaths from lung cancer in that country during the years 1920 to 2010.

Table 3.1

year	percentage of the population that were smokers	deaths from lung cancer per 100,000 people
1920	30	100
1930	35	150
1940	45	200
1950	60	250
1960	40	550
1970	30	700
1980	25	800
1990	20	700
2000	20	525
2010	18	500

(a) (i) Name the drug in tobacco smoke responsible for addiction.

..... [1]

(ii) Name a substance in tobacco smoke known to cause cancer.

..... [1]

(iii) Name a substance in tobacco smoke that affects the carriage of respiratory gases.

..... [1]

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(iv) Explain why a pregnant woman is advised not to smoke.

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.....[3]

(b) Describe and explain the relationship between the number of smokers and the number of deaths from lung cancer shown in Table 3.1.

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.....[4]

[Total: 10]

4 Fig. 4.1 shows a section through a heart connected to what is described as an LV Assist Device.

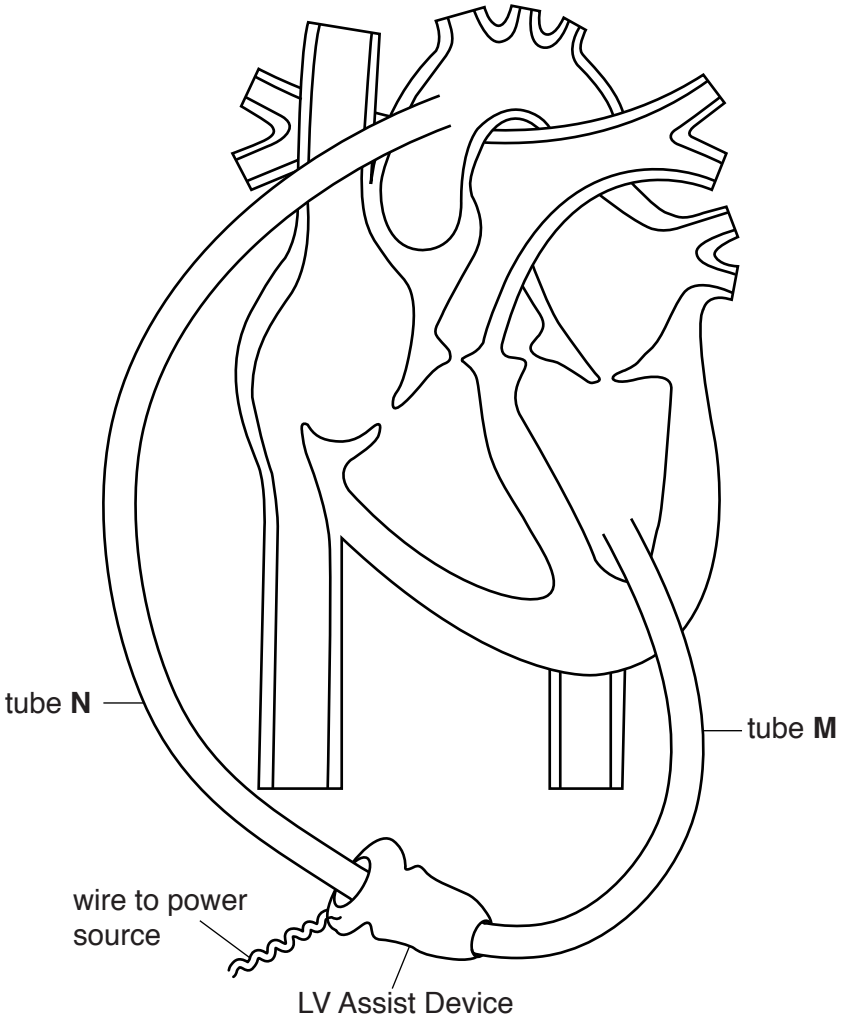


Fig. 4.1

(a) (i) Use Fig. 4.1 to suggest why the device is called an LV Assist Device.

.....

.....[1]

(ii) Name the type of tissue through which tube **M** passes.

..... [1]

(iii) Name the blood vessel into which tube **N** is inserted.

..... [1]

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(b) Draw arrows on Fig. 4.1 to show

(i) the direction of blood flow in the blood vessels that carry blood into the heart. [2]

(ii) the direction of blood flow through the LV Assist Device. [1]

(c) Name the valve that is bypassed by blood flowing through the LV Assist Device.

.....[1]

(d) Sometimes the pulmonary circulation requires artificial assistance. Suggest and describe where, under these circumstances, an Assist Device would be fitted.

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.....[2]

[Total: 9]

5 Sweet clover is a member of the pea and bean family (leguminous plants) that grows amongst grass in fields used for cattle feed.

(a) Explain how sweet clover can improve the soil in which it grows.

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.....[2]

(b) As sweet clover dries, fungi that grow on it produce a chemical (dicoumarol) that prevents blood from clotting.

Suggest a protein that cattle which eat sweet clover affected by such fungi might be unable to produce.

..... [1]

(c) Dicoumarol has been used for many years as a constituent in a form of rat poison.
Fig. 5.1 shows the change in the LD_{50} for dicoumarol in rats from 2000 to 2015.
The LD_{50} is a measure of the amount of poison that will kill 50% of the rats that consume it.

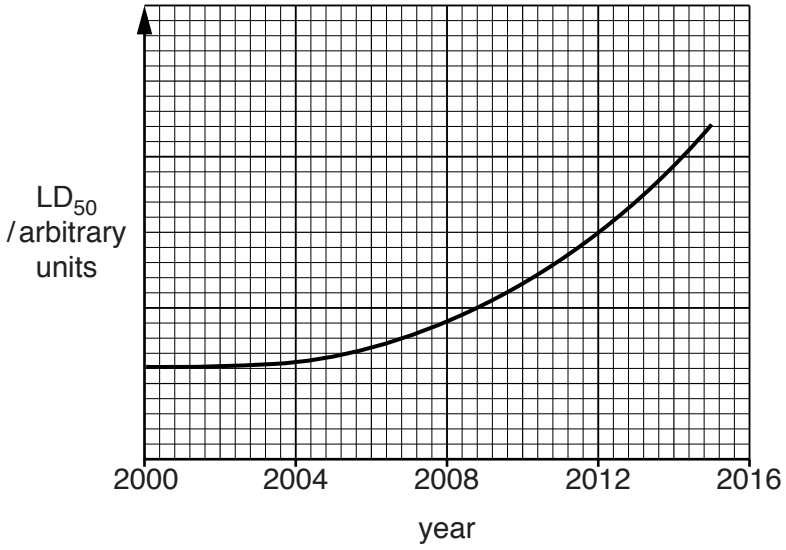


Fig. 5.1

(i) Describe the change in the LD_{50} for dicoumarol in rats from 2000 to 2015.

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.....[2]

(ii) Suggest an explanation for the change you have described.

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.....[4]

[Total: 9]

Section B

Answer **both** questions in this section.

6 **(a)** As a person gets older, the lens of the eye loses its elasticity.
Describe and explain how light rays from a near object pass through the eye but may not form a sharply focused image for an older person.

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(b) Suggest how reading glasses may bring the image into focus.

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.....[3]

[Total: 10]

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7 **(a)** Describe and explain the benefits to a person of the changes that occur in the body during a physical activity such as a 400 m running race.

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(b) Explain why, after this type of physical activity, a person remains out of breath for several minutes.

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.....[2]

[Total: 10]

Section C

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

8 **(a)** Describe the similarities and differences between the absorption of ions in plants and the uptake of glucose in humans.

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(b) Explain why humans absorb amino acids but plants do not.

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.....[4]

[Total: 10]

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9 **(a)** Describe the role of the mosquito in the spread of disease.

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(b) Describe the symptoms of named diseases that may result from deficiencies in a balanced diet.

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[Total: 10]

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