بسم الله الرحمن الرحيم

مقابل هذا المجهود ارجو منكم الدعاء لي بالمغفرة ولابنائي الهداية والنجاح والتوفيق

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IGCSE

BIOLOGY

Examination

PAPER

3

Good luck

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
INTERNATIONAL EXAMINATIONS

Biology O.L.

contents

Paper 3	Page

Centre Number	Candidate Number

Candidate Name .....

0610/3 IGCSE JUNE

BIOLOGY

PAPER 3

Thursday 10 JUNE 1993 Morning 1 h 15 min

Additional materials
Answer paper

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

Instructions to candidates:

Write your name and examination number in the spaces provided at the top of this page.

Answer **all** *the questions.*

Answers to Section A should be written in the spaces provided on the question paper.

Answers to Section B should be written on the sheets available from the Supervisor, which must be attached securely, in the correct order, to the back of the question paper.

Candidates are advised to spend no more than 30 minutes on Section A.

The intended marks for questions or parts of questions are given in brackets [ ].

Question Number	Examiner's use only
1	
2	
3	
4	
5	
TOTAL	

This Question Paper consists of 8 printed pages. 1

[Turn over

Section A

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

1 **Fig. 1A** shows a vertical section (drawn in perspective) through a pair of guard cells and through some epidermal cells, as they appear in a leaf in the dark. **Fig. 1B** shows a simple drawing of the same guard cells seen in surface view.

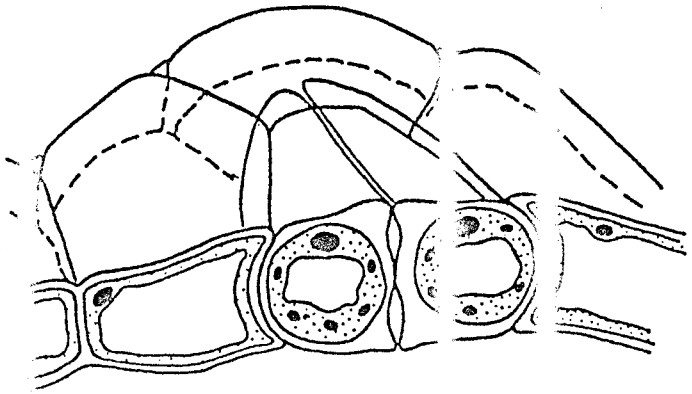

Fig. 1A

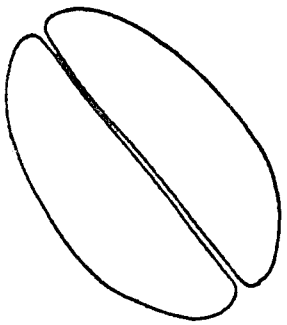

Fig. 1B

(a) (i) On **Fig. 1A**, clearly label a *cell wall*, *cytoplasm* and a *vacuole*.

(ii) In the space below, redraw **Fig. 1B** to show the cells as they would appear in daylight.

[5]

(b) Name the gases which pass into and out of a leaf in daylight.

(i) *passing in* .....

(ii) *passing out* ..... [2]

c) Explain the possible advantages to a plant of the stomata being closed at night.

.....

.....

.....

..... [2]

d) Describe **three** adaptations of leaves or stems in plants growing in habitals which are very cold or very hot or very dry or permanently wet.

Habitat .....

.....

.....

.....

.....

.....

..... [3]

2 **Fig. 2** is a section through a human thorax (chest). It shows some of the structures that are found inside the thorax.

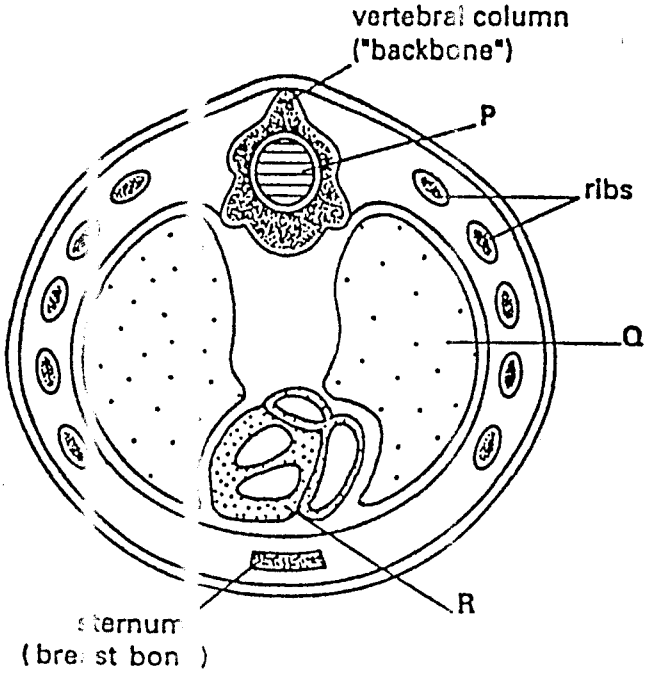

Fig. 2

(a) Identify structures P .....

Q .....

R ..... [3]

(b) Name **three** structures, **not shown in Fig. 2**, which pass through **or** into the thorax.

1. .....

2. .....

3. ..... [3]

(c) **(i)** Which of the organs shown has a large surface area?

.....

(ii) Explain the importance of this large surface area.

.....

.....

.....

..... [4]

(d) Describe the role of the ribs, intercostal muscles and diaphragm in breathing in (inspiration).

.....

.....

.....

.....

.....

..... [4]

3 **Fig. 3** shows the average numbers of teeth lost per person in two towns, **T** and **U**.

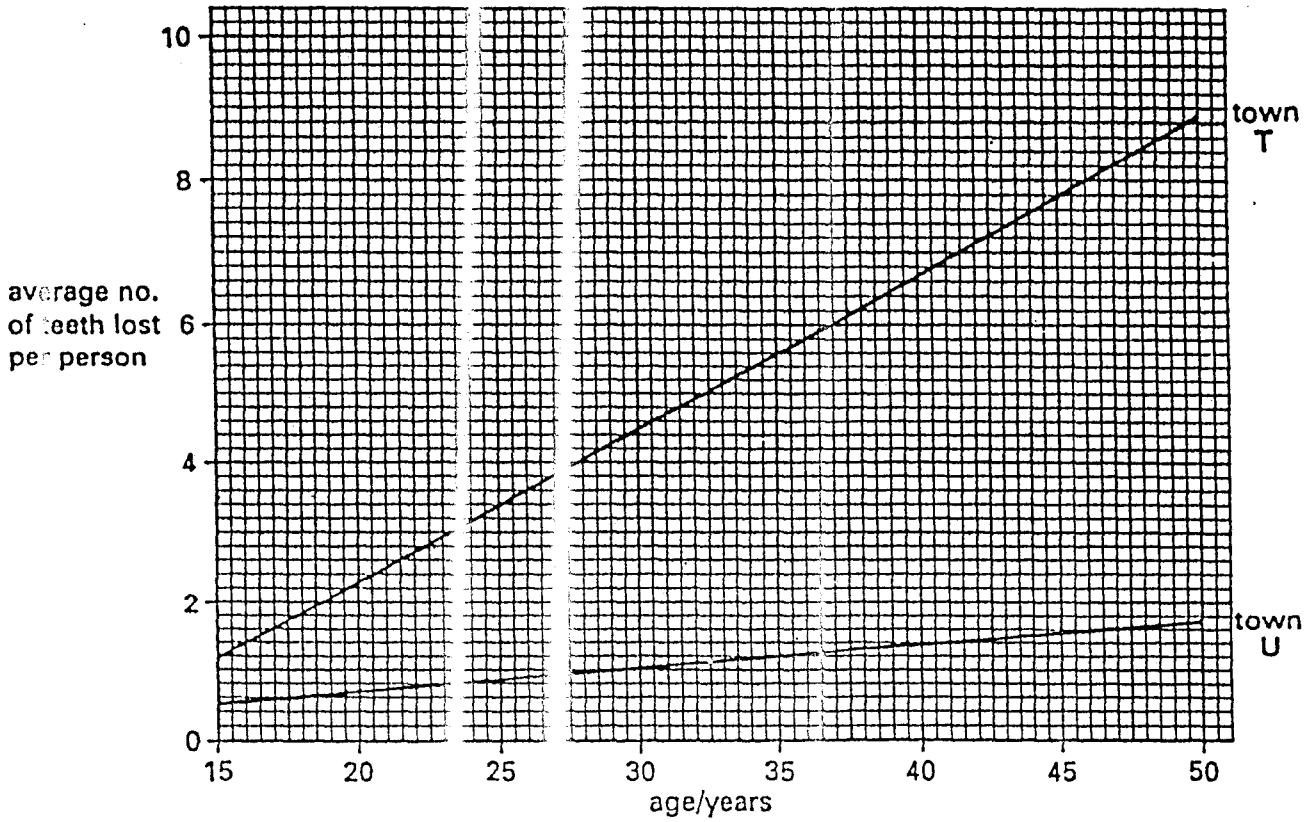

Fig. 3

(a) What type of organism causes tooth decay?

..... [1]

(b) Use the graph to find the average number of teeth lost by

(i) a 37 year-old in town **T**; .....

(ii) a 29 year-old in town **U**. ..... [2]

(c) Suggest **four** possible reasons for the differences between the average numbers of teeth lost in the two towns.

1. .....

2. .....

3. .....

4. ..... [4]

(d) Suggest why information is not provided for children younger than 15 years.

.....

.....

..... [2]

(a) Describe briefly the advantages of breast milk for babies, compared with bottle feeding.

.....

.....

.....

.....

.....

.....

.....

.....[5]

SECTION B QUESTIONS ARE OVELEAF

Section B

Answer both questions from this section.

When these questions are being marked the examiner will look to see how well you write about a biological subject. You will be given credit for expressing relevant ideas clearly and in a sensible order. Use labelled or annotated diagrams if it will make your answer more easily understood.

4 **(a)** **Fig. 4** shows energy flowing through a food chain consisting of organisms **A, B, C** and **D.**

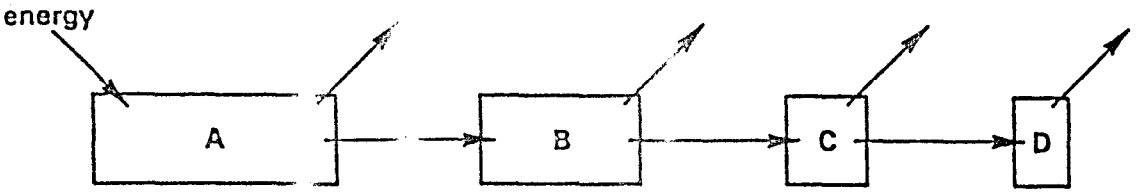

Fig. 4

Explain how energy **(i)** enters the chain, **(ii)** passes through it and **(iii)** leaves the organisms in this food chain. [10]

(b) What are the advantages of short food chains? [2]

(c) What are the advantages and disadvantages of feeding crop plants to animals? [3]

5 **(a)** Scientists wished to breed a certain fruit for improved flavour and a more attractive colour. Explain, with full details, how they could achieve this. [9]

(b) Suggest, with an example, how artificial selection might be of **economic** importance to a farmer. [3]

(c) Describe the process by which bacteria have become resistant to antibiotics such as penicillin. [3]

Centre Number	Candidate Number

Candidate Name .....

0610/3 IGCSE NOV

BIOLOGY

PAPER 3

Friday 19 NOVEMBER 1993 Morning 1 h 15 min

Additional materials:
Answer paper

International General Certificate of Secondary Education

Instructions to candidates:

Write your name and examination number in the spaces provided at the top of this page.

Answer **all** *the questions.*

Answers to Section A should be written in the spaces provided on the question paper.

Answers to Section B should be written on the sheets available from the Supervisor, which must be attached securely, in the correct order, to the back of the question paper.

Candidates are advised to spend no more than 30 minutes on Section A.

The intended marks for questions or parts of questions are given in brackets [ ].

Question Number	Examiner's use only
1	
2	
3	
4	
5	
Total	

This Question Paper consists of 8 printed pages.

Section A

Answer all the questions in this section.

1 Fig. 1A is a graph showing the thickness of the lining of the uterus of a woman over a 28-day cycle. Fig. 1B represents the 28 days of the cycle in Fig. 1A.

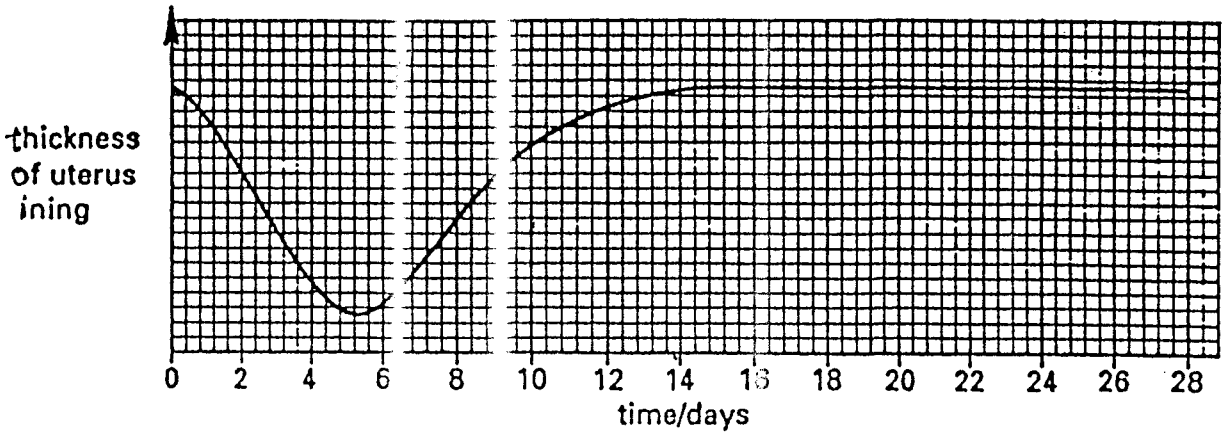

Fig. 1A

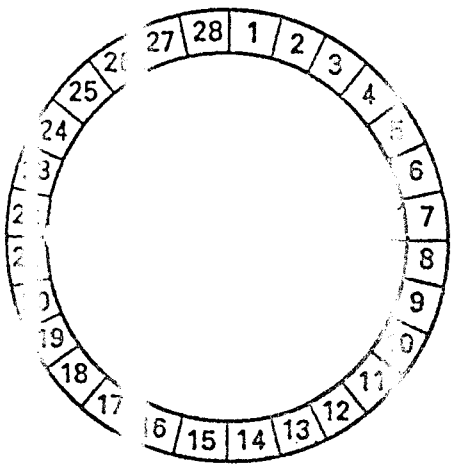

Fig. 1B

(a) On Fig. 1B, shade in and label,

(i) the days during which menstruation occurs;

(ii) the day on which an ovum is likely to be released from an ovary. [2]

(b) Why would sexual intercourse between days 6 and 10 be unlikely to lead to pregnancy?

.....

..... [2]

(c) If fertilisation occurs, what part is played by the uterus in the development of the embryo?

.....

.....

.....

.....

.....

.....

.....

..... [5]

(d) (i) How does a fertility drug increase a woman's chances of becoming pregnant?

.....

.....

(ii) State **two** disadvantages of using fertility drugs.

1. .....

.....

2. .....

..... [3]

2 Fig. 2A shows a cylinder of Irish potato tuber immersed in water. Fig. 3A shows an identical cylinder in concentrated salt solution. Both cylinders are fixed to a support at one end and have identical weights firmly attached to the opposite ends. (All figures are drawn to the same scale.)

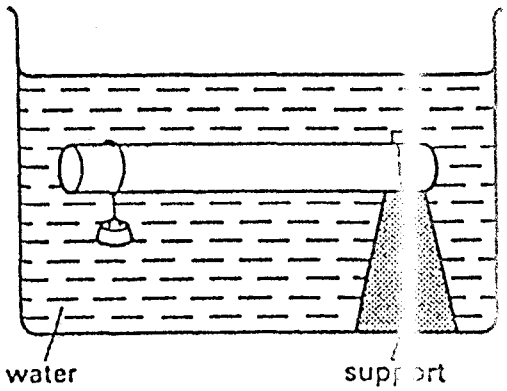

Fig. 2A

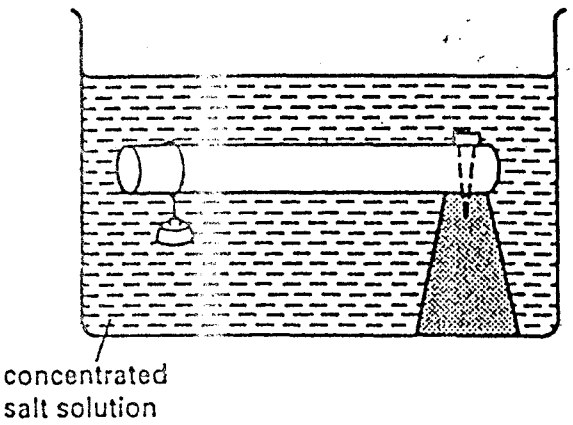

Fig. 3A

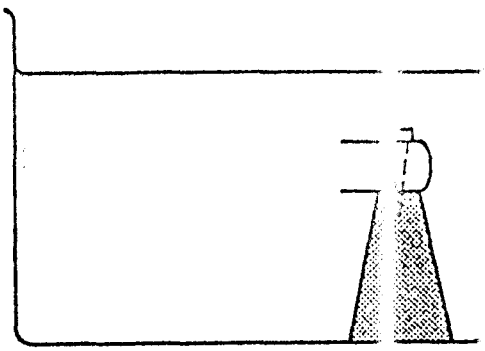

Fig. 2B

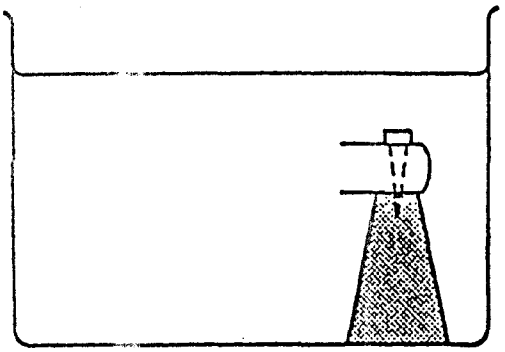

Fig. 3B

(a) (i) Complete Figs. 2B and 3B, above, to show how the cylinders would appear several hours later.

(ii) Explain what has happened in

Fig. 2B; .....

.....

Fig. 3B. .....

.....

(iii) Name the process responsible for any changes in appearance of the cylinders.

..... [7]

(b) (i) Suggest how pressure within a plant cell may reach higher levels than those usually found within animal cells.

.....

.....

(ii) What is the value of this pressure to the shoot of a seedling?

.....

..... [3]

(c) Root hair cells are involved in both the uptake of water and the uptake of mineral ions from the soil. In what ways are these two processes different?

.....

.....

.....

..... [2]

3 (a) What is meant by the term *homeostasis*?

.....

..... [2]

Fig. 4 shows the body temperature of a person before, during and after taking a cold bath. (The temperature of the bath water was 12 °C.)

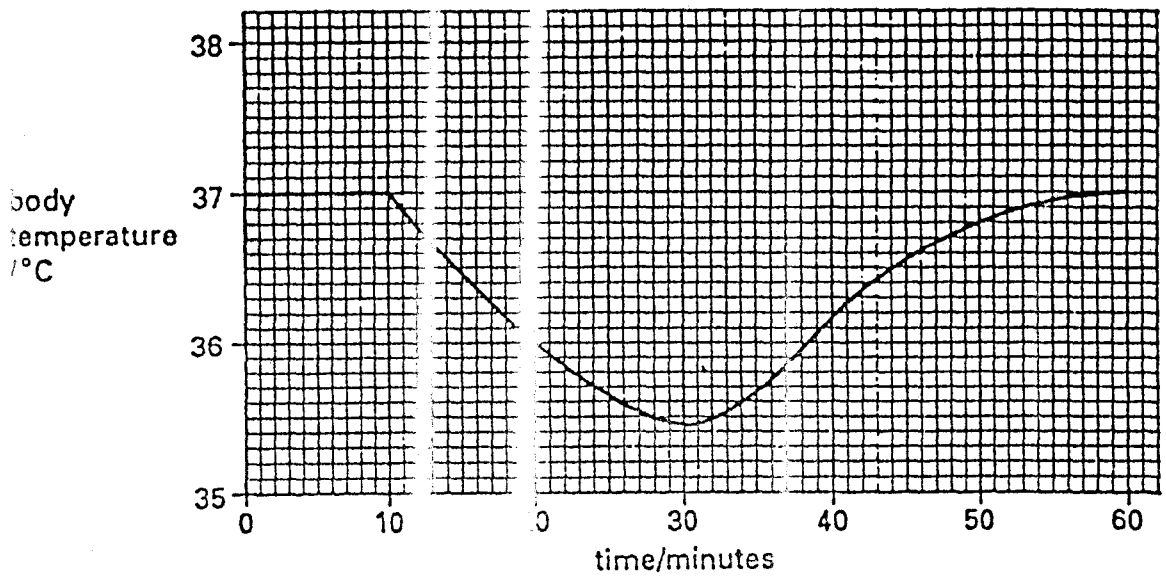

Fig. 4

(b) (i) For how long was the person in the bath?

..... [1]

(ii) Explain why the person's body temperature fell.

.....

..... [2]

(iii) Explain the roles played by the following in helping to return the body temperature to normal:

1. the liver;

.....

.....

2. blood vessels in the skin

.....

..... [4]

(c) Fig. 5 shows a side view o the ali entary canal within a person's abdomen.

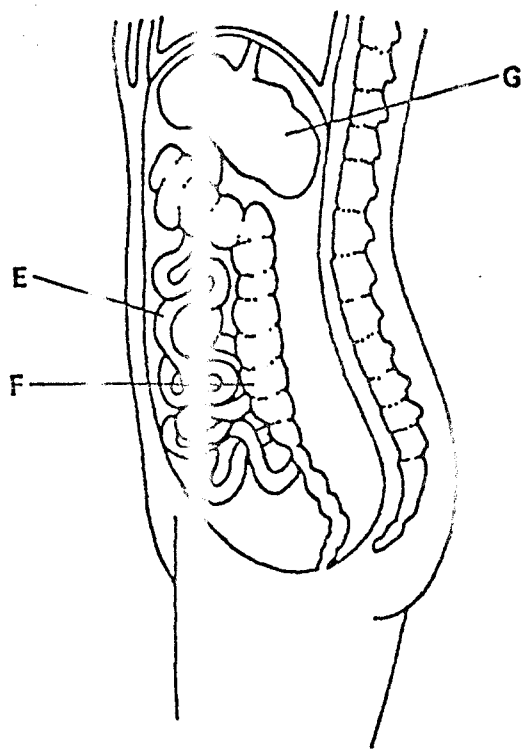

Fig. 5

(I) On Fig. 5, draw in th correc positions and label, 1. the liver; 2. a kidney. [2]

(II) Complete the table b low, ic ntifying parts **E** and **F**. For each part, state **one** function and **one** structural fe ture w ich adapts it to the function you have mentioned.

part	*name*	*function*	*structural feature*
E	.....	.....	.....
	.....	.....	.....
F	.....	.....	.....
	.....	.....	.....

[3]

(III) What type of food is digest d in the organ labelled **G**?

.....

(Iv) Explain what happe s in th liver to the final product of digestion of this food.

.....

.....

.....

.....

.....

.....

.....

Candidate Name _____

Centre Number	Candidate Number

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

Thursday 9 JUNE 1994 Morning 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

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 the separate answer paper securely to the question paper.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.
You should spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 8 printed pages.

SB(PU) QF41319

[Turn over

Section A

Answer all the questions in this section.

1 Fig. 1 shows how crop plants, such as tomatoes, can be grown without soil.

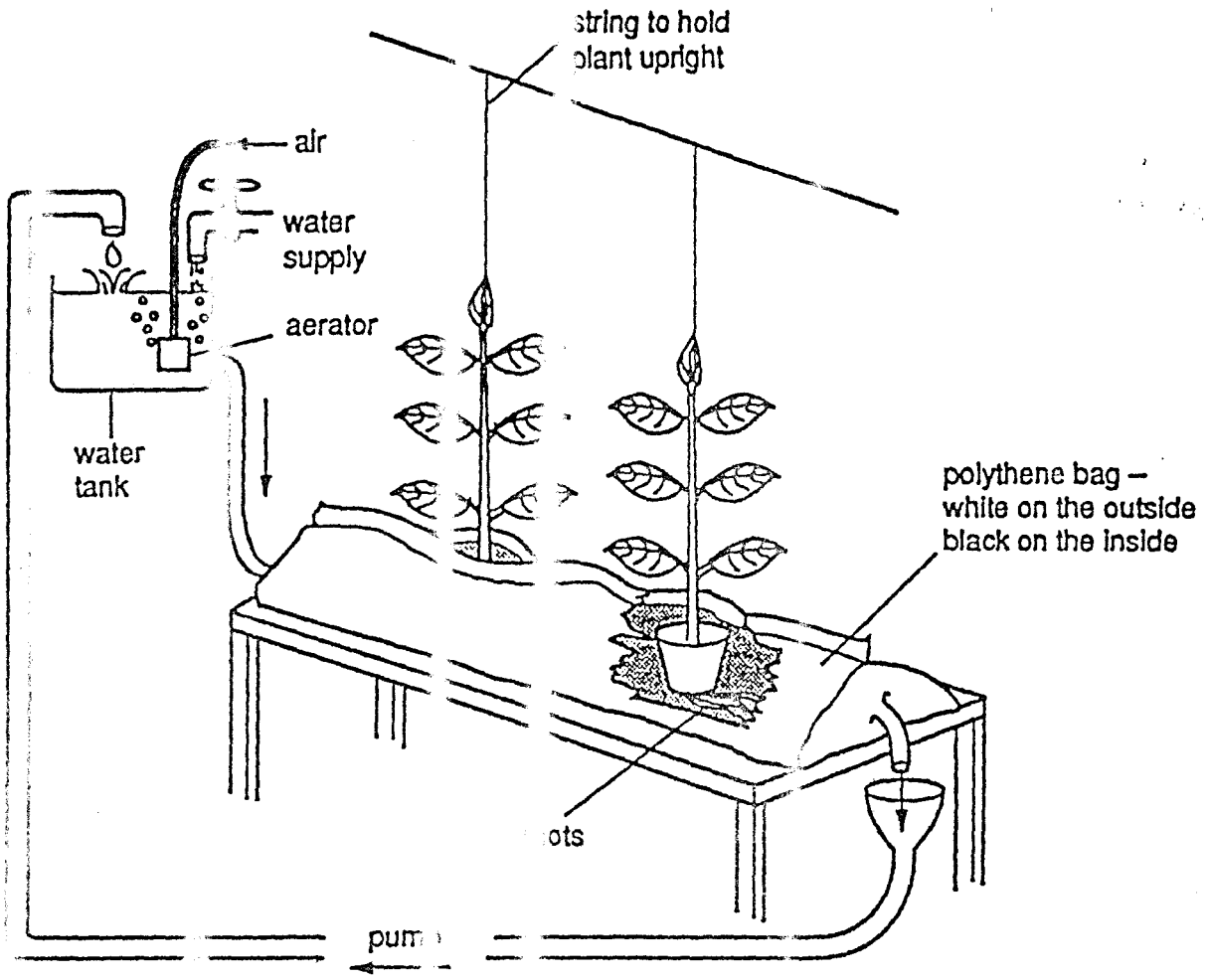

Fig. 1

(a) (i) What substances, essential for the healthy growth of plants, must be added to the water in the tank?

.....

(ii) In what two ways is the uptake of these substances, by the roots, different from the uptake of water?

.....

.....

.....

.....

[4]

For Examiner's Use

(b) Why is it necessary to use an aerator in the water tank?

.....

..... [2]

(c) List three other factors which would affect the rate of growth of the plants.

1. .....

2. .....

3. ..... [2]

(d) Suggest one reason for each of the following:

(I) supporting the plants as shown in Fig. 1;

.....

.....

(II) using polythene of the colouring indicated.

.....

..... [2]

(e) If the polythene bag was thrown away after use, how might it cause pollution?

.....

.....

.....

.....

.....

.....[3]

2 Fig. 2 shows a human heart.

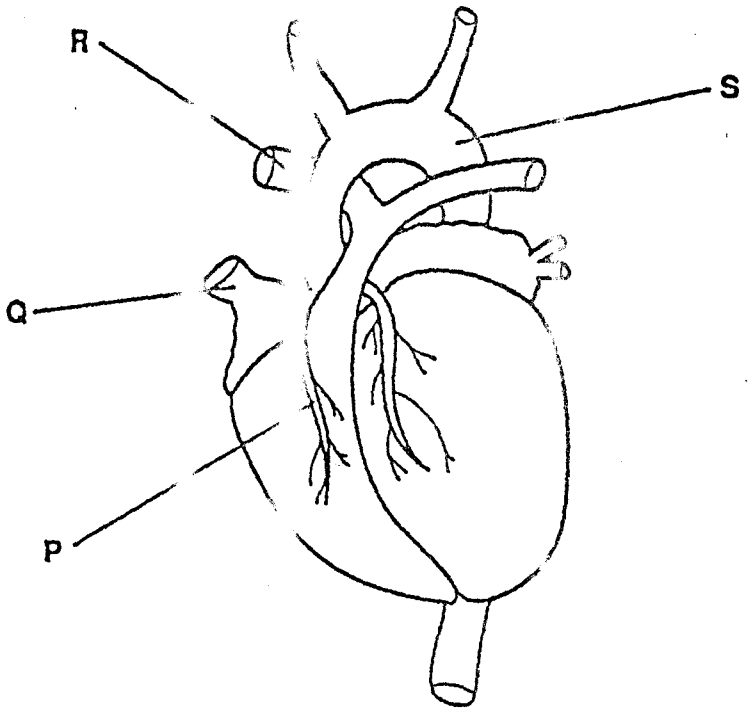

Fig. 2

(a) Complete the table to show whether the blood in vessels **P, Q, R** and **S** in Fig. 2 above is oxygenated or de-oxygenated, and under high or low pressure.

	blood oxygenated	blood under high pressure
P		
Q		
R		
S		

[4]

(b) (i) State **two** substances in food that are believed to cause heart disease.

1. .....

2. .....

(ii) State **two** other factors that are possible causes of heart disease.

1. .....

2. .....[4]

When artery P becomes blocked (see Fig. 2), it is sometimes replaced, during an operation, with a vein taken from another part of the patient's body.

(c) (i) When the vein is sewn into place, why must great care be taken to ensure that it is the correct way round?

.....

.....

(ii) Suggest and explain one advantage and one disadvantage of using the patient's own vein rather than an artery transplanted from another person.

Advantage

.....

.....

.....

Disadvantage

.....

.....

.....

[6]

3 The apparatus shown in Fig. 3 was used by a student to investigate the effect of temperature on the activity of yeast.

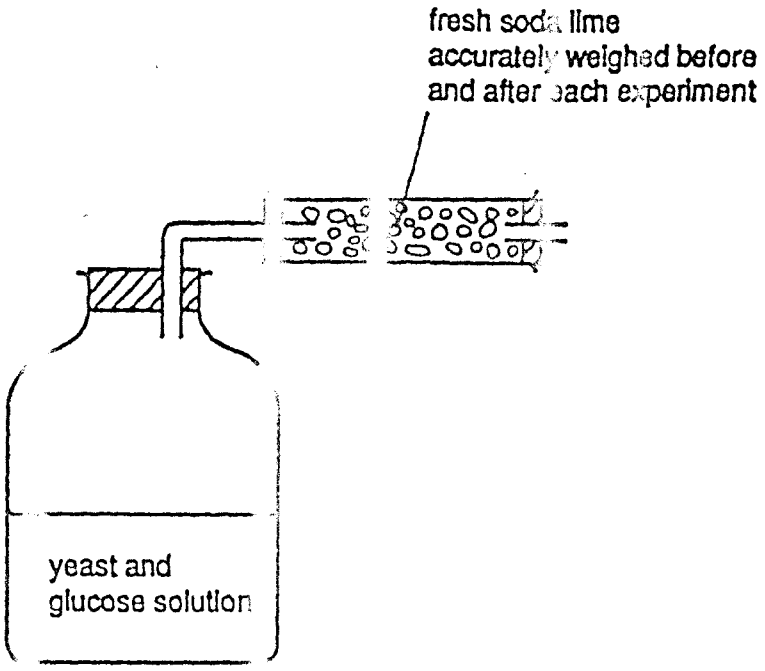

Fig. 3

Three different temperatures were provided by a refrigerator, a laboratory bench and a hot water bath. Each time, the apparatus was cleaned and set up afresh at room temperature using similar quantities of materials. The apparatus was checked 15 minutes after being placed in its experimental conditions and any observations noted.

Each experiment ran for the same length of time and the change in mass of the soda lime was carefully recorded. The results are shown in Table 1.

Table 1

Experiment	Observation after 5 minutes	Increase in mass of soda lime/g
1. refrigerator	no bubbles	0.03
2. laboratory bench	many bubbles	1.33
3. hot water bath	no bubbles	0.16

For Examiner's Use

(a) In Experiment 2,

(I) what process caused the bubbles?

.....

(II) what gas do the bubbles contain?

.....

(III) why did the soda lime increase in mass?

.....

[3]

(b) What chemical would be present in the flask at the end of Experiment 2 that was not present at the start?

.....[1]

(c) What conclusions could the student draw from the results of these experiments?

.....

.....

.....

.....

.....

.....[3]

(d) Suggest why there was an increase in mass of the soda lime in Experiment 3, even though no bubbles were visible after 15 minutes.

.....

.....

.....

.....[3]

Section B

Answer two questions from this section.

4 (a) Explain the processes involved in the movement of water from the soil into the conducting tissue of a plant root. [7]

(b) Systemic pesticides are sprayed directly onto the leaves of plants. Insects which later feed on shoots which have grown after the spraying period are killed. Suggest how this method of pest control works. [5]

(c) What structural similarities are there between the plant root and the lining of the intestine, for the absorption of nutrients? [3]

5 (a) Define the term *excretion*. [3]

(b) What parts played in excretion by (I) the lungs, and (II) the kidneys? [6]

(c) Explain how a kidney machine helps a person whose kidneys have ceased to function. [6]

6 (a) Describe the events which occur from the moment a person accidentally touches a very hot object to the moment the hand is lifted clear. [9]

(b) Explain how the action of deliberately raising the arm differs from the sequence of events described in (a). [3]

(c) Why are the muscles in the arm in antagonistic pairs? [3]

7 (a) Distinguish clearly between *complete dominance* and *codominance*. [4]

(b) Explain how a man with blood group A and a woman with blood group B can have a child with blood group O. [6]

(c) The presence of hairs on the stems of a certain species of plant is controlled by a single pair of alleles. When a pure-breeding plant with a hairy stem is crossed with a pure-breeding plant with a smooth stem, all the offspring have hairy stems. Use a genetic diagram to show a cross which would produce offspring with hairy stems and smooth stems in a ratio of 1 : 1 and explain the symbols you use. [5]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

Wednesday 23 NOVEMBER 1994 Morning 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

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Section A

Answer all questions.
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INFORMATION FOR CANDIDATES

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You should spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

For Examiner's Use

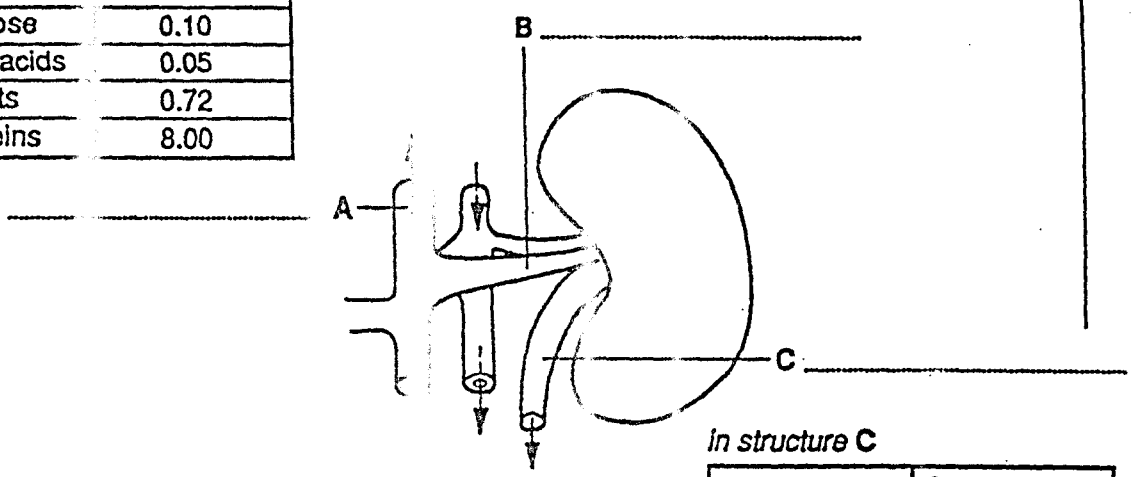
Section A

Answer all the questions in this section.

1 Fig. 1 shows a diagram of a kidney and associated structures. The tables list the percentages of certain components found within structures **B** and **C**.

In structure **B**

Component	*Concentration (%)*
urea	0.03
glucose	0.10
amino acids	0.05
salts	0.72
proteins	8.00



In structure **C**

Component	*Concentration (%)*
urea	2.00
glucose	0.00
amino acids	0.00
salts	1.50
proteins	0.00

Fig. 1

(a) On the diagram, label structures **A**, **B** and **C**. [3]

(b) Which chamber of the heart first receives the contents of structure **A**? [1]

For Examiner's Use

(c) Using only the information in the tables in Fig. 1, deduce the functions of the kidney.

.....

.....

.....

.....

.....

.....

..... [5]

(d) Explain how the proportions of the components present in **C** would change

(i) after eating meat;

.....

.....

.....

.....

.....

.....

(ii) if a person suffering from diabetes had not taken enough insulin.

.....

.....

.....

.....

.....

..... [6]

For Examiner Use

2 In some parts of the world, crop plants are grown in glasshouses (greenhouses), similar to the one shown in section in Fig. 2, in order to increase their rate of growth and development.

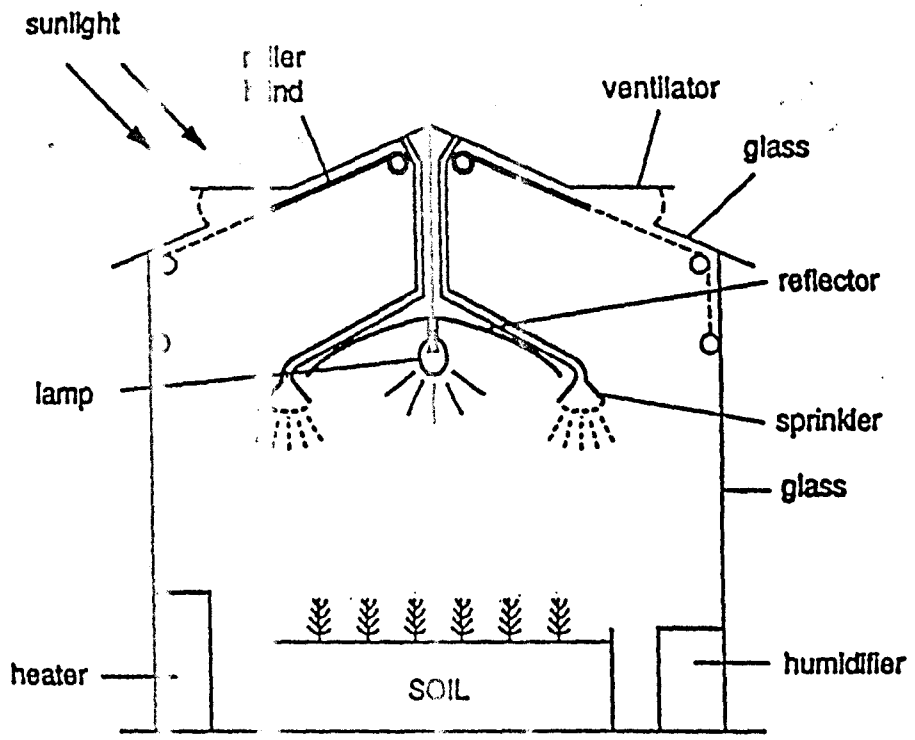


Fig. 2

(a) Suggest functions for each of the following features shown in Fig. 2.

(i) *ventilator* .....

.....

.....

(ii) *heater* .....

.....

.....

(iii) *blind* .....

.....

.....

(iv) *lamp* and *reflector* .....

.....

..... [5]

For Examiner's Use

(b) Suggest a gas which might be supplied to the glasshouse to increase the rate of plant growth.

.....[1]

(c) It is often important to use the humidifier when seedlings are first planted in the glasshouse.

Explain why this is so.

.....

.....

.....[2]

(d) (I) Name an **element**, present in compounds in the soil, which is necessary for the healthy growth of the plants.

.....

(II) What is the function of this element in the plant?

.....

.....[3]

Examiner's Use

3 Fig. 3 shows details of an experiment in which three similar shirts (P, Q and R), with identical fat stains, were washed in an enzyme containing washing powder at three different temperatures, 15 °C, 35 °C and 65 °C.

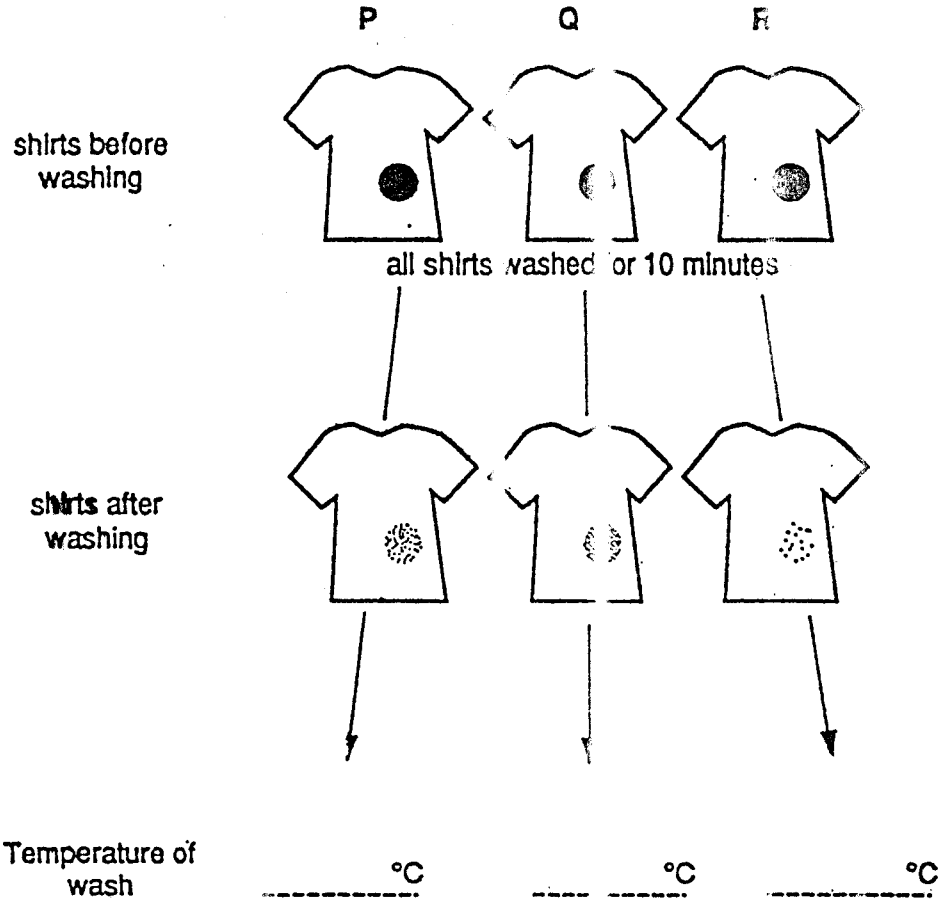


Fig. 3

(a) (I) Complete Fig. 3 to show the temperature at which each shirt was washed. [3]

(II) Explain your answer for each shirt.

Shirt P .....

.....

.....

Shirt Q .....

.....

.....

Shirt R .....

.....

..... [5]

For Examiner's Use

(b) Suggest two changes to the procedure which might have resulted in the complete removal of the stain from shirt R.

1. .....

2. .....[2]

(c) (I) Name the type of enzyme likely to be in the powder.

.....

(II) Suggest what type of enzyme would need to be present in a washing powder designed to remove blood stains.

.....[2]

Section B

Answer **two** questions from this section.

You will be given credit for expressing relevant ideas clearly and in a logical manner.

Use clearly labelled or annotated diagrams if they help to make your answer more easily understood.

4 Fig. 4 shows the structure of a flower.

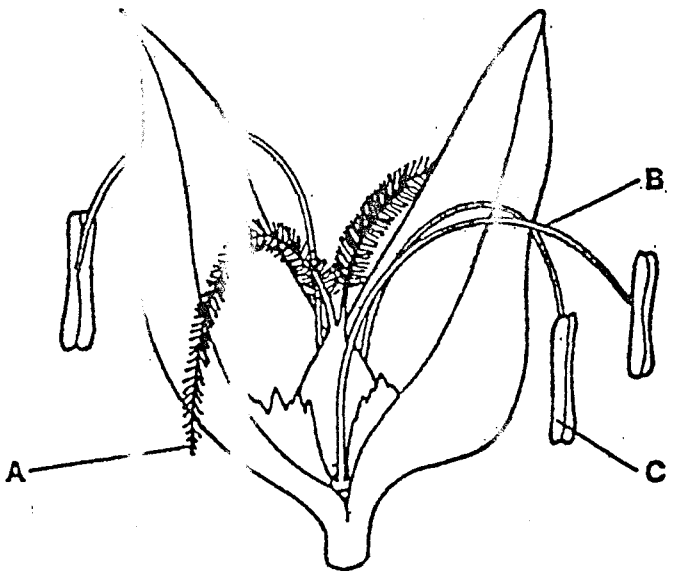


Fig. 4

(a) Describe how the process of pollination is most likely to be carried out in this flower. [9]

Your answer should include identification of structures A, B, and C.

(b) (I) What are the advantages to an organism of asexual reproduction?

(II) What are the commercial advantages of asexual reproduction? [6]

[Turn over

5 (a) Discuss why it is important to the natural environment

(i) to recycle paper and

(ii) to discharge sewage only after proper treatment. [9]

(b) What are

(i) the advantages, and

(ii) the disadvantages of using pesticides? [6]

6 Describe the part played by microorganisms in

(a) the production of any two of the following: bread, alcohol, cheese, yoghurt; [8]

(b) the nitrogen cycle, and [4]

(c) the carbon cycle. [3]

7 (a) Explain, with examples where possible,

(i) how mutations are brought about, and

(ii) how they may lead to a change in phenotype. [9]

(b) Explain how mutation and natural selection may lead to evolution. [6]

Candidate Name .....

Centre Number	Candidate Number

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

Thursday 8 JUNE 199[illegible] Morning 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

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:

1 fasten the separate answer paper securely to the question paper;
2 enter the numbers of the Section B questions you have answered in the grid below.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.
You are advised to spend no longer than 1 hour 0 minutes on Section A..

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 10 printed pages and 2 blank pages.

SB(PU) QF53712

[Turn over

For Examiner's Use

Section A

Answer all questions in this section.

1 Fig. 1A is a diagram of a developing mammalian fetus and part of the uterus wall.

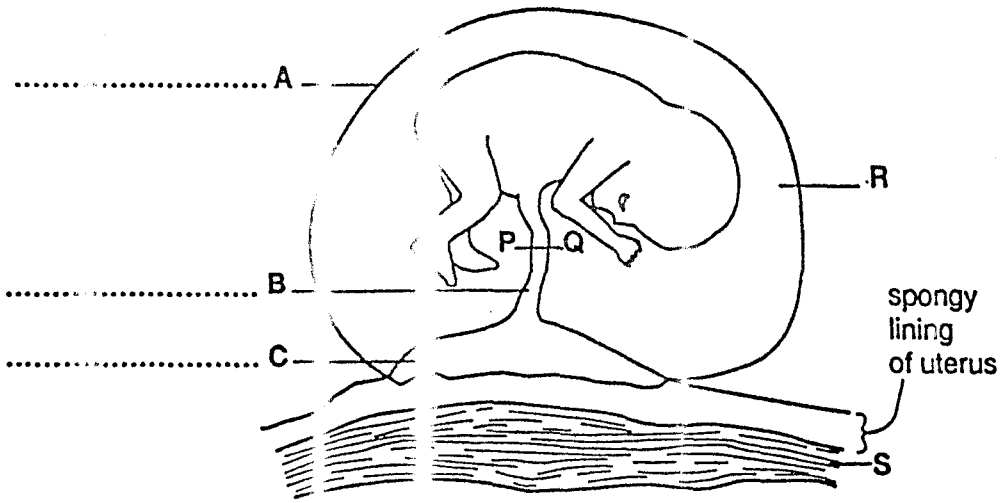


Fig.1A

(a) On the diagram, label structures A, B and C. [3]

(b) State the function of R.

.....[1]

(c) What type of tissue is found at S?

.....[1]

(d) Fig. 1B shows a section through structure B taken at P – Q.

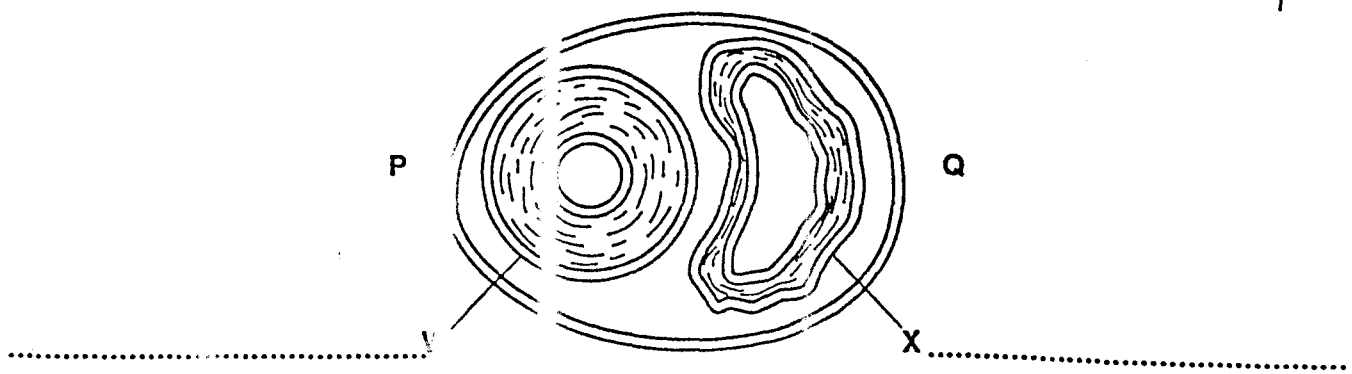


Fig. 1B

(i) On the diagram label W and X. [2]

For Examiner's Use

(II) With reference to structures **W** and **X**, state how they are involved in the nutrition, excretion and gaseous exchange of the fetus.

nutrition:

.....

.....

.....

excretion:

.....

.....

.....

gaseous exchange:

.....

.....

.....

[5]

2 Fig. 2A shows an experiment in which the coleoptiles (shoots) of similar seedlings have been treated in different ways.

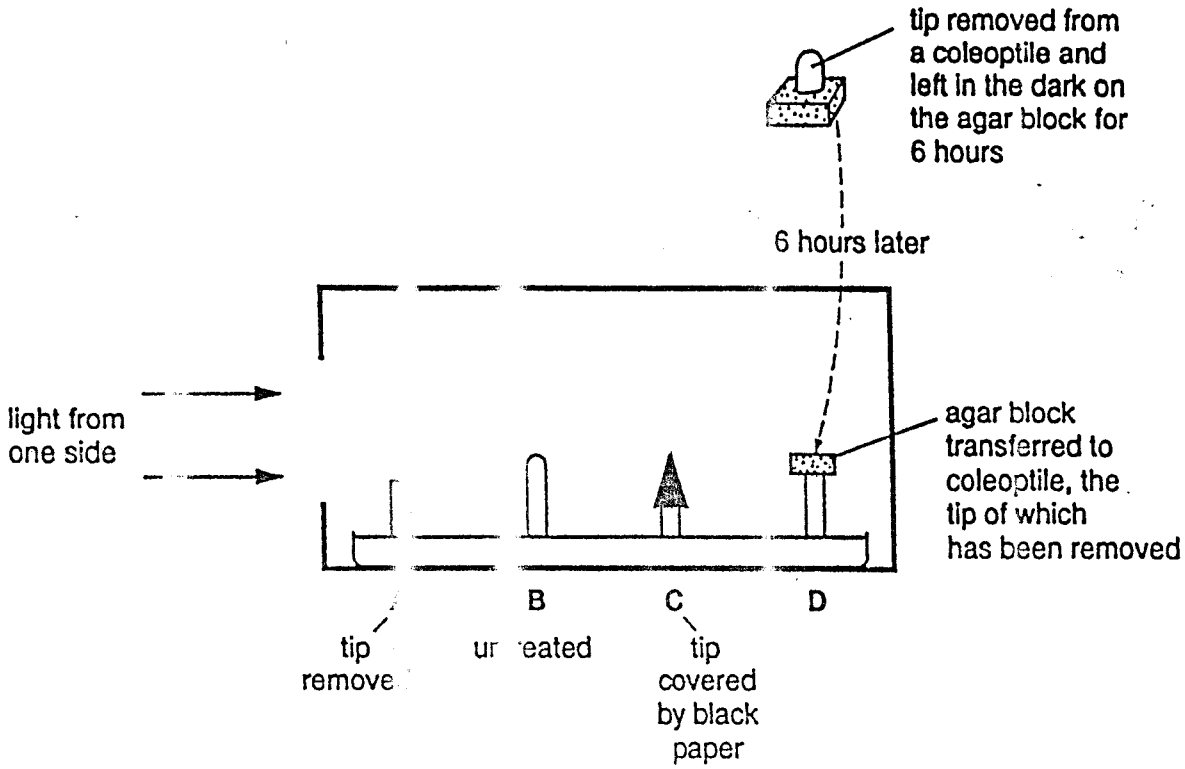


Fig. 2A

In Fig. 2B, the result in shoot D is shown 24 hours later.

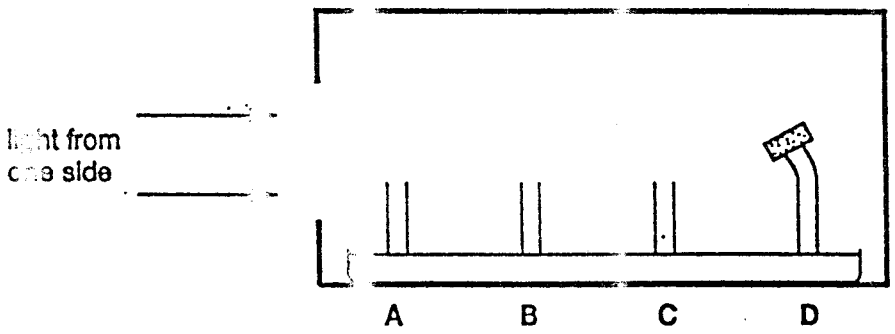


Fig. 2B

(a) (i) Name the response shown by shoot D.

.....[2]

Examiner's Use

(ii) Explain what has caused this response.

.....

.....

.....

.....

.....[3]

(b) Complete Fig. 2B to show the likely results for shoots **A**, **B** and **C**. [3]

(c) (i) What name is given to the simple behavioural response shown by invertebrates to external stimuli?

.....[1]

(ii) Many invertebrates move towards damp and dark conditions when given a choice. Suggest how this response may help them to survive.

.....

.....

.....

.....

.....

.....[4]

For Examiner's Use

3 Fig. 3 shows models which demonstrate the actions of two different sets of muscles used during breathing in a mammal.

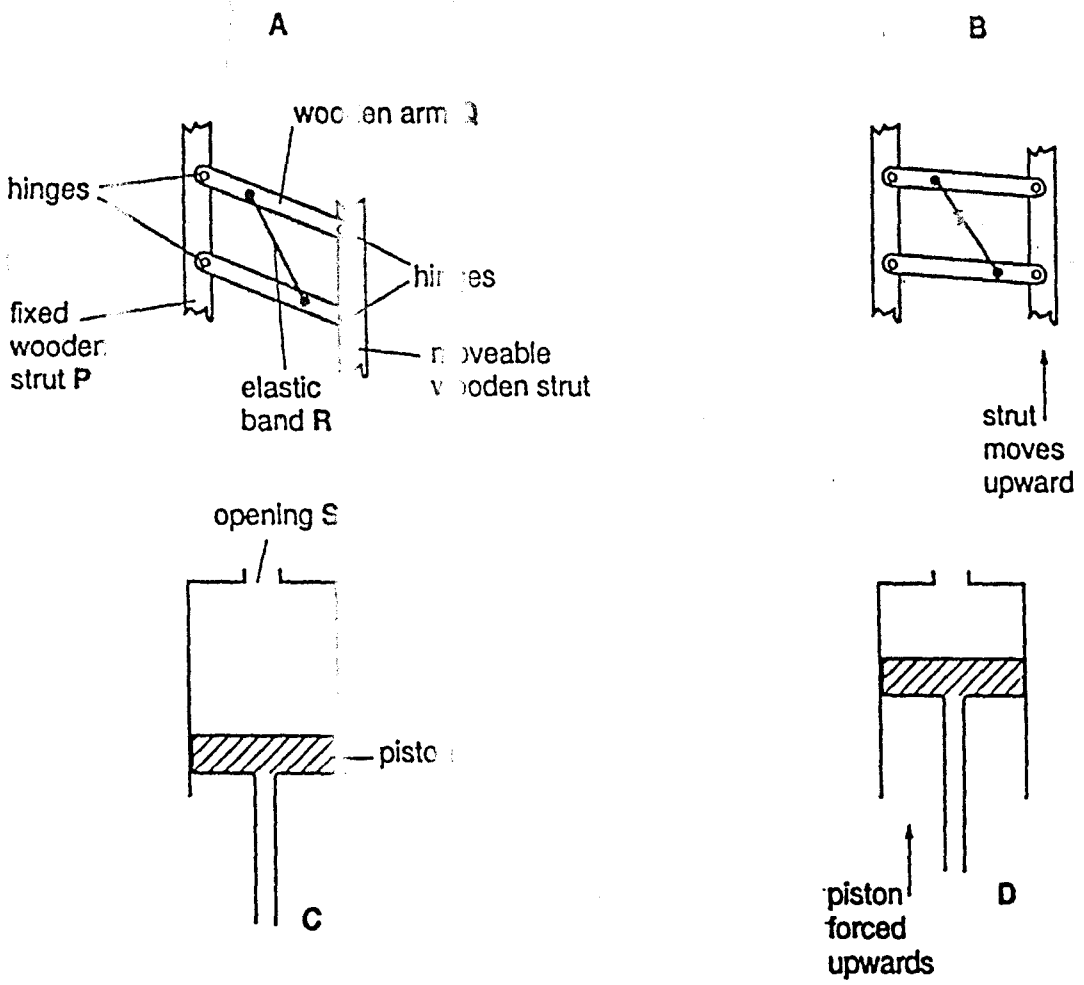


Fig. 3

(a) The action of which muscles is represented by

A and B? .....

C and D? .....

[2]

(b) Which two diagrams represent the thorax after breathing in?

1 .....

2. .....

[2]

(c) Which structures in the human thorax are represented by the following parts labelled on the models?

P .....

Q .....

R .....

S .....

[4]

(d) State three ways in which the model shown in C/D does **not** accurately represent the process of breathing in a mammal

1 .....

.....

.....

2 .....

.....

.....

3 .....

.....

.....

[3]

(e) (i) State where precise gaseous exchange takes place in the lungs.

.....[1]

(ii) List **three** features of this surface which help to make it efficient for gaseous exchange.

1 .....

2 .....

3 .....

[3]

Section B

Answer **two** questions from this section.

. 4A shows a section through part of a leaf.

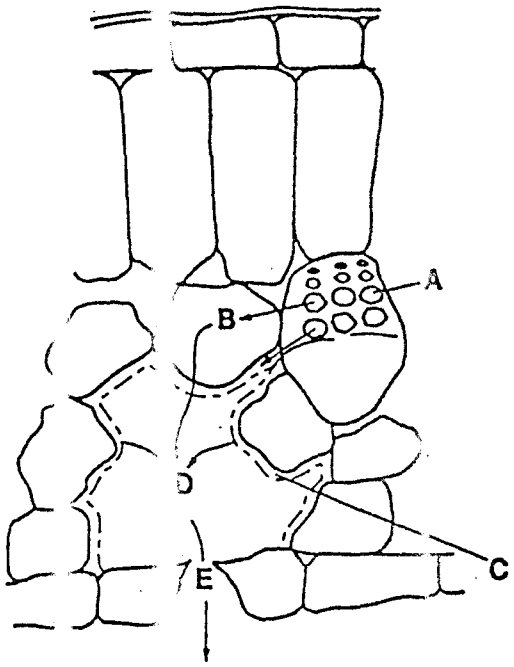


Fig. 4A

(a) Describe the process of water loss in this leaf. In your answer, you should identify and refer to the events occurring in all the lettered regions. [6]

Fig. 4B is a cross section through the leaf of a plant which grows in a sandy soil often lacking in water.

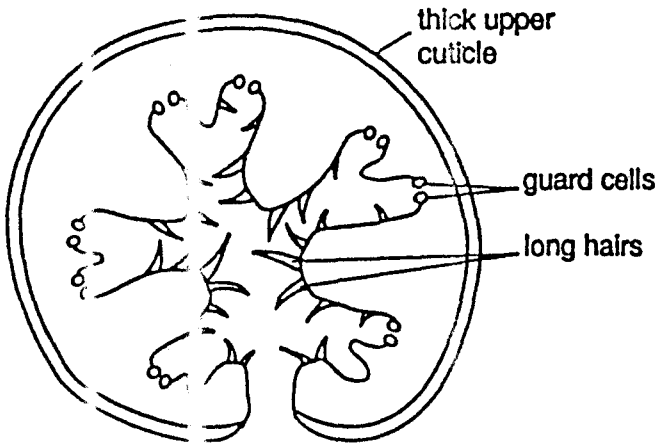
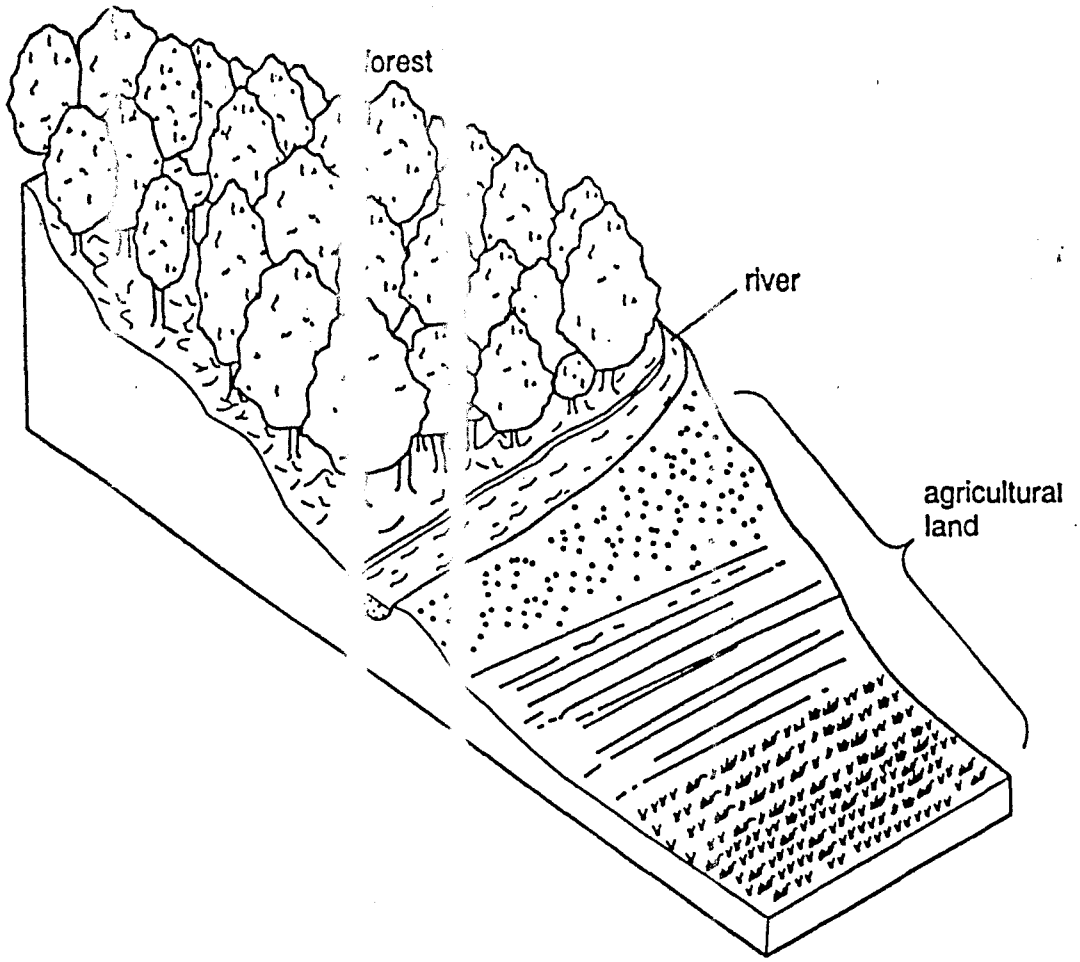


Fig. 4B

(b) With reference to the features shown, suggest how water loss is reduced in this plant. [5]

(c) State two external factors which may cause an increase in the rate of water loss from a plant. For each factor chosen, suggest why it causes an increase. [4]

5 Fig. 5 shows part of a forested slope.



(Source WWF Data Support Sheet No. 29)

Fig. 5

(a) What are the values of the forest to the agricultural land in terms of

(i) the water cycle;

(ii) the nitrogen cycle?

[5]

(b) What disadvantages might the local farmers experience if the forest were chopped down?

[4]

(c) What warnings and advice would you give to people who believe that chopping down trees is the best way to exploit the natural resource?

[6]

The followi processes are in lved i he movement of substances in a plant.

(a) *active nsport* [4]

(b) *diffusi* [3]

(c) *osmo* [4]

(d) *transp ation pull* [4]

For each p cess, explain the rm an describe how it is important to the plant.

(a) Defin the terms *tissue, gan* ar *organ system,* naming **one** example of each. [7]

(b) Expla how a sudden b ght ligl brings about a response in tissues in the iris of the eye. [8]

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Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY **0610/3**
PAPER 3

Wednesday 22 NOVEMBER 1995 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

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,
1 fasten the separate answer paper securely to the question paper;
2 enter the numbers of the Section B questions you have answered in the grid below.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.
You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 9 printed pages and 3 blank pages. 44

For Examiner's Use

Section A

Answer all the questions in this section.

1 Fig. 1 shows some organisms in the natural environment.

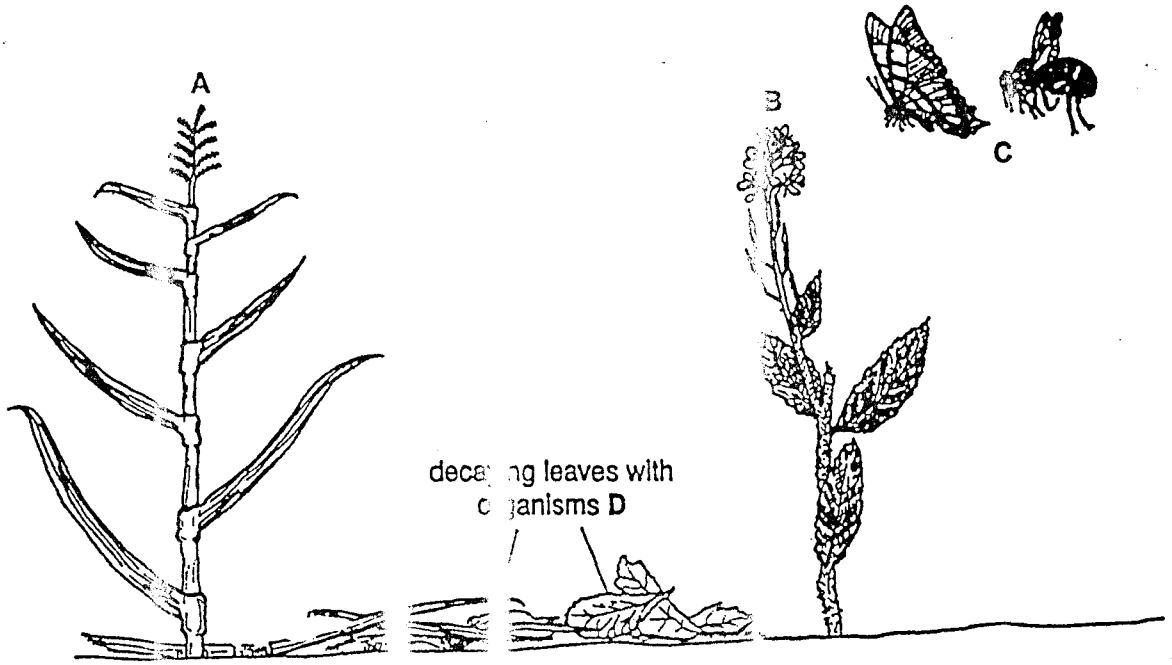


Fig. 1

(a) (i) A and B are two different flowering plants. To which group does each belong?

Plant A .....

Plant B ..... [2]

(ii) To which group of animal C belong?

..... [1]

(iii) State two visible features of organisms A, B and C which led you to your identification.

A 1 .....

2 .....

B 1 .....

2 .....

C 1 .....

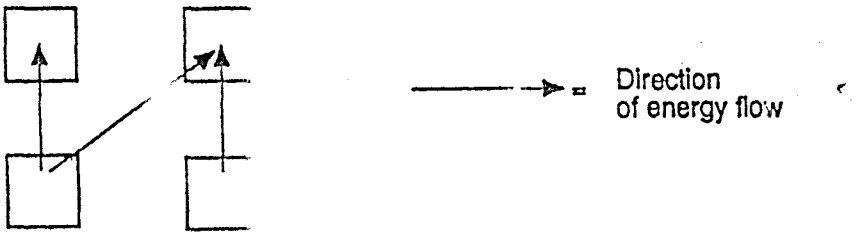
2 ..... [6]

For Examiner's Use

(b) Name one group of organisms responsible for the decaying of the leaves.

.....[1]

(c) Organisms A, B, C and D are linked in a simple food web. By placing letters in the boxes below, show how they are related.



[2]

(d) Name two mineral ions released by the decaying leaves. For each ion, state its function in a plant.

Mineral ion 1 .....

Function .....

.....

Mineral ion 2 .....

Function .....

.....

[2]

[Turn over

For Examiner's Use

2 Fig. 2A shows a section through the apparatus used in an experiment to investigate the behaviour of some small invertebrates.

Fig. 2B shows a surface view of the same apparatus.

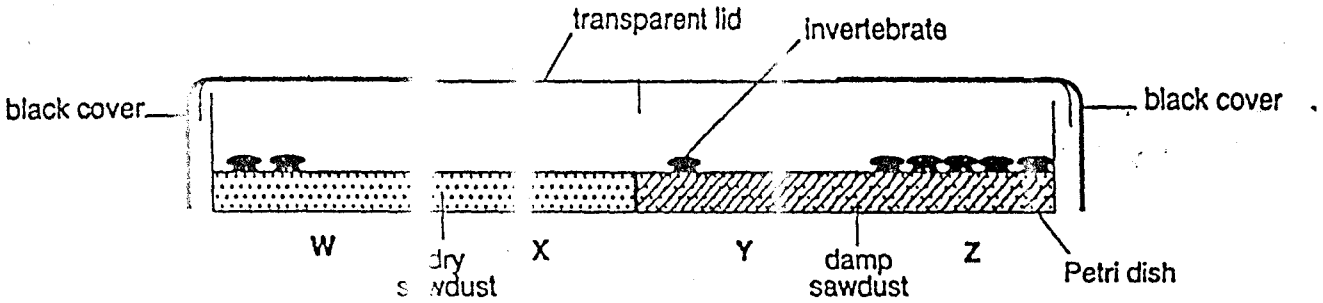


Fig. 2A

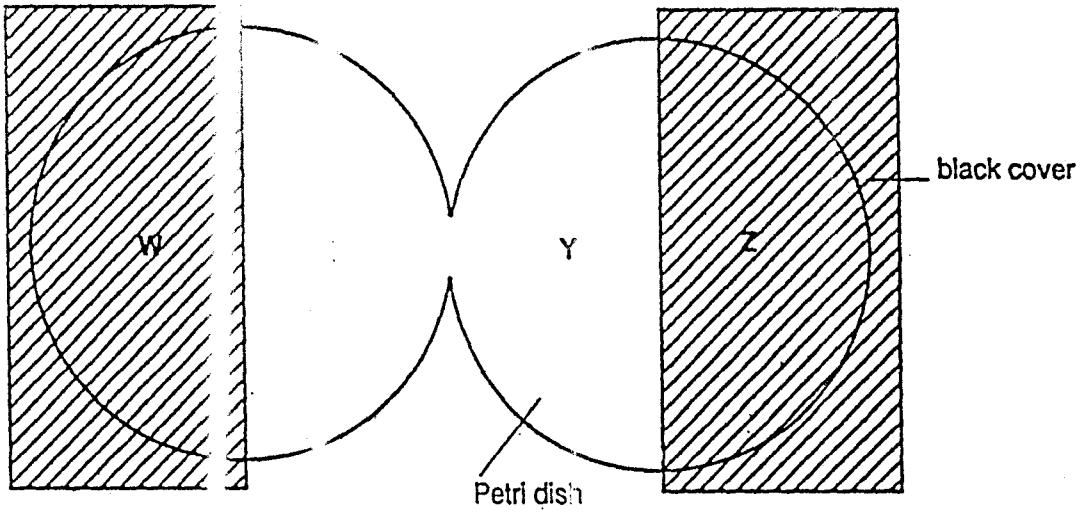


Fig. 2B

20 invertebrates were placed in the apparatus, left for 30 minutes, and then the numbers in each region were counted. The results are shown in the table opposite. This experiment was carried out five times.

For Examiner's Use

Experiment	Region			
	W	X	Y	Z
1	2	0	4	14
2	5	0	7	8
3	2	1	4	13
4	0	3	3	14
5	1	1	2	16
Average number				

(a) (i) Calculate the average number of animals in each region of the apparatus, to complete the table above. [2]

(ii) Explain why an average number is calculated in experiments of this type.

.....

.....[1]

(iii) Why were the animals left for 30 minutes before counting them?

.....

.....[1]

(b) Suggest which characteristic of living organisms is under investigation in this experiment.

.....[1]

(c) Describe the conditions in which

(i) most animals were counted .....[1]

(ii) least animals were counted .....[1]

(d) Suggest a habitat in which you might find these animals living naturally.

.....[1]

For Examiner's Use

3 Fig. 3 shows the carpel of flower after pollination has occurred.

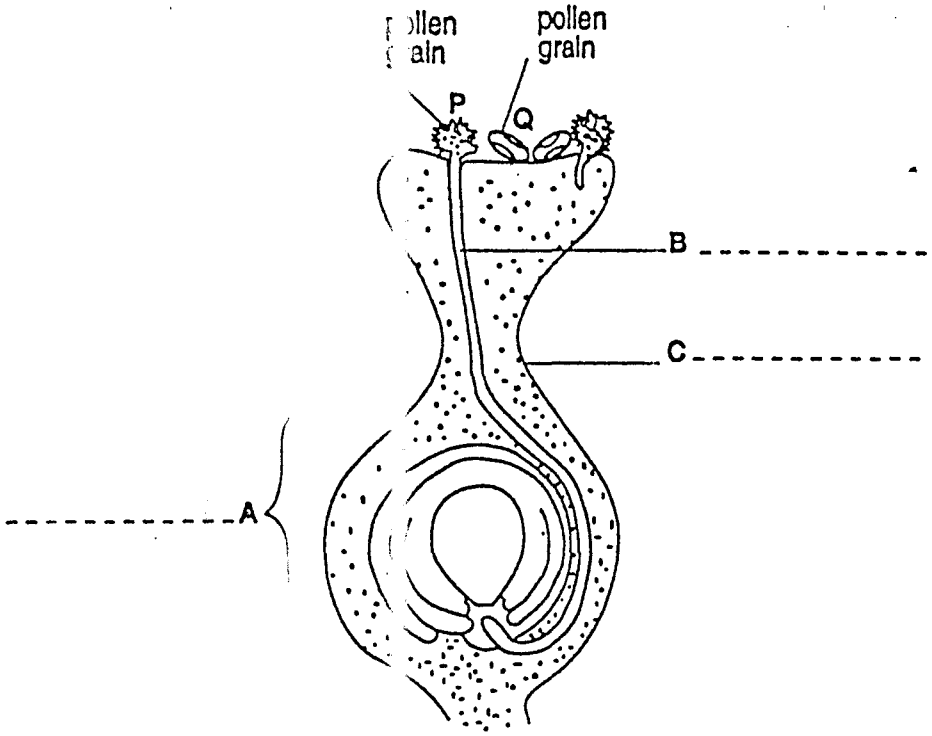


Fig. 3

(a) (i) On the diagram label structures A, B and C. [3]

(ii) Place an X on the diagram where a female gamete is found. [1]

(iii) What is the function of structure B?

.....[1]

(b) (i) Suggest how pollination is likely to have occurred in this flower. Give reasons for your answer.

.....

.....

.....

.....[2]

(ii) Suggest why pollen grains Q have not germinated.

.....[1]

For Examiner's Use

Fig.4 shows the average le gths of 2 different batches of seedlings. Batch A was grown in the dark and batch B was g own in he light.

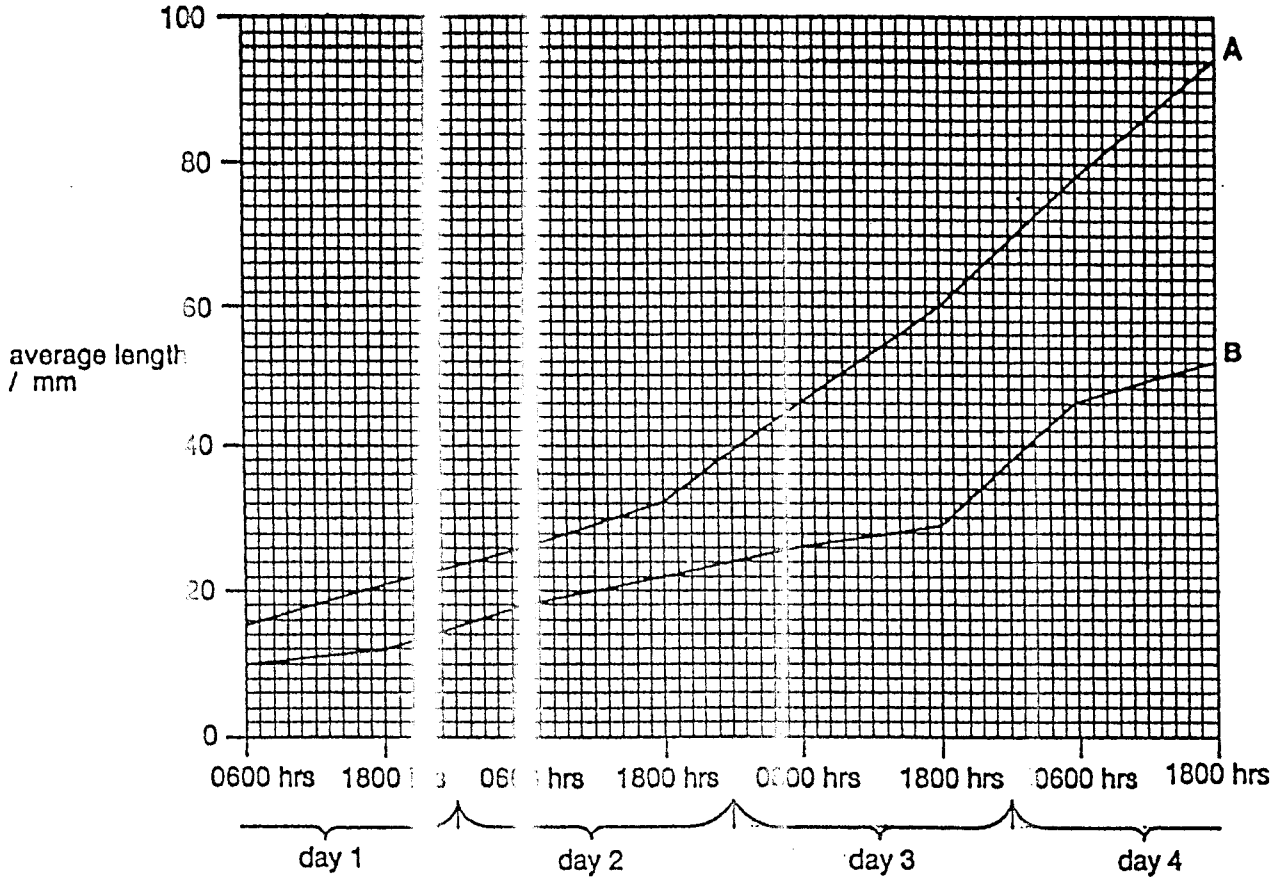


Fig. 4

(c) Use the graph to find he ave ge length of:

(i) batch A seedlin at 12 on on day 2; .....[1]

(ii) batch B seedlin at 12 on on day 3. .....[1]

(d) From the informatic in Fig 4, describe the effect of light on the growth of these seedlings.

.....

.....

.....

.....[2]

[Turn over

(e) State three conditions, other than light, which could affect the growth rate of these seedlings.

1 .....

2 .....

3 .....

[3]

(f) Explain, with reasons, what would happen eventually to the seedlings grown in the dark.

.....

.....

.....

.....

.....[3]

Section B

Answer **two** questions from this section.

4 (a) (i) What type of variation is illustrated by human blood groups?

(ii) State an example of a different type of variation and explain how it is brought about. [4]

(b) Explain, with a genetic diagram, how parents, neither of whom has blood group O, can have two children, one with blood group O and the other with blood group AB. In your diagram, use the symbols I^A, I^B and I^O to represent the alleles responsible for the human blood groups. [7]

(c) Explain how a child may be born with Down's syndrome. [4]

5 (a) Cancer and heart disease are two major causes of death. Explain how the following may contribute towards these diseases:

(i) smoking cigarettes;

(ii) eating an unbalanced diet. [8]

(b) Suggest why smoking is now widely regarded as a socially unacceptable habit. [3]

(c) Explain how dependency on drugs such as heroin, can lead to infection with the AIDS virus (HIV). [4]

6 (a) What is meant by the term *homeostasis*? [3]

(b) In what situations might a healthy person's blood glucose level be expected to

(i) rise,

and (ii) fall? [4]

(c) Explain how blood glucose is normally maintained at a more or less constant level. [8]

7 (a) (i) Explain, with named examples, how essential substances carried in the blood capillaries reach the cytoplasm of the body cells.

(ii) Describe the use of these substances in the cells. [10]

(b) Explain how the blood system carries a named waste product from the liver to the kidneys. [5]

M 1

Candidate Name _____ _____

Centre Number	Candidate Number

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

International General Certificate of Secondary Education

BIOLOGY 0610/3

PAPER 3

Thursday 6 JUNE 1996 Morning 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

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:

1 fasten the separate answer paper securely to the question paper;
2 enter the numbers of the Section B questions you have answered in the grid below.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.

You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 8 printed pages.

53

[Turn over

Examiner's Use

Section A

Answer all the questions in this section.

1 Fig. 1 shows a blood vessel (Q) linking a part of the alimentary canal (P) with an organ (R) in the abdomen.

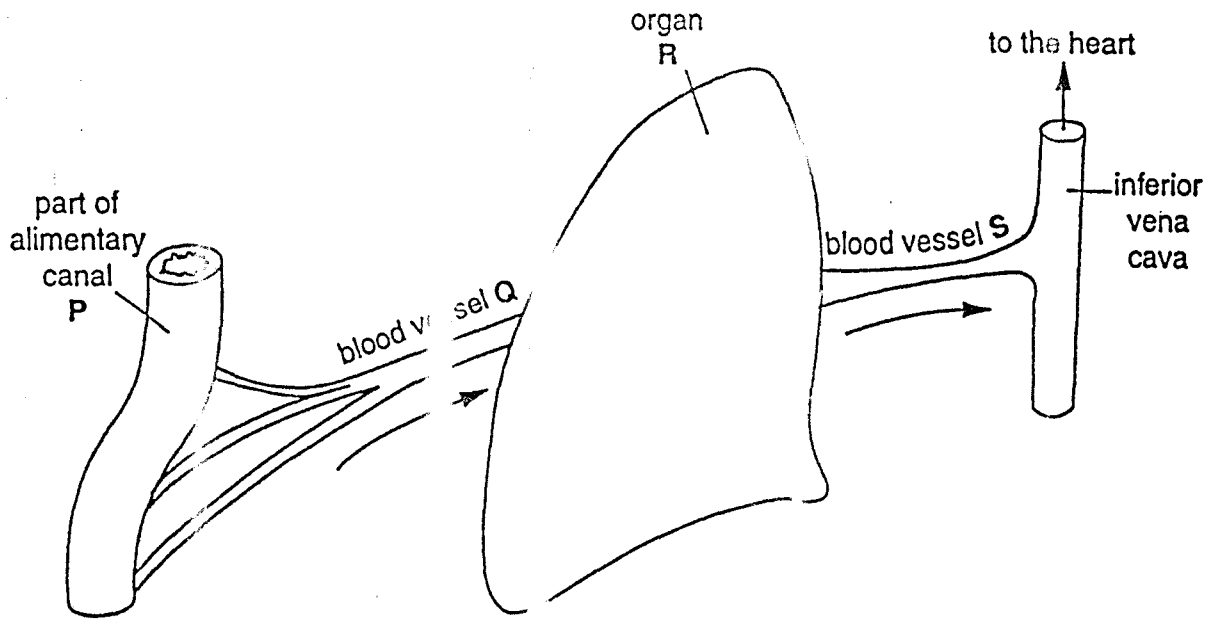


Fig. 1

(a) (i) Identify P, Q and R.

P .....

Q .....

R .....[3]

(ii) What type of blood vessel is S?

.....[1]

(b) State the changes in the composition of the blood in Q shortly after a meal has been eaten which contains protein and carbohydrate.

.....

.....

.....

.....[3]

An athlete is about to take part in a race.

(c) (i) How do the concentrations of materials in blood vessel S differ from those in blood vessel Q?

.....

.....

.....[2]

(ii) Explain how the differences in concentration of the materials have occurred.

.....

.....

.....[2]

Examiner's Use

2 A student wished to investig e the e fect of three different samples of water on the growth and reproduction of a water p ant.

Fig. 2A shows how each bea er was set up and Fig. 2B shows the results 3 weeks later.

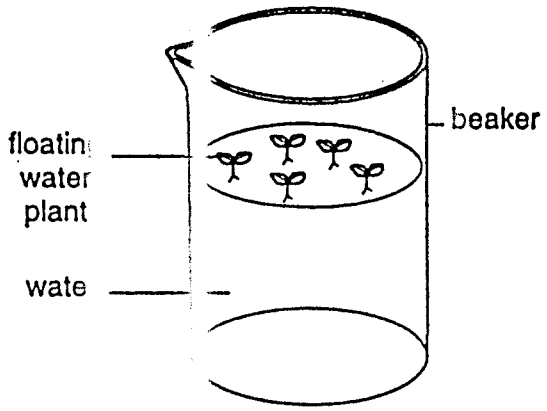


Fig. 2A

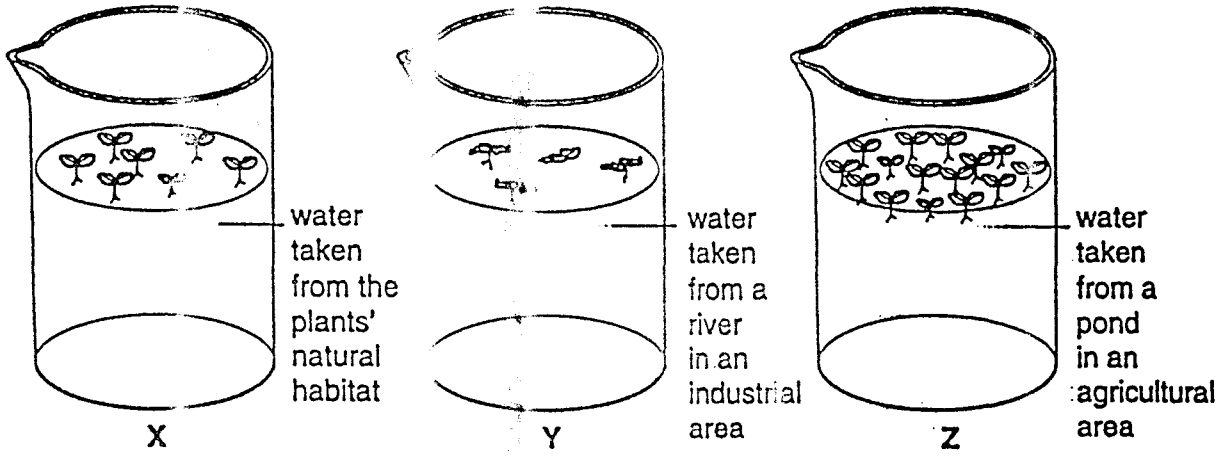


Fig. 2B

Beakers **X**, **Y** and **Z** we kept under identical conditions.

(a) State two conditions w ch sho ld be provided for all the plants.

1. .....

2. .....

[2]

(b) What is the purpose of eaker ?

.....[1]

(c) From the information s pplied, state the likely method of reproduction of the plant.

.....[1]

For Examiner's Use

(d) How do the plants obtain their mineral requirements?

.....

.....[2]

(e) Suggest explanations for the results in each of the beakers.

beaker X

.....

.....

beaker Y

.....

.....

.....

beaker Z

.....

.....

.....

[6]

[Total: 12]

Examiner's Use

3 (a) (i) What type of organism causes each of the following?

AIDS .....

Gonorrhoea .....

Syphilis .....[3]

(ii) Which of the above cannot be successfully treated with antibiotics?

.....[1]

Urine samples were taken from three different people, **L**, **M** and **N**. Each sample was tested for the presence of alcohol, glucose and protein. Table 1 shows the results obtained.

Table 1

person	*alcohol*	*glucose*	*protein*
L	✓	✗	✓
M	✓	✓	✗
N	✓	✗	✗

key:
✓ = present
✗ = absent

(b) (i) Which person is likely to be producing insufficient insulin?

.....[1]

(ii) Explain your answer.

.....

.....

.....[2]

(c) (i) Suggest which person might be suffering from kidney disease.

.....[1]

(ii) Explain your answer.

.....

.....

.....

.....[3]

For Examiner's Use

(d) Figs 3A and 3B show the effects of two diseases caused by dietary deficiency.

Fig. 3A

Fig. 3B

Complete the table below by

(i) identifying each disease;

(ii) stating which constituent was lacking in the diet;

(iii) naming a food which could have prevented the disease.

	disease	*constituent*	*food*
Fig. 3A			
Fig. 3B			

[6]

[Total: 17]

Section B

Answer two questions from this section.

Use labelled or annotated diagrams if they help to make your answer more easily understood.

4 (a) (I) For a named fruit or seed, describe how its external features adapt it for wind dispersal.

(II) What are the advantages and possible disadvantages of fruit (or seed) dispersal to a plant species?

[8]

(b) List the environmental conditions which affect the germination of seeds. For each condition listed, suggest why it is important for germination. [7]

5 Distinguish clearly between the following pairs of terms.

(a) *ovary* and *ovule* [4]

(b) *ureter* and *urethra* [4]

(c) *testa* and *testis* [4]

(d) *fertilisation* and *pollination* [3]

6 Fig. 4 shows a section through an eye.

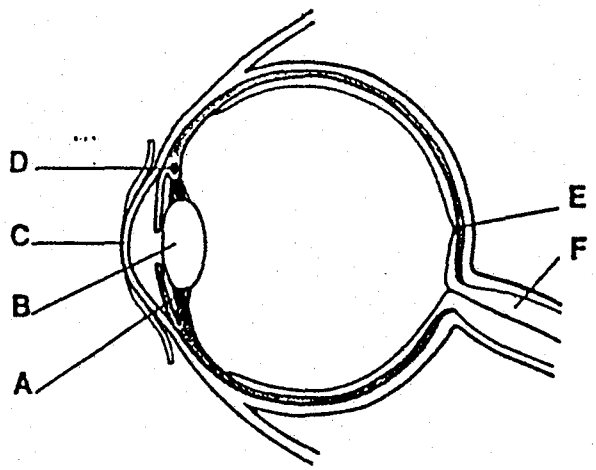


Fig. 4

(a) Explain what happens in the eye when a person reads the words on the page of a book. Your answer should refer to, and identify, structures A to F on the diagram. [12]

(b) Suggest why it is an advantage to have two eyes instead of one. [3]

7 (a) List the main characteristics of (I) a fungus, and (II) a virus. [8]

(b) Describe how (i) bread, and (ii) yoghurt are manufactured [7]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

Wednesday 20 NOVEMBER 1996 Morning 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

Section A

Answer all questions.

Write your answers in the spaces provided on the question paper.

Section B

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INFORMATION FOR CANDIDATES

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You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

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[Turn over

For Examiner's Use

Section A

Answer all the questions in this section.

1 Fig. 1 shows the flow of energy through part of a food chain.

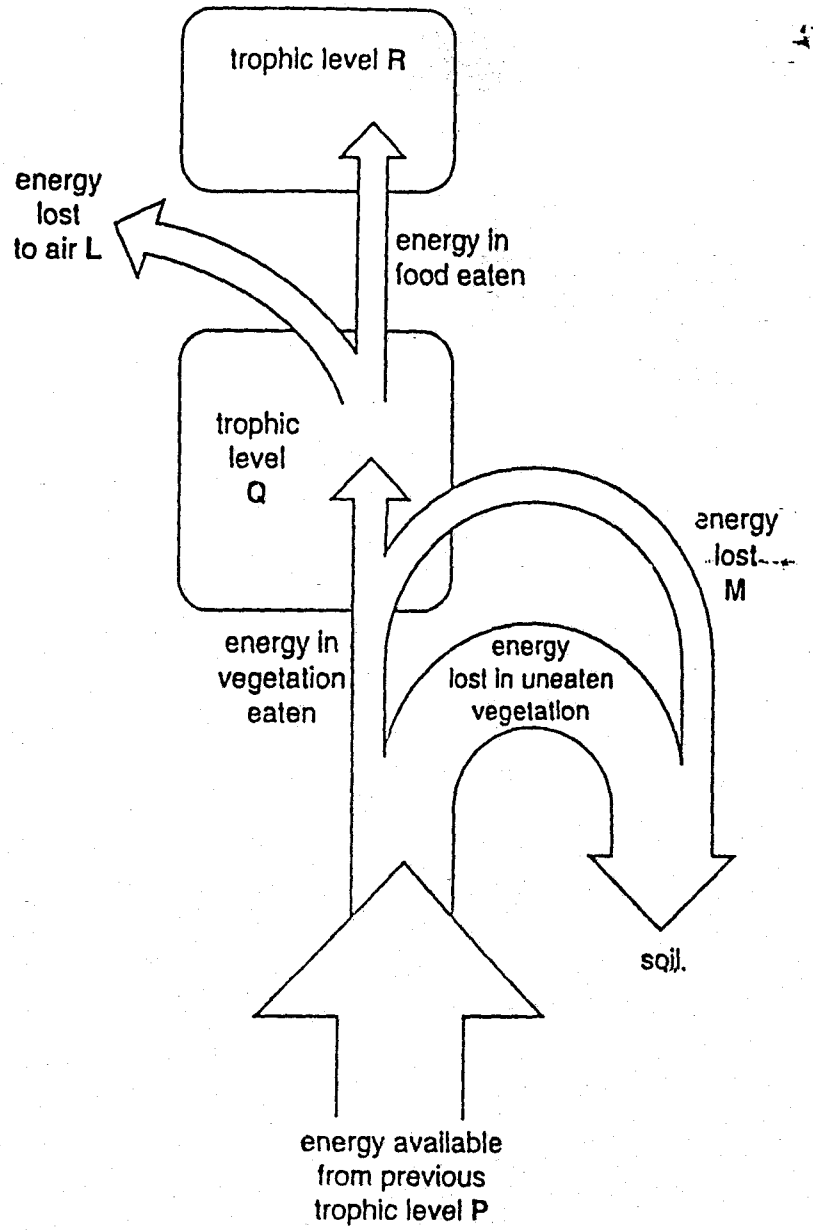

Fig. 1

(a) Name trophic levels R and Q.

R .....

Q .....

[2]

For Examiner's Use

(b) (i) State three possible uses of energy by the organisms in trophic level Q.

1. .....

2. .....

3. .....

[3]

(ii) What processes are likely to be responsible for the losses of energy at L and at M?

L .....

M .....

[2]

(c) (i) In what form does the energy pass from trophic level P to trophic level Q?

.....[1]

(ii) Explain briefly how energy enters the food chain at trophic level P.

.....

.....

.....

.....[3]

For Examiner's Use

Fig. 2 shows a person taking part in an experiment on the eye's response to light. The lamp was placed at different positions on the line A – B.

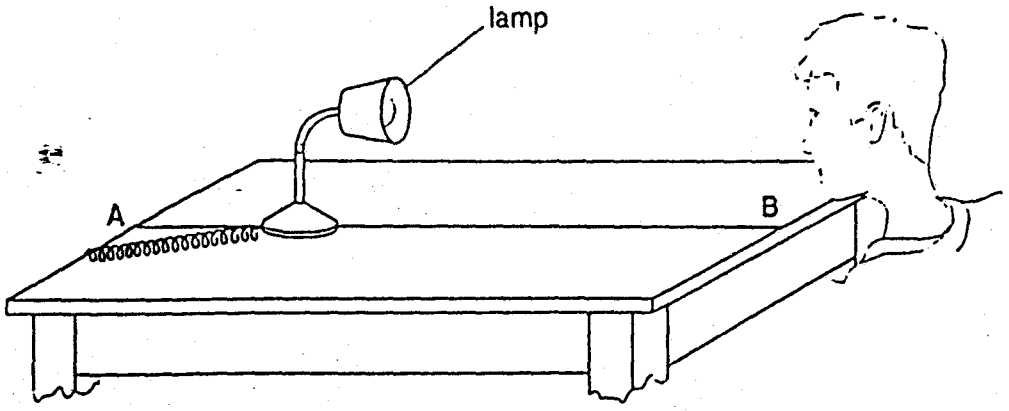

Fig. 2

Table 1 shows the diameter of the person's pupil when the light was placed at seven different positions.

Table 1

position of lamp	*diameter of pupil*/mm
1	3.1
2	4.0
3	4.5
4	4.9
5	3.8
6	2.4
7	1.7

(a) In which position was the lamp furthest from the eye?

.....[1]

(b) Explain what is happening in the iris of the eye as the lamp moves from position 1 to position 2.

.....

.....

.....

.....[4]

(c) (i) What type of response is being shown by the eye?

.....[1]

(ii) How does this response benefit the eye?

.....

.....

.....[2]

3 Fig. 3A shows a section through a flower, and Fig. 3B shows a fruit of the same plant.

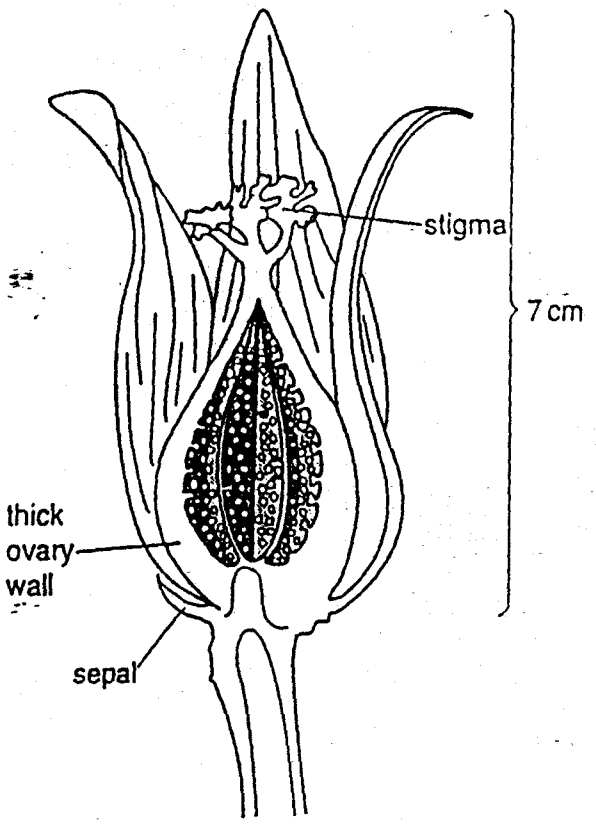

Fig. 3A

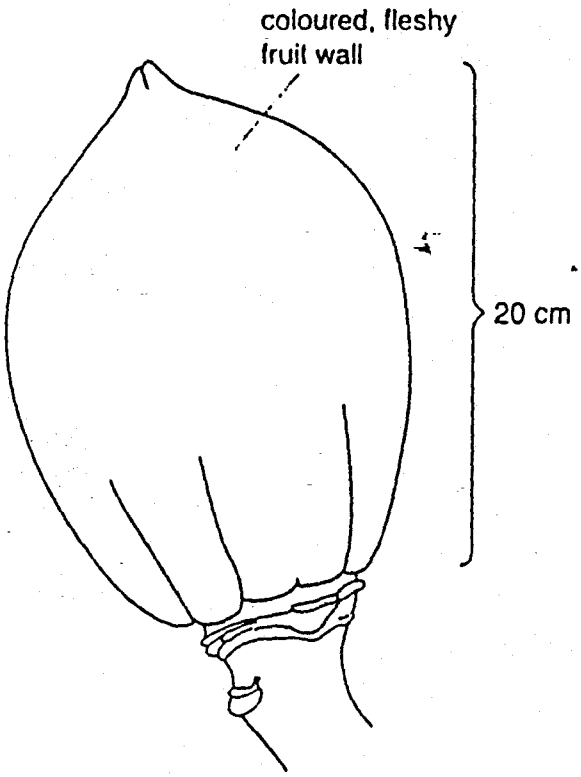

Fig. 3B

(a) (i) Use the information in Fig. 3A to suggest the most likely method of pollination.

.....[1]

(ii) State **two** reasons for your answer.

1. .....

2. .....

[2]

(b) Explain why this flower cannot be self-pollinated.

.....

.....

.....[2]

(c) (i) Suggest the most likely method of seed dispersal in this plant.

.....[1]

(ii) Complete the table below, stating two features of the fruit and the role each feature plays in the method of dispersal you have suggested in (i).

	feature	*role*
1		
2		

[2]

The lengths of 250 of these fruits were measured. The ranges in length are shown in Table 2.

Table 2

range in length/cm	*number of fruits*	*range in length/cm*	*number of fruits*
under 15.0	3	19.5 – 19.9	22
15. 0 – 15.4	3	20.0 – 20.4	22
15.5 – 15.9	5	20.5 – 20.9	24
16.0 – 16.4	6	21.0 –21.4	21
16.5 – 16.9	8	21.5 – 21.9	18
17.0 – 17.4	8	22.0 – 22.4	17
17.5 – 17.9	10	22.5 – 22.9	15
18.0 – 18.4	11	23.0 – 23.4	11
18.5 –18.9	15	23.5 – 23.9	8
19. 0 – 19.4	20	24.0 and over	3

(d) (i) What is the commonest range in length of the fruits?

.....[1]

(ii) What type of variation is shown by these fruits?

.....[1]

For Examiner's Use

Both environmental and non-environmental factors could be responsible for the variation in the fruits.

(e) State

(i) **three** environmental factors;

1. .....

2. .....

3. .....

[3]

(ii) **one** non-environmental factor.

.....

[1]

4 Fig. 4 shows a leguminous plant (bean) and a non-leguminous plant (grass) growing side by side in a field.

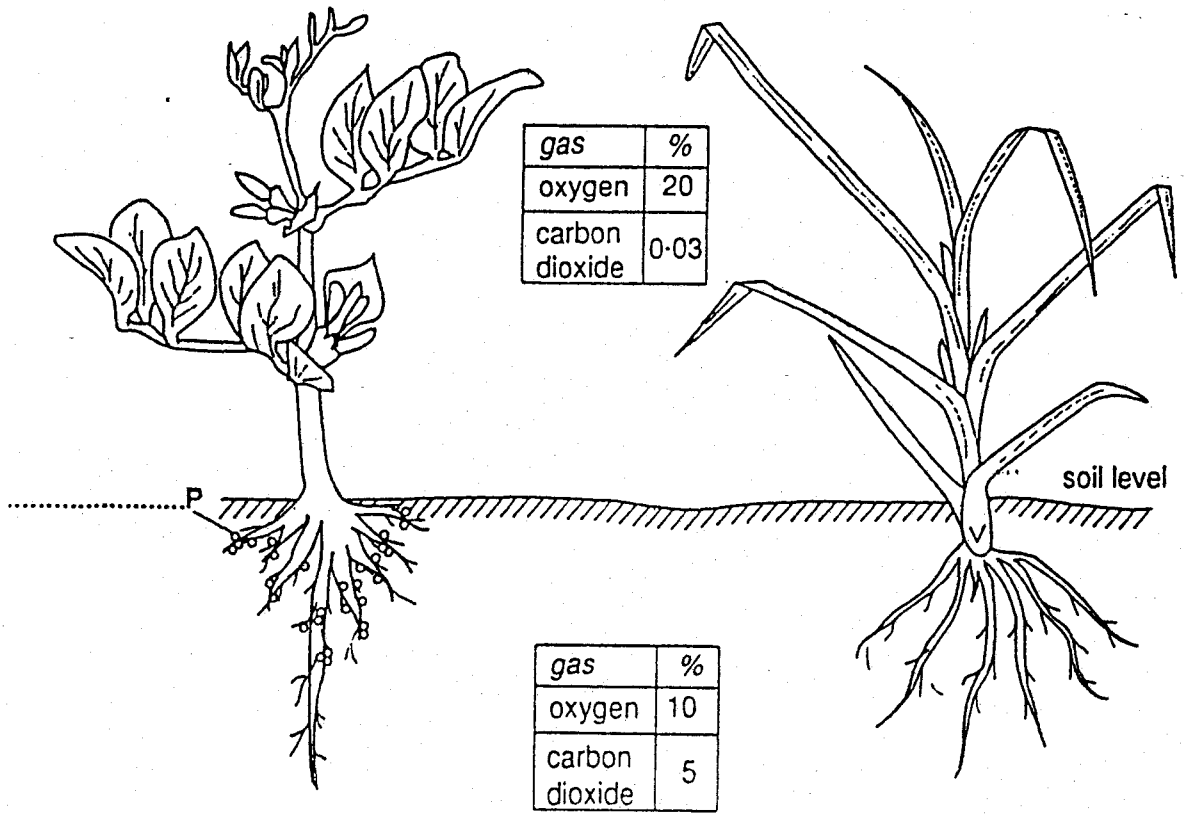

Fig. 4

(a) (i) On the diagram, label structure P. [1]

(ii) Structure P contains organisms. To which group do they belong?

.....[1]

The tables in Fig. 4 show the percentages of carbon dioxide and oxygen in the air above and below the soil during the day.

(b) Account for the differences in percentages of each of the gases above and below the soil.

carbon dioxide

.....

.....

.....

oxygen

.....

.....

.....

[4]

(c) Which important molecules in plants are made using nitrate absorbed from the soil?

.....[1]

Section B

Answer two questions from this section.

5 (a) Explain

(i) how, during strenuous exercise, the human body temperature rises;

(ii) how the body temperature returns to normal when the exercise is over.

[8]

(b) Account for the effect of exercise on

(i) the breathing rate;

(ii) the pulse rate.

[7]

6 (a) (i) What do the chemical structures of carbohydrates and fats have in common?

(ii) How do their chemical structures differ?

[4]

(b) Explain

(i) how protein stored in a named seed is used by the embryo plant during germination;

(ii) how molecules of urea are produced from food protein.

7 (a) Describe and explain how water moves

(i) into a plant root;

(ii) from the root into the stem;

(iii) from a leaf to the atmosphere.

[12]

(b) What are the functions of water in a plant? [3]

8 Fig. 5 shows a ventral (front) view of the human heart.

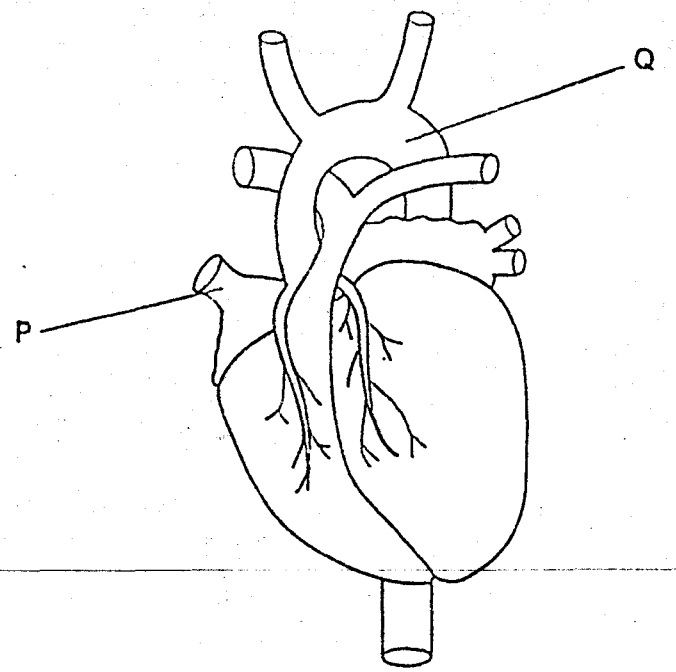

Fig. 5

(a) Describe and explain the flow of blood through the heart from the time that it arrives at P to the time that it leaves at Q. [12]

(b) Explain the relationship between blood and tissue fluid. [3]

The University of Cambridge Local Examinations Syndicate gratefully acknowledges the contribution made by the following to the preparation of this question paper:

Section A Fig. 1 *Biological Sciences Review*, Vol. 6 (Philip Allan Publications, 5 May 1994).
Section A Figs. 3A & 3B D.G. MACKEAN, *Introduction to Biology – Tropical Edition* (John Murray, 1962).

Centre Number	Candidate Number

Candidate Name ____________________

[redacted]

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

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Section A

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INFORMATION FOR CANDIDATES

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You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 10 printed pages and 2 blank pages.

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For Examiner's Use

Section A

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

1 (a) State **three** conditions necessary for the germination of most seeds.

1. .....

2. .....

3. ..... [3]

A student carried out an experiment on the direction of growth of the root of a germinating seed and the shoot of a seedling. Fig. 1a shows the experiment when first set up. The electric motors slowly turn the cork base and the plant pot. Fig. 1b shows the experiment after two days. The root and shoot received the same amount of light from all directions.

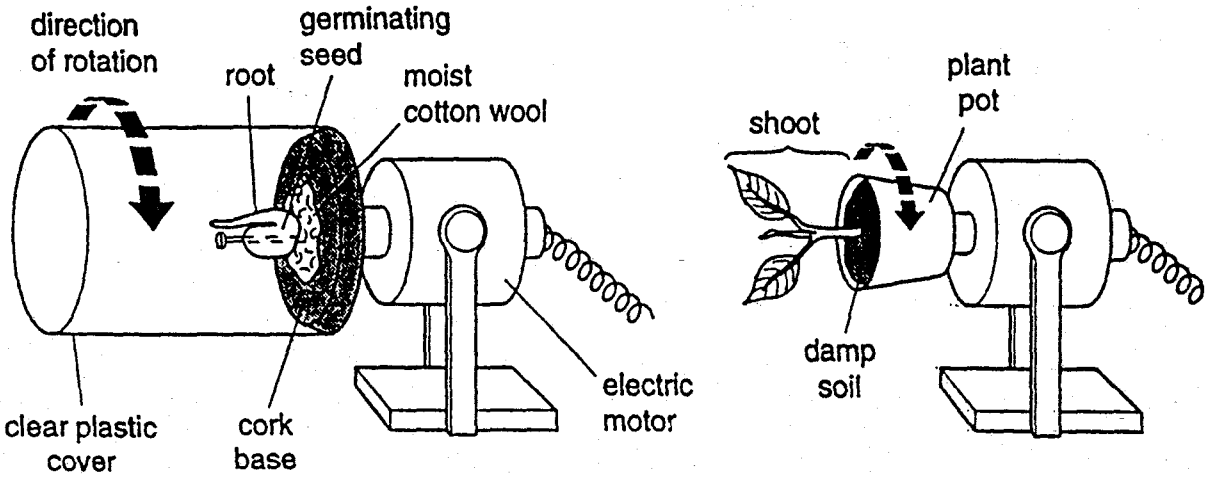


Fig. 1a

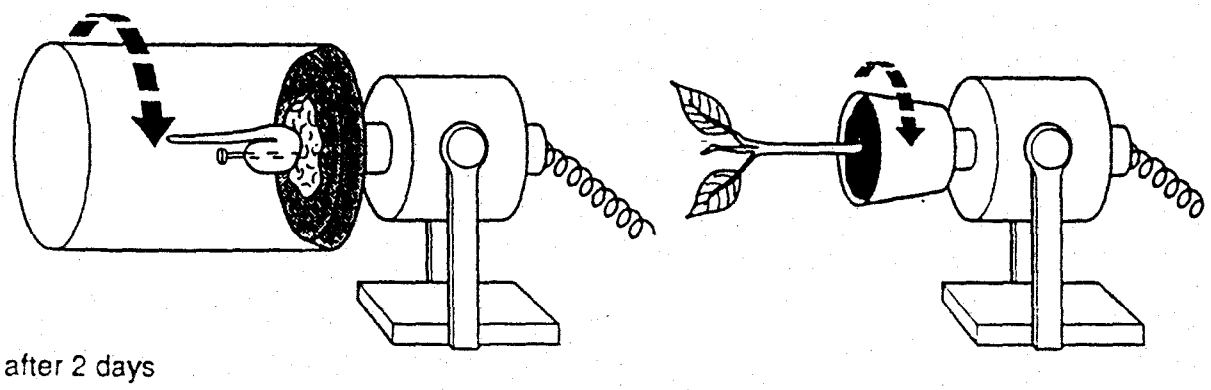


Fig. 1b

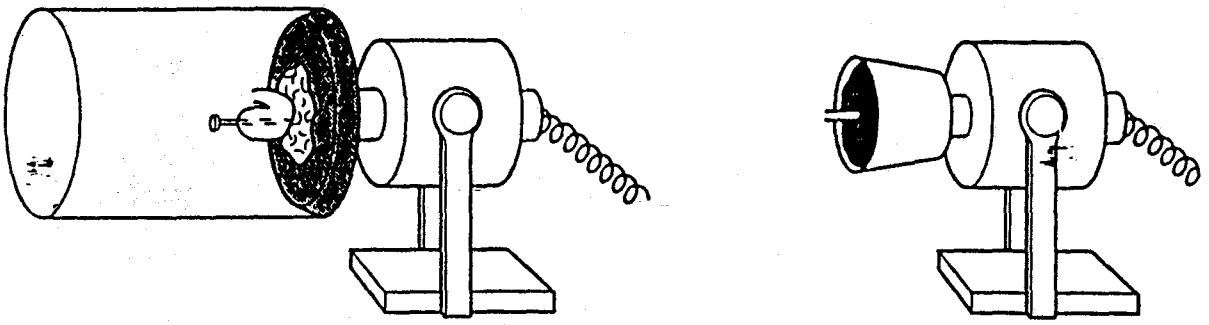
(b) Suggest why a clear plastic cover was provided for the root but not for the shoot.

.....

..... [1]

For Examiner Use

(c) (i) Complete the diagram below to show how the root and shoot would appear 24 hours **after the motors were switched off.**



[2]

(ii) Name the responses shown by the root and the shoot that you have drawn and explain how the responses have come about.

Root response .....

Explanation .....

.....

Shoot response .....

Explanation .....

..... [4]

(iii) Suggest why these responses were **not** shown in Fig. 1b.

.....

.....

..... [1]

2 Fig. 2 shows the changes in the size of a population of producers and of a population of consumers in a lake over several months.

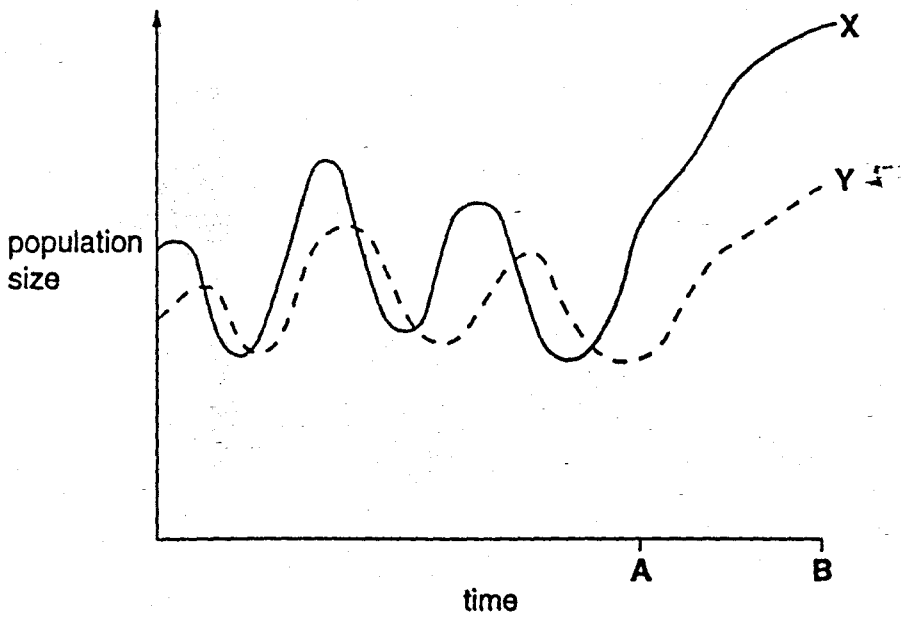


Fig. 2

(a) Name the process by which the producers manufacture their carbohydrates.

..... [1]

(b) Which curve, **X** or **Y**, represents the consumers? Explain your answer.

Consumers .....

Explanation .....

..... [2]

The change in population size of the producer between time **A** and time **B** was the result of farming around the lake.

(c) Suggest how the farming methods may have caused this change.

.....

.....

..... [3]

A Biologist studying the lake several weeks after time **B**, found that the size of both populations had fallen greatly, whilst the numbers of bacteria were very high.

(d) Suggest how these changes may have been produced.

.....

.....

.....

..... [3]

3 Fig. 3 shows the reproductive organs of a woman.

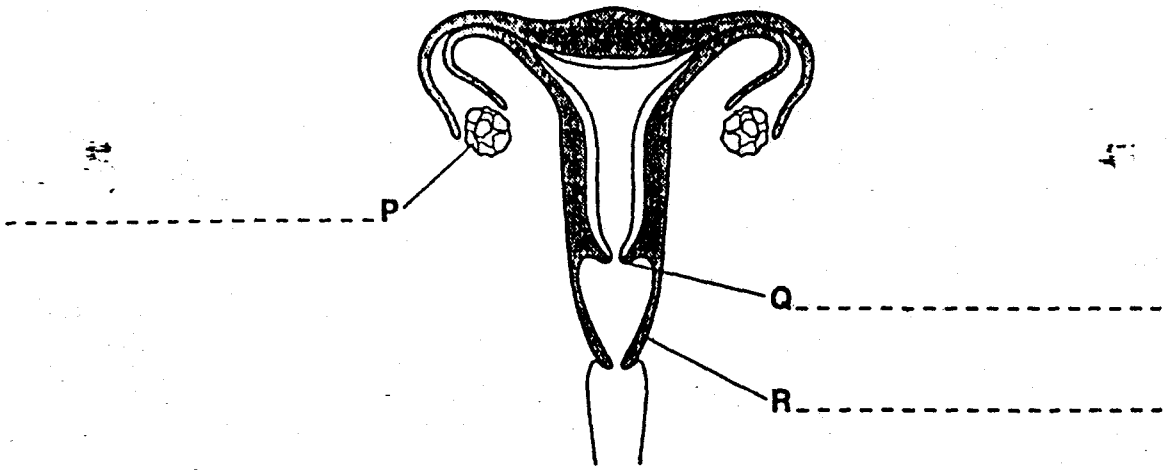


Fig. 3

(a) Label parts **P**, **Q** and **R**. [3]

(b) What feature shown on Fig. 3, might indicate that this woman is infertile? Explain your answer.

Feature .....

Explanation .....

.....

..... [2]

This woman's infertility could be overcome by fertilising one of her ova (eggs) in a test-tube.

(c) (i) Place an **X** on Fig. 3 to show where the fertilised ovum should be implanted. [1]

(ii) Suggest **two** reasons why the fertilised ovum might be incubated for a few days, in a test-tube, before it is implanted.

1. .....

.....

2. .....

..... [2]

Fig. 4 shows the thickness of the uterus lining, and the level of progesterone in the blood, at different times in the woman's menstrual cycle. High levels of the hormone progesterone in the blood are needed to keep a thick spongy lining in the uterus.

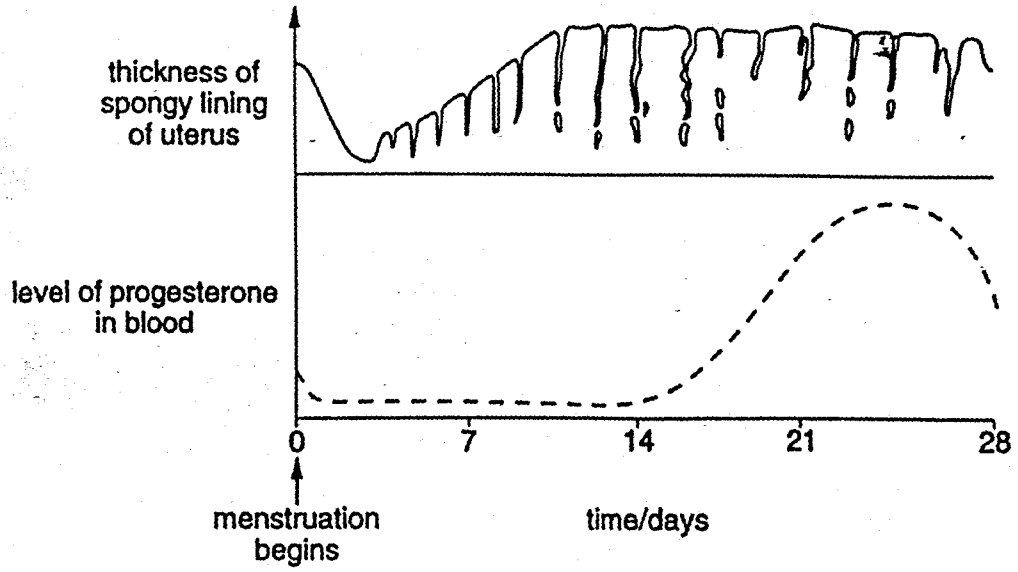


Fig. 4

(d) Using the information provided in Fig. 4, suggest a time when implantation would be likely to be most successful. Explain your answer.

Time for implantation .....

Explanation .....

..... [2]

4 Seventy seeds were collected from a cross between two plants of the same species. The seeds were sown at the same time and, after three weeks, the heights of the plants which grew were measured and found to fall into two groups, **A** and **B**, as shown in Fig. 5.

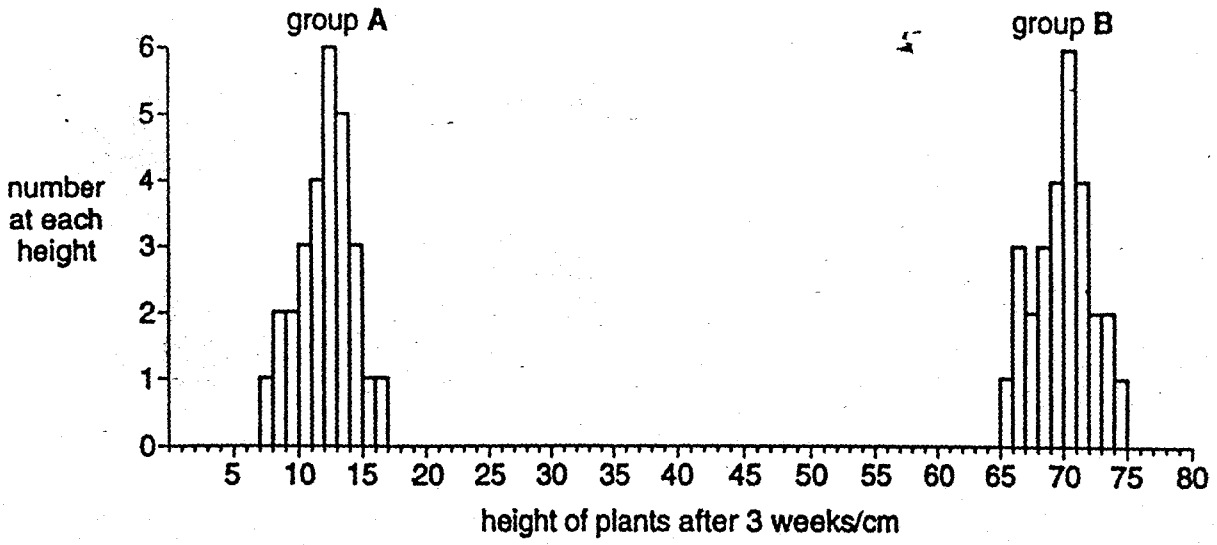


Fig. 5

(a) Calculate the percentage of seeds which germinated. Show your working.

% = ... [2]

(b) (i) Name the type of variation shown **within each group.**

..... [1]

(ii) State **three** factors which might have caused this variation.

1. .....

2. .....

3. ..... [3]

When the plants in Group B flowered, they were allowed to self-pollinate. 526 seeds were collected and sown. The heights of the resulting plants are given in Table 1.

Table 1

range in height	*number in that range*
7 cm – 16 cm	127
65 cm – 74 cm	394

All plants in group B contain at least one dominant allele, (T), for tallness.

(c) Using suitable symbols, complete the genetic diagram to explain the results obtained in Table 1.

genotype of group B *plants* _____ x _____

gametes _____ _____ _____ _____

genotypes of offspring _____ _____ _____ _____

phenotypes of offspring _____ _____ _____ _____

[4]

Section B

Answer **two** questions from this section.

5 **(a)** By means of a table, compare the structure of a palisade cell with that of a liver cell.

(b) Describe the function of each part of the palisade cell.

6 **(a)** Name the waste products of metabolism and, for each waste product, state which or removes it from the blood.

(b) Outline how a kidney dialysis machine works.

(c) Why is the removal of faeces from the alimentary canal **not** considered to be excretion?

7 **(a)** Describe how you would carry out an experiment to show the effect of varying th temperature on the rate of an enzyme-controlled reaction. [9

(b) Explain why starch digestion, started in the mouth, ceases when food reaches the stomach. [3]

(c) Explain why food is chewed before it is swallowed. [3]

8 **(a)** Construct a table to show the main differences between monocotyledonous and dicotyledonous plants. [5]

(b) For a **named** food plant with a storage organ, describe how the food travels from where it is made to the cells where it is stored. [5]

(c) Using **named** examples, explain how plants form a valuable part of a healthy diet. [5]

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Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

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FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of [illegible] printed pages and [illegible] blank page

Section A

Answer all the questions in this section.

1 Fig. 1 shows a short length of a blood vessel.

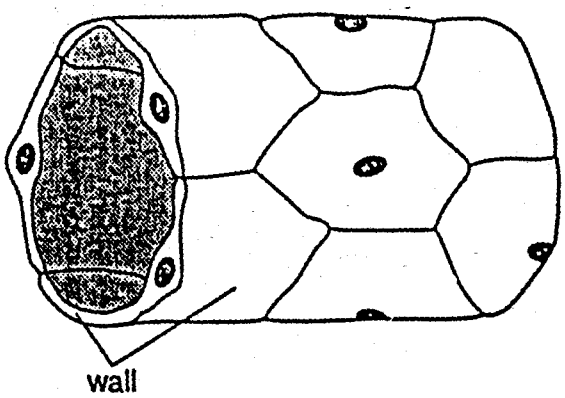

Fig. 1

(a) (i) Which type of blood vessel is shown in Fig. 1?

..... [1]

(ii) Explain how the wall is suited to the functions of this blood vessel.

.....

.....

..... [2]

Fig. 2 shows the pressure of the blood as it completes one circulation of the body (excluding the lungs).

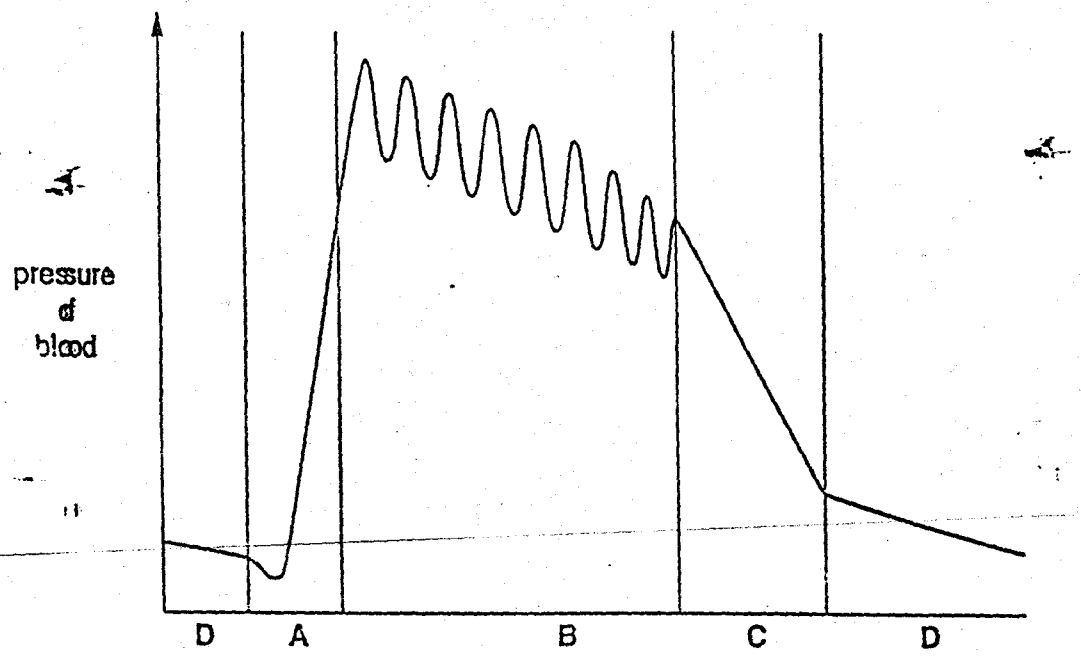

Fig. 2

(b) State which labelled section of the graph shows the pressure of the blood as it passes through

arteries; .....

veins; .....

capilaries; .....

the heart. ..... [4]

(c) Suggest why the blood pressure in the pulmonary artery is not as high as that in the aorta.

..... [1]

(d) Explain how blood pressure might be affected by eating foods rich in animal fats and cholesterol.

.....

.....

.....

..... [2]

[Total : 10]

For Examiner's Use

2 Fig. 3 shows a seed which has just been planted and stages in the growth of the seedling.

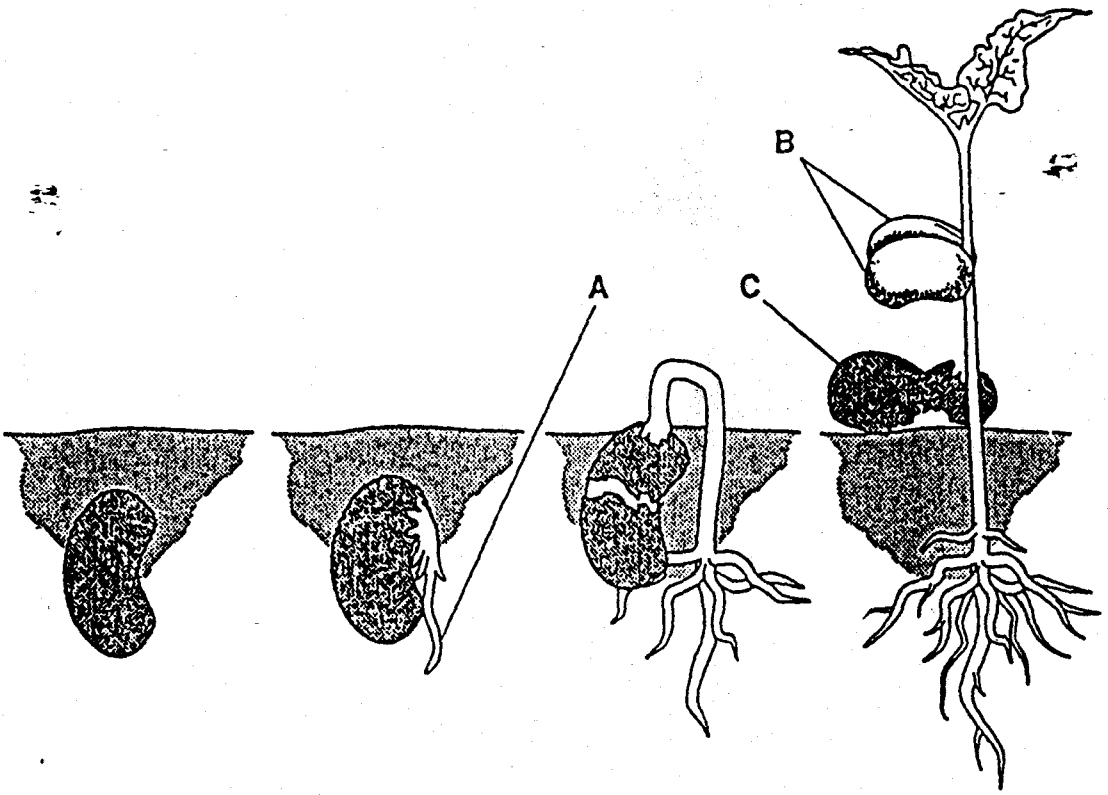

Fig. 3

(a) Name structures A, B, and C.

A .....

B .....

C ..... [3]

(b) State the term which describes the changes occurring between stage 1 and stage 2.

..... [1]

Table 1 shows the total mass and the amounts of starch and sugar present at each stage.

Table 1

	total mass/g	*starch content/g*	*sugar content/g*
stage 1	0.38	0.21	0.01
stage 2	2.55	0.16	0.04
stage 3	3.86	0.03	0.14
stage 4	5.92	0.19	0.01

(c) Explain

(i) the increase in total mass between stages 1 and 2;

.....

(ii) the change in the amount of starch between stages 2 and 3;

.....

.....

(iii) the change in the amount of starch between stages 3 and 4.

.....

[3]

(d) Suggest two reasons to account for the change in sugar content between stages 3 and 4.

1. .....

2. ..... [2]

[Total : 9]

Fig. 4 shows a pitcher plant, which has normal green leaves as well as leaves modified to form pitchers. A pitcher plant makes carbohydrates in the usual way.

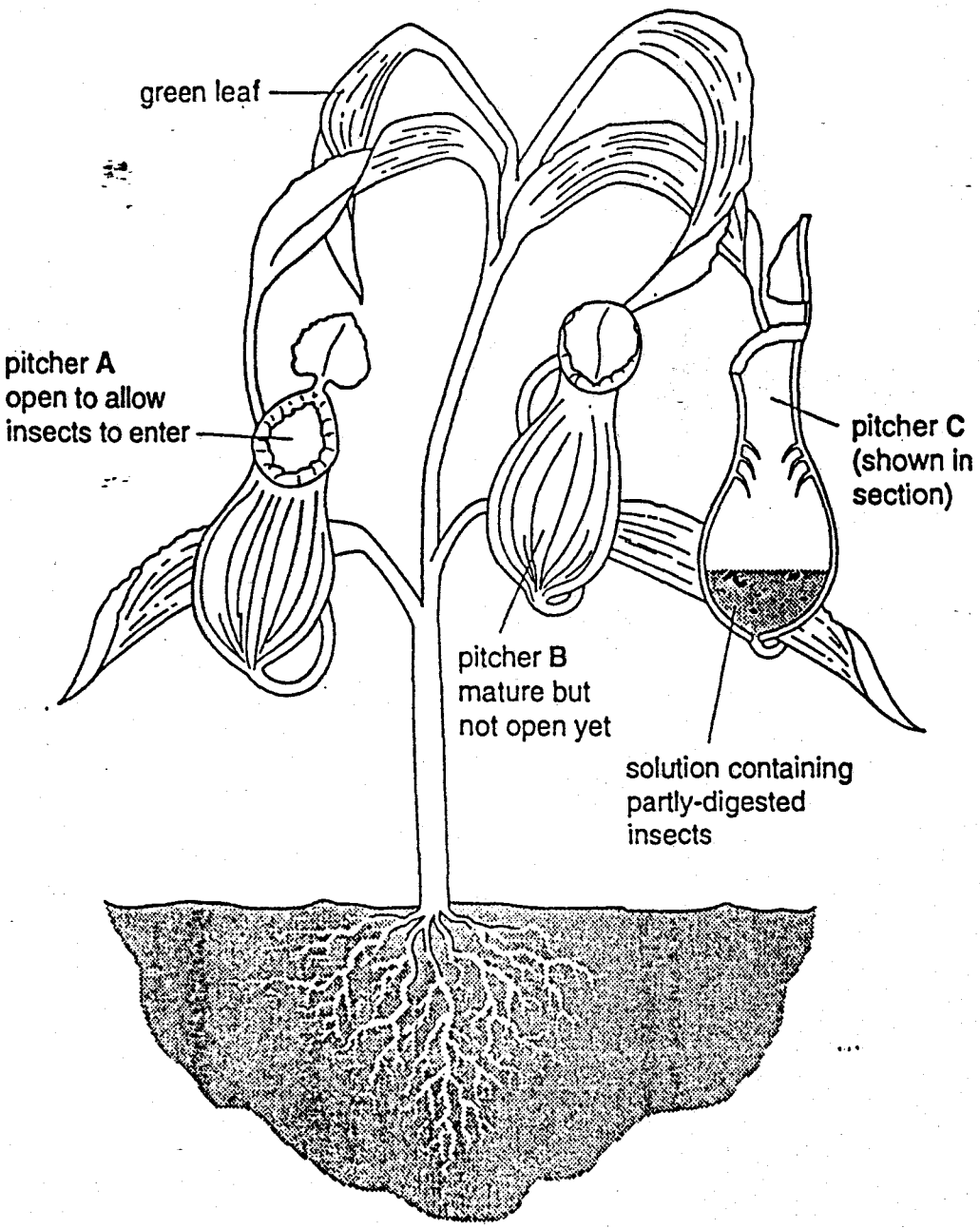

Fig. 4

(a) Complete the table to show the raw materials used by the pitcher plant to make its carbohydrates, and from where these raw materials are absorbed.

raw material	*from where absorbed*
.....	.....
.....	.....
.....	.....
.....	.....

For Examiner's Use

Pitcher plants are also able to digest insects in solutions which they secrete into their pitchers. A student wanted to investigate the nature of these solutions.

Table 2 below, summarises the contents of the six test-tubes which were set up.

Table 2

test-tube P	*test-tube Q*	*test-tube R*
2 cm^3 water	2 cm^3 liquid from pitcher B	2 cm^3 boiled and cooled liquid from pitcher B
1 cm^3 raw meat	1 cm^3 raw meat	1 cm^3 raw meat

test-tube S	*test-tube T*	*test-tube U*
2 cm^3 water	2 cm^3 liquid from pitcher B	2 cm^3 boiled and cooled liquid from pitcher B
1 cm^3 butter	1 cm^3 butter	1 cm^3 butter

Five hours later, the only visible change was that the cube of meat in test-tube Q was much smaller.

(b) State the purpose of

test-tubes P and S; .....

test-tubes R and U. .....

..... [2]

(c) At the end of the experiment, which chemical would be present in test-tube Q, but **not** in any of the other test-tubes? Explain your answer.

Chemical present .....

Explanation .....

.....

..... [2]

(d) Using only the information provided in the question, suggest which mineral ion may be deficient in the soils in which pitcher plants grow. Explain your answer.

Mineral ion .....

Explanation .....

..... [2]

For Examiner Use

4 Fig. 5 shows the results of some breeding experiments on mice.

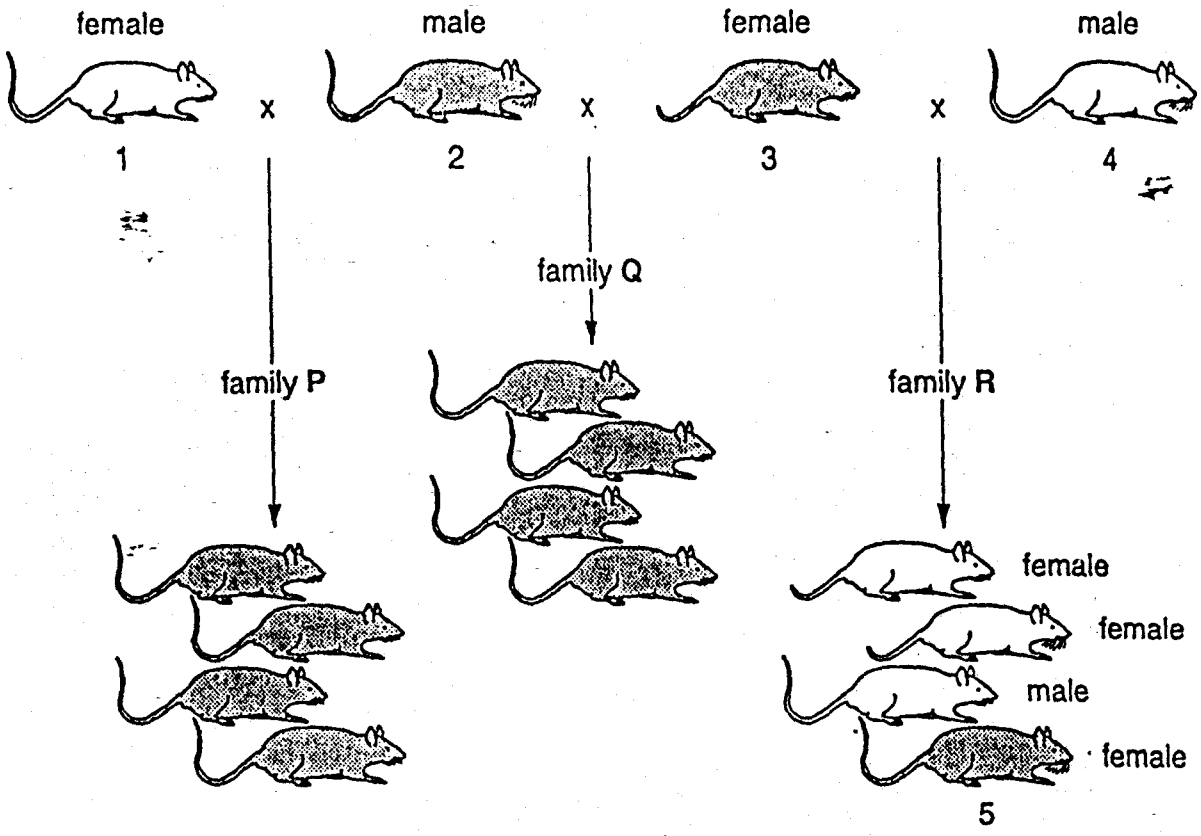

Fig. 5

(a) (i) Complete the table below to show the sex chromosomes present in the gametes of parent mice 2 and 3.

mouse 2		*mouse 3*	

[1]

(ii) If mice 3 and 4 had a second family, what is the percentage chance that the first mouse born would be female?

.....

[1]

Coat colour in these mice is controlled by a single pair of alleles showing complete dominance.

(b) Which of the parent mice 1 to 4 is likely to be

(i) homozygous dominant for coat colour? .....

(ii) heterozygous for coat colour? .....

[2]

For Examiner's Use

(c) Mouse 5 later bred with a mouse of similar genotype to its mother (mouse 3). In the space below, draw a full genetic diagram to show how coat colour would be inherited in this new family. [3]

(d) (i) The mice in Fig. 5 show some examples of pairs of inherited characters, in addition to coat colour. Identify **one** of these pairs of inherited characters.

..... [1]

(ii) Assume that the inheritance of the pair of characters you have identified is due to one pair of alleles showing complete dominance. Draw a full genetic diagram to explain the inheritance in family R.

genetic diagram [3]

[Total : 11]

90

Section B

Answer two questions from this section.

5 (a) How do male gametes differ from female gametes? [3]

(b) Describe fertilisation in a mammal, and the events that follow until implantation. [9]

(c) Explain the possible harmful effects of smoking cigarettes during pregnancy. [3]

6 (a) Explain what is required in the diet of a man who does regular, hard, physical work. [7]

(b) Distinguish between the terms *starvation* and *malnutrition*. [4]

(c) Outline the problems which contribute to famine. [4]

(a) (i) Give an example of a food chain involving four trophic levels.

(ii) Draw and label a pyramid of energy for this food chain. [4]

(b) For the food chain, explain

(i) how energy passes through the chain, and

(ii) how energy is lost to the environment. [8]

(c) Explain why it is considered inefficient to feed crop plants to animals. [3]

8 Fig. 6 shows structures associated with breathing and gaseous exchange.

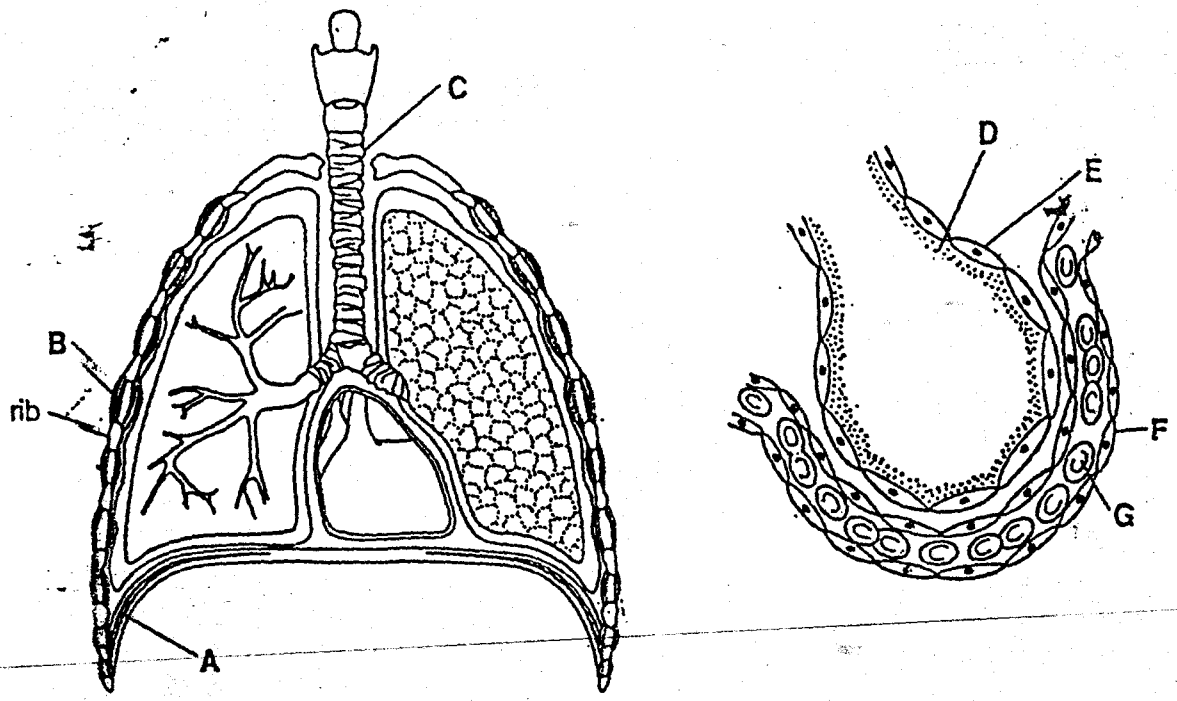

Fig. 6

Describe the roles of the labelled structures A to G, from the moment air enters the nose until the time oxygen leaves the lungs in the blood. In your answer, you should clearly identify each of the labelled structures. [15]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

Friday 5 JUNE 1998 Morning 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

Section A

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Section B

Answer any **two** questions.

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At the end of the examination:

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2 enter the numbers of the Section B questions you have answered in the grid below.

INFORMATION FOR CANDIDATES

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You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 10 printed pages and 2 blank pages.

SB (SLC) QF855461

For Examiner's Use

Section A

Answer all the questions in this section.

1 Fig. 1 shows the volume of air in the lungs of a person measured over a period of time.

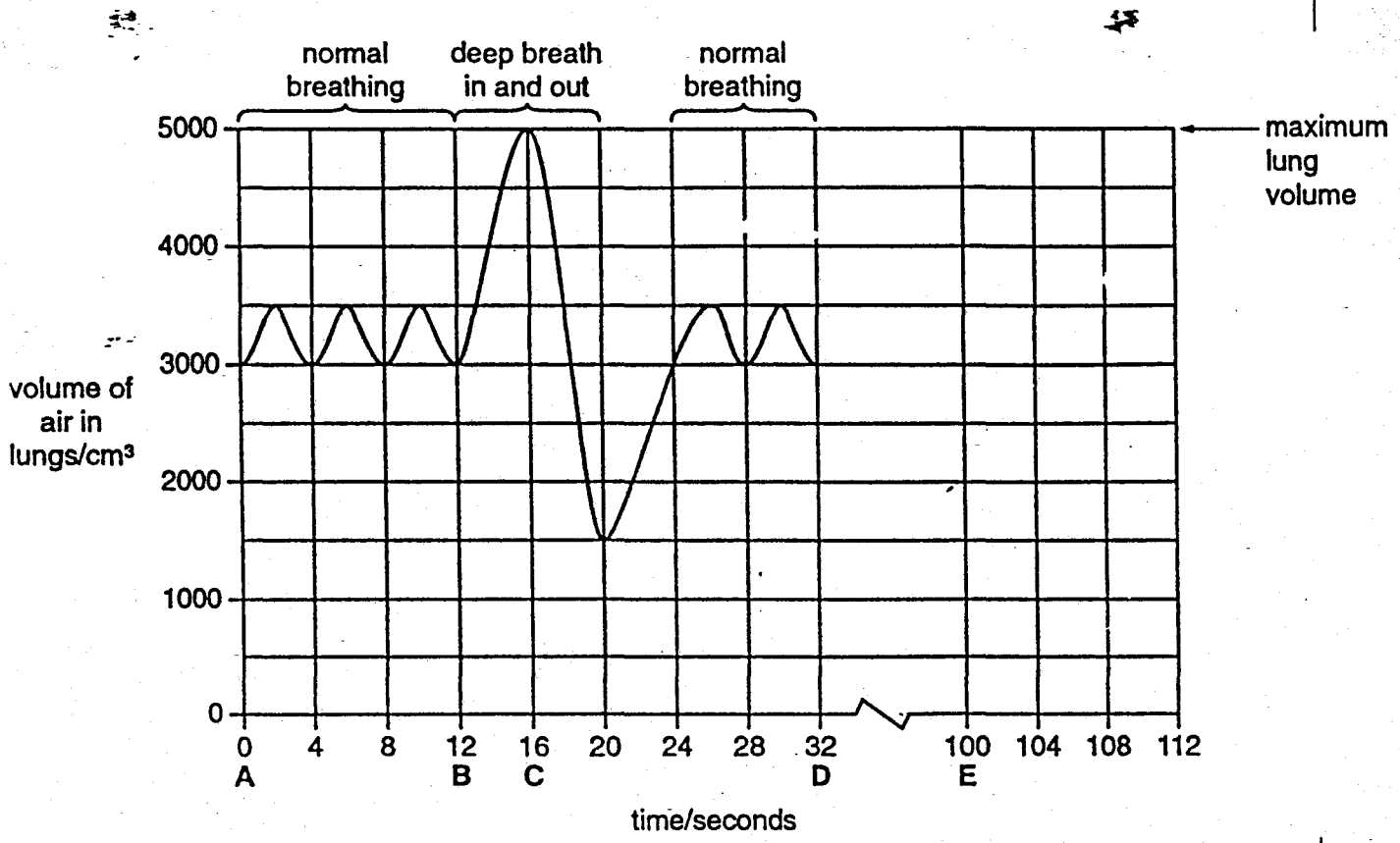

Fig. 1

(a) (i) With reference to Fig. 1, calculate, in breaths per minute, the rate of normal breathing between A and B. Show your working.

.....breaths per minute [2]

(ii) State the volume of air remaining in the lungs after the deep breath out.

.....[1]

(iii) Explain how the intercostal muscles are involved in breathing from time B to time C.

.....

.....

.....[2]

For Examiner's Use

At time D, the person performed one minute of vigorous exercise.

(b) (i) On Fig. 1, starting at time E, continue the graph to show the person's breathing pattern after this exercise. [2]

(ii) Explain why the breathing pattern changes after a period of exercise.

.....

.....

.....

.....[3]

[Total : 10]

For Examiner's Use

2 (a) State **three** normal functions of a root.

1. .....

2. .....

3. .....[3]

Fig. 2 shows a mangrove tree growing in a swamp.

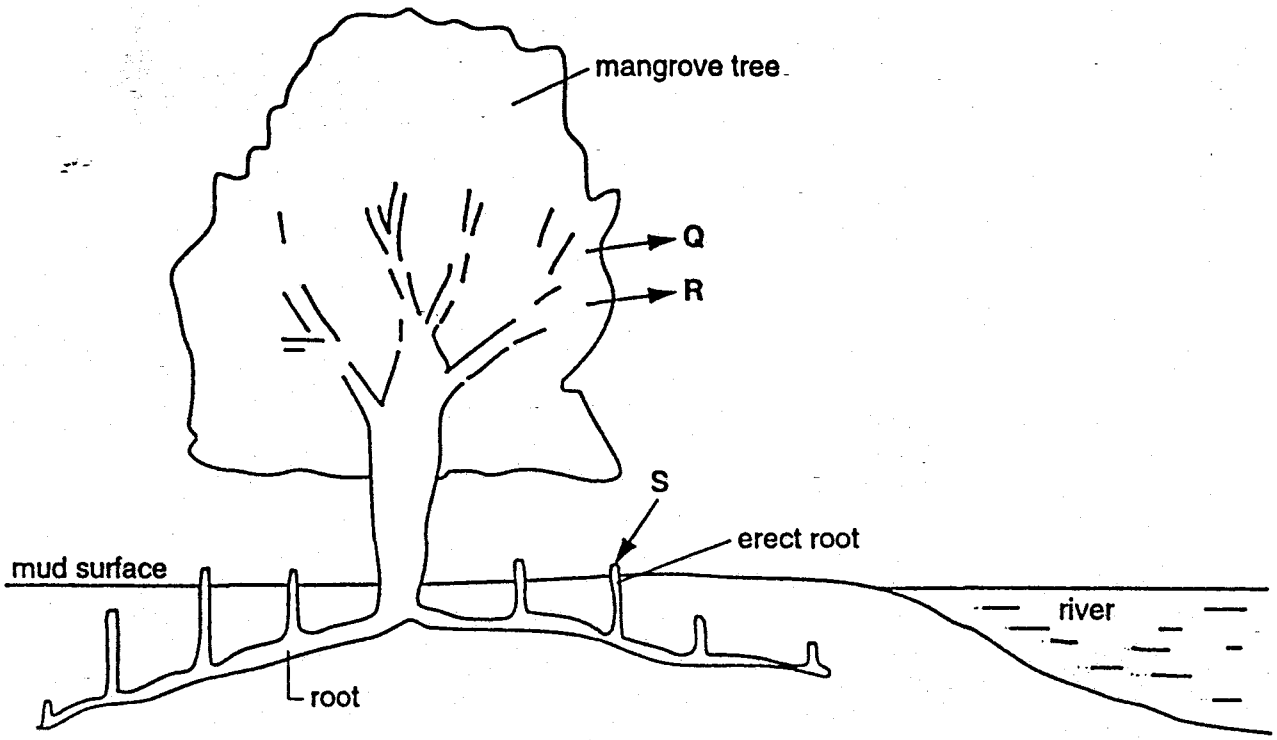

Fig. 2

The roots of the mangrove are specially modified to overcome the fact that air spaces in the soil are always filled with water. In other respects, the roots are normal in structure and function.

Arrows **Q**, **R** and **S** represent the movement of gases into and out of the tree during the day.

(b) (i) Name gases **Q** and **R** and, for each gas, state the process in the tree which produces it.

Gas Q ..... *process* .....

Gas R ..... *process* .....[2]

(ii) Name gas S and state in which process it is used in the tree.

Gas S ..... *process* .....[1]

For Examiner's Use

(c) Name the **unusual** response being shown by the erect roots of the tree.

.....[1]

Active transport is a process which occurs in most plant roots.

(d) Suggest why mangrove roots may have difficulty in carrying out this process.

.....

.....

.....

.....[2]

[Total : 9]

3 Fig. 3 shows an organism W and Fig. 4 shows how the reproduction of this organism is affected by an antibiotic.

Organism W

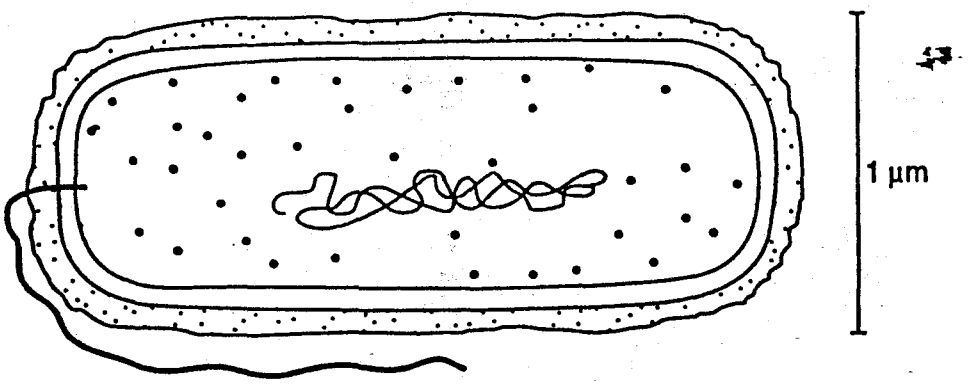

Fig. 3

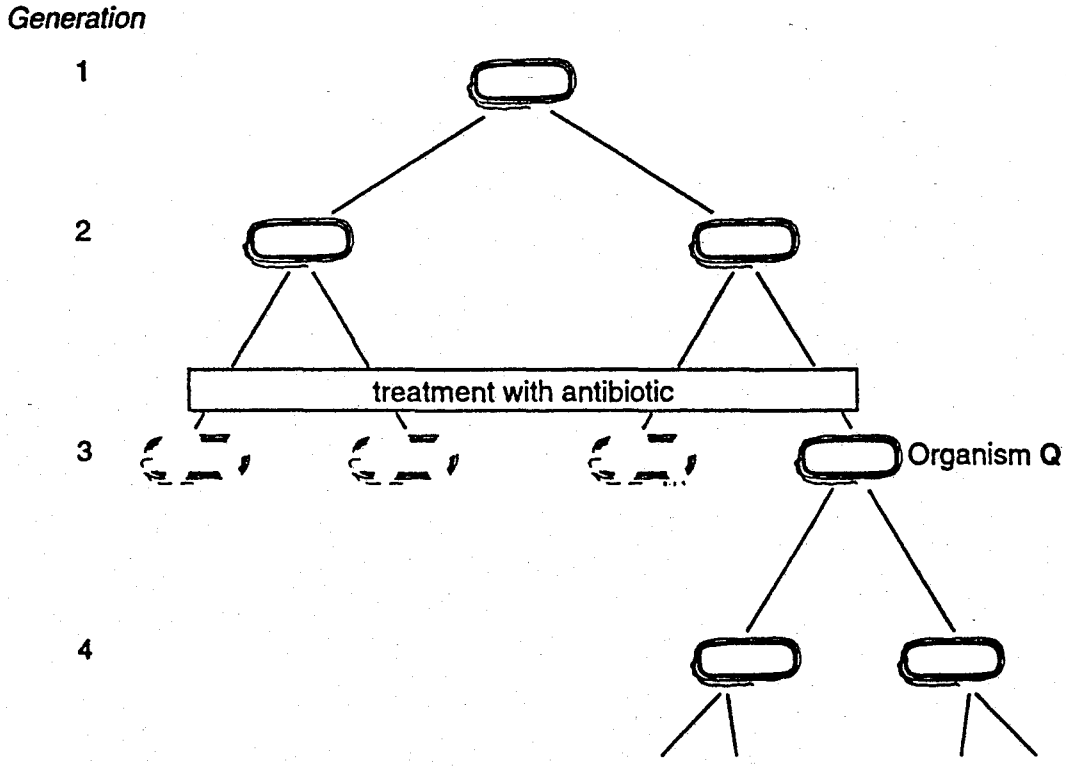

Fig. 4

(a) (i) What type of organism is W most likely to be?

.....[1]

(ii) State **three** reasons for your answer.

1. .....

2. .....

3. .....[3]

(b) Name the type of reproduction shown by organism W.

.....[1]

Q is the only organism surviving the antibiotic treatment.

(c) Suggest an explanation for the survival of Q and its offspring.

.....

.....

.....

.....[2]

(d) Explain why patients who are treated with antibiotics are always advised to take the complete course of treatment, rather than stop the treatment as soon as they feel better.

.....

.....

.....

.....

.....[3]

[Total : 10]

For Examiner's Use

4 Fig. 5 is a diagram showing some of the structures and processes found in an animal.

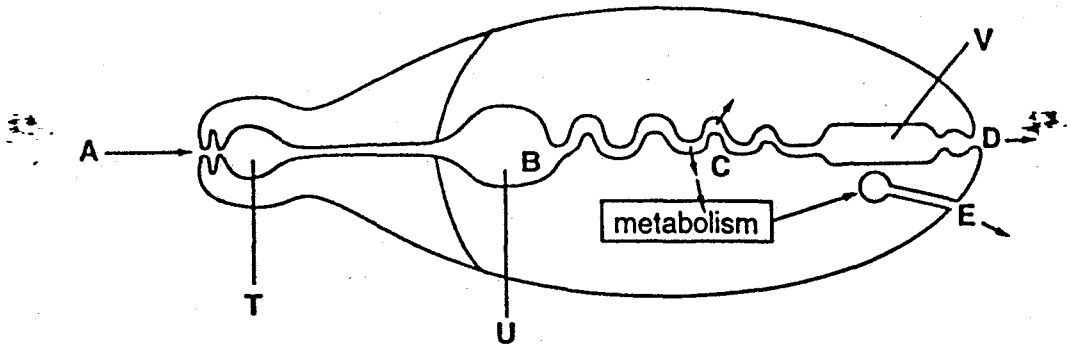

Fig. 5

(a) Name structures **T**, **U** and **V**.

T .....

U .....

V .....[3]

Some processes which occur in animals are shown by letters **A** to **E** in Fig. 5.

(b) Name the **two** characteristics of **all** living things which are represented in Fig. 5.

1. .....

2. .....[2]

(c) Name the processes which would occur in a living animal at **A**, **B** and **C**.

A .....

B .....

C .....[3]

Villi are involved in the process which occurs at **C**.

(d) Explain how villi are adapted to carry out this process.

.....

.....

.....

.....

.....[3]

[Total : 11]

Section B

Answer **two** questions from this section.

5 Fig. 6 shows a family running some risks to their health.

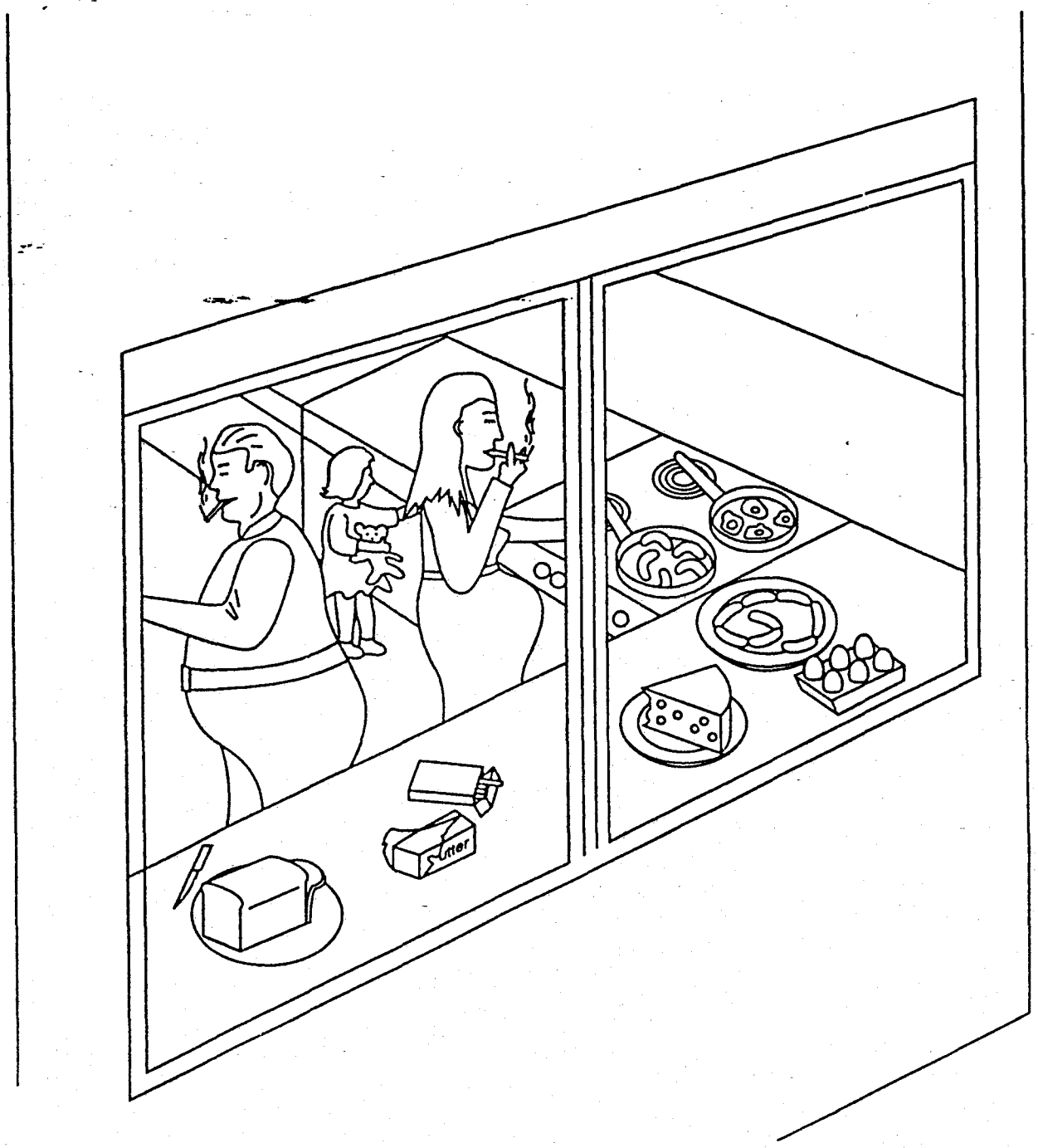

Fig. 6

(a) Identify as many risks as you can and, for each risk identified, explain its possible harmful effects. [8]

(b) Suggest an alternative diet for the family which might help to avoid some of the harmful effects. Give reasons for your answer. [7]

6 (a) With reference to a **named** plant, explain the commercial advantages of asexual reproduction. [4]

(b) Explain how the male reproductive system of a mammal is adapted for sexual reproduction. [7]

(c) Outline the role of testosterone in a male mammal. [4]

7 (a) (i) Explain what is meant by the term *food chain.*

(ii) Give an example of a food chain from a **named** habitat. [7]

(b) Explain the differences between a *pyramid of biomass* and a *pyramid of energy.* [6]

(c) Explain why it is better for humans to be the last organism in a short food chain, rather than the last organism in a long food chain. [2]

8 (a) Explain how dental decay occurs and how it may be prevented. [8]

(b) Compare digestion in the mouth with digestion in the stomach of a human. [7]

Centre Number	Candidate Number

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International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

Wednesday **18 NOVEMBER 1998** Morning 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

Section A

Answer **all** questions.

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INFORMATION FOR CANDIDATES

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You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

SB (SLC/DJ) QK87429'3

[Turn over

For Examiner's Use

Section A

Answer all the questions in this section.

1 Fig. 1 shows the relationship between smoking and coronary heart disease, but the graph is incomplete.

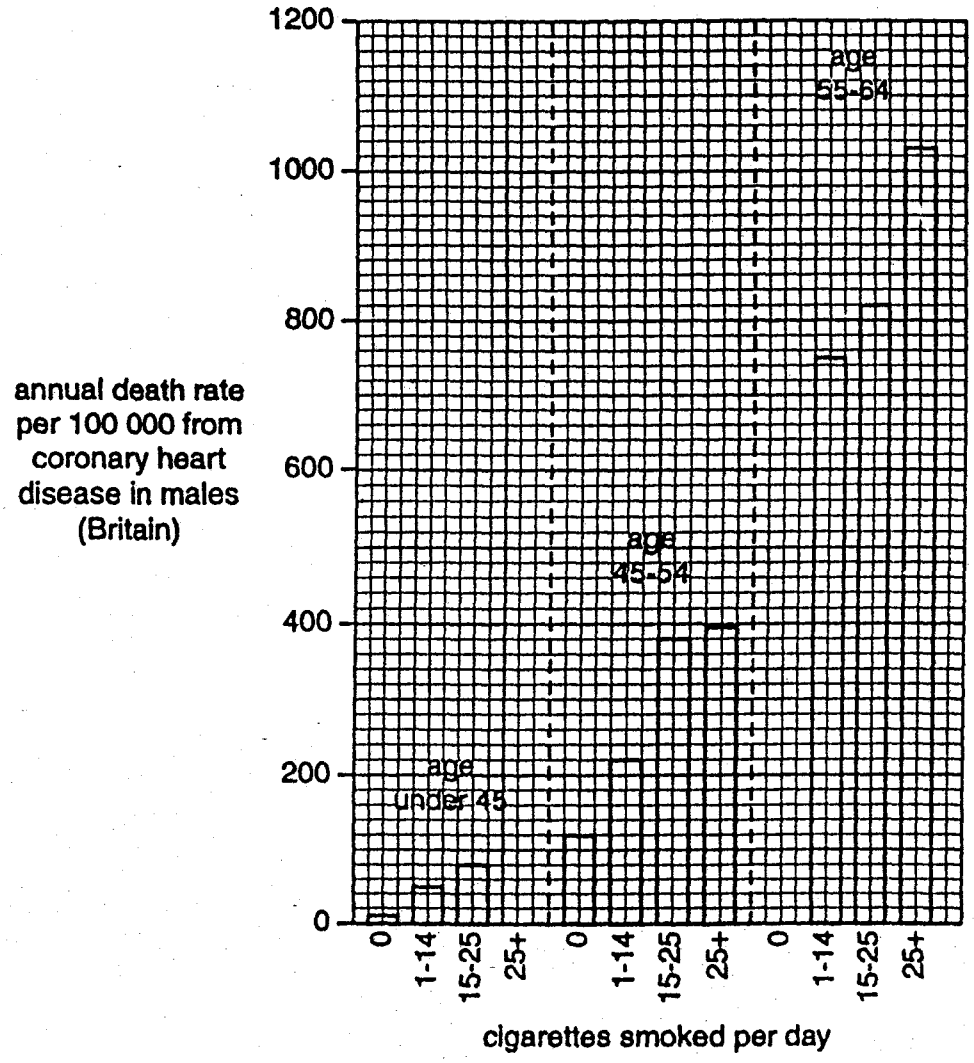

Fig. 1

(a) Complete Fig. 1 using the following data.

age	cigarettes smoked per day	annual death rate per 100 000 from coronary heart disease
under 45	25+	110
55–64	0	430

[2]

For Examiner's Use

(b) What relationship is shown in Fig. 1 between

(i) age and coronary heart disease?

.....

.....[1]

(ii) smoking and coronary heart disease?

.....

.....[1]

(c) Is it correct to state that smoking can lead to coronary heart disease? Use evidence from Fig. 1 to support your answer.

.....

.....[1]

(d) Suggest **two** ways, other than not smoking, of reducing the risk of coronary heart disease.

1. .....

2. .....[2]

(e) (i) Name **two** harmful chemicals found in cigarette smoke.

1. .....

2. .....[2]

(ii) Describe the effects that these chemicals may have in a smoker's body.

.....

.....

.....

.....

.....[4]

[Total : 13]

For Examiner's Use

2 A student carried out an experiment to investigate the growth of floating water plants taken from a pond. Equal masses of the plants were placed into three separate glass containers **A**, **B** and **C**, similar to the one shown in Fig. 2.

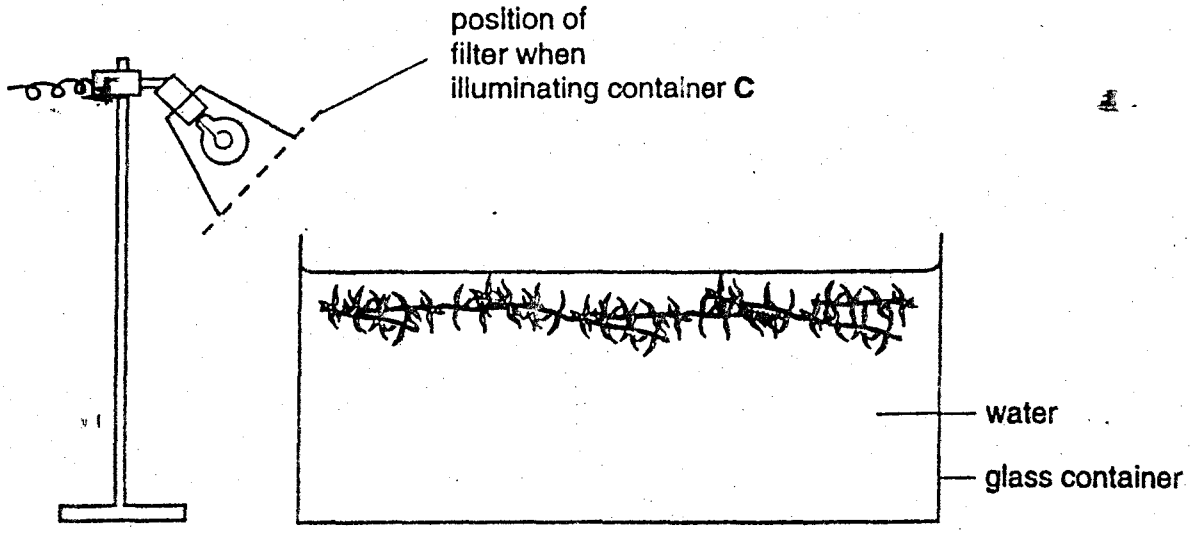

Fig. 2

Container A was lit by a 250 W bulb, B was lit by a 75 W bulb and C was lit by a 250 W bulb with a coloured filter in front of the lamp, as shown in Fig. 2.

At weekly intervals, the plants were removed from each container in turn, gently dried, weighed and returned to the containers after their mass had been recorded. Fig. 3 shows the results plotted on a graph.

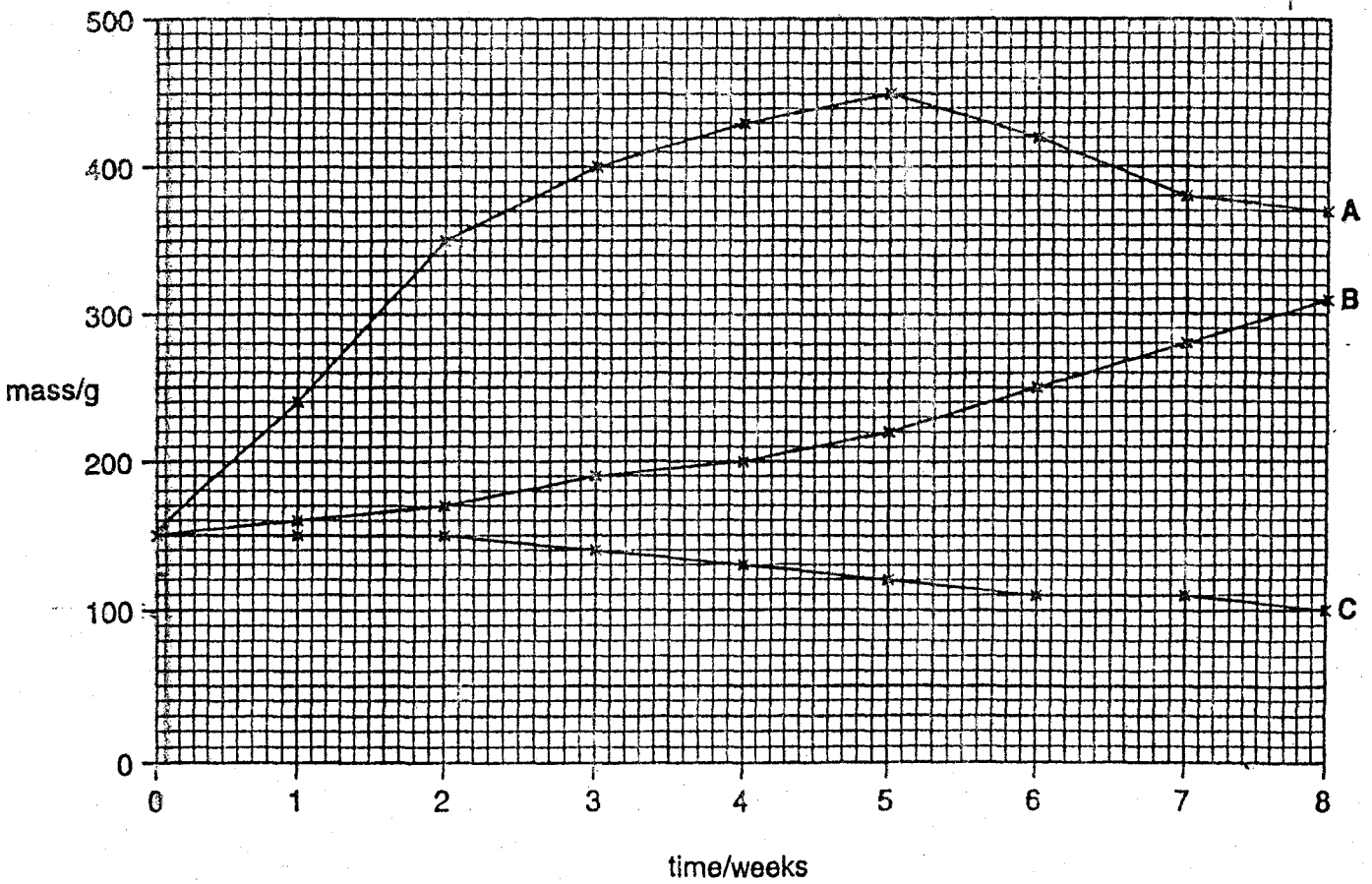

Fig. 3

For Examiner's Use

(a) With reference to Fig. 3, calculate the percentage increase in mass of the plants in container **A** during the first five weeks of the experiment. (Show your working.)

% increase .....[2]

(b) Suggest why the mass of plants in container **A** began to decrease after week 5, while the mass of plants in **B** continued to increase.

Container **A** .....

.....

Container **B** .....

.....[2]

(c) During the eighth week, in which container would there be the least dissolved oxygen? Explain your answer.

Container .....

Explanation .....

.....[2]

Fig. 4 shows the amount of light of different colours absorbed by chlorophyll.

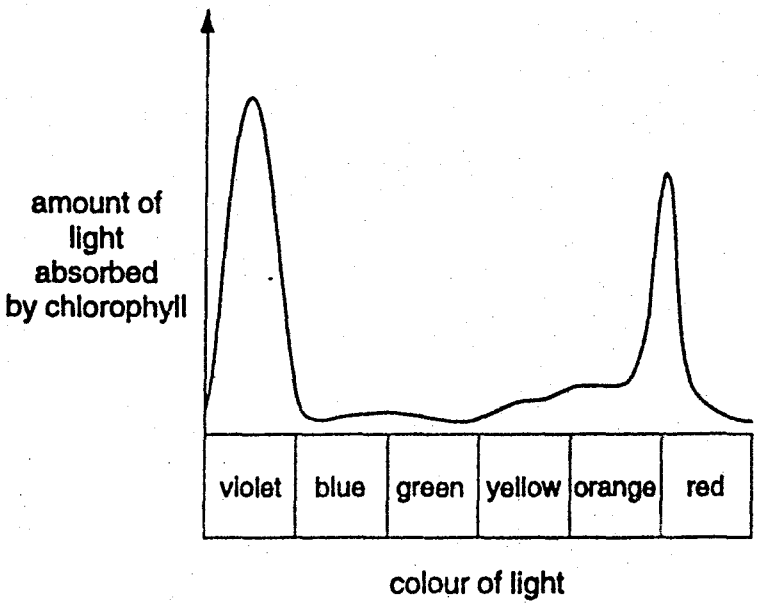

Fig. 4

The filter used in illuminating container **C** allowed only one colour of light to pass through to the water plants.

(d) Suggest which colour of light passed through the filter. Explain your answer.

Colour of light .....

Explanation .....

.....[2]

[Total : 8]

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Question 3 starts on page 8

3 Fig. 5 shows a stamen and a section cut through the stamen.

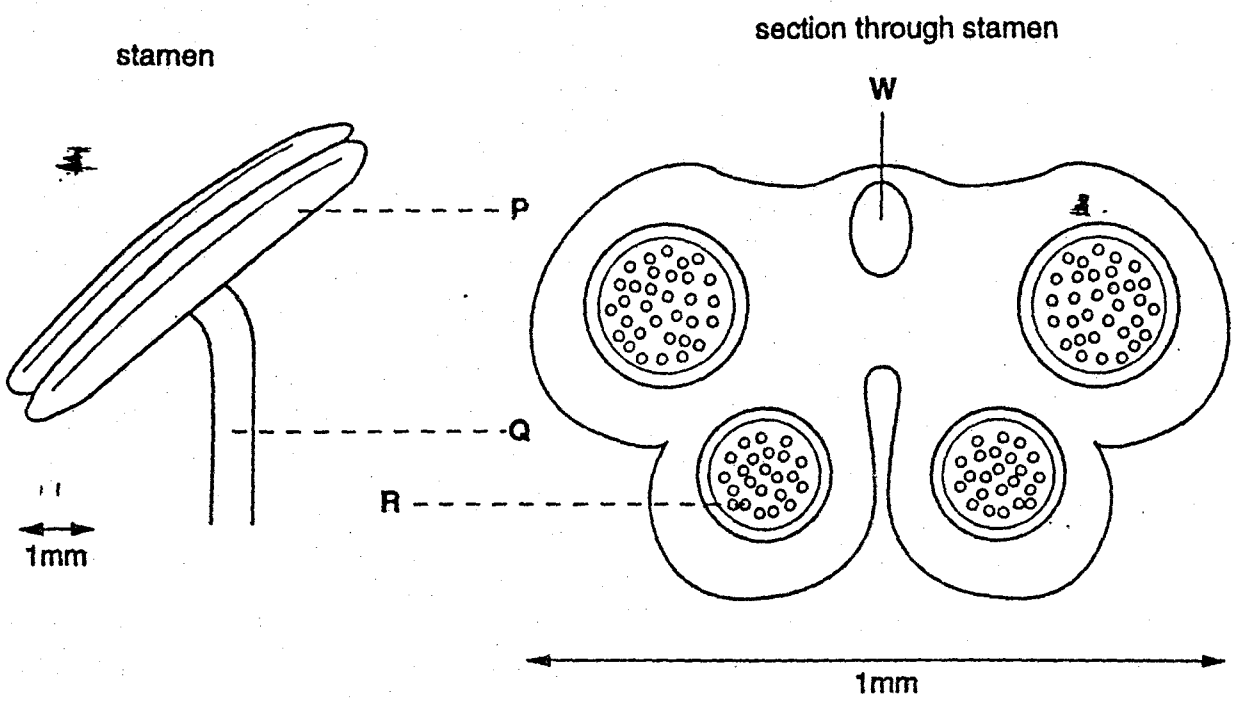

Fig. 5

On Fig. 5,

(a) (i) label P, Q and R; [3]

(ii) draw a line to show where the stamen was cut to produce the section. [1]

(b) (i) Describe what happens to the chromosomes in the nuclei of the dividing cells during the production of the structures labelled R.

.....[1]

(ii) Explain the importance of this in the process of sexual reproduction.

.....

.....[2]

(iii) How may genetic variation be produced during the formation of the structures labelled R?

.....

.....[1]

For Examiner's Use

Structure W, in Fig. 5, is involved in translocation.

(c) Explain how translocation is important in the development of the stamen.

.....

.....

.....[2]

[Total : 10]

4 Fig. 6 shows two experiments to investigate the partial permeability of Visking tubing.

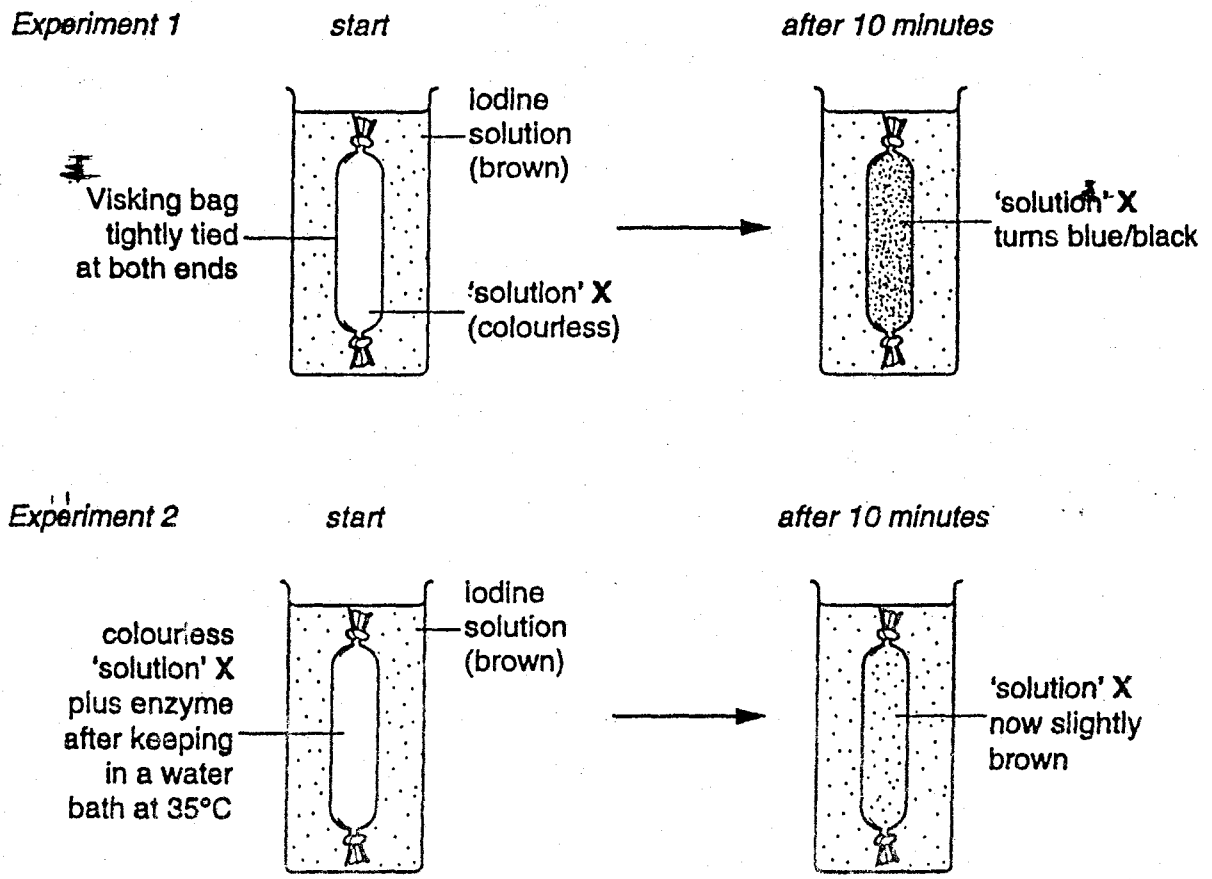

Fig. 6

(a) Suggest what 'solution' **X** was likely to have been.

.....[1]

(b) In Experiment 1, explain

(i) why 'solution' **X** turned from colourless to blue/black;

.....

.....

.....[2]

(ii) why the iodine solution remained brown.

.....

.....

[1]

In Experiment 2, 'solution' **X** and an enzyme were placed in a Visking bag which was kept at 35 °C for 30 minutes. After this time, the bag was placed in iodine solution. This experiment, and the results, are also shown in Fig. 6.

(c) In Experiment 2, explain

(i) why the bag was first kept at 35 °C for 30 minutes;

.....[1]

(ii) why 'solution' **X** did **not** turn blue/black.

.....

.....[1]

At the end of Experiment 2, the student noticed a change in the condition of the Visking bag.

(d) (i) What change might have been noticed?

.....[1]

(ii) Explain what caused this change.

.....

.....[2]

[Total : 9]

Section B

Answer any **two** questions from this section.

5 (a) List the main characteristics of insects. [4]

(b) Describe how a **named** insect-pollinated flower is adapted to attract insects. [5]

(c) Explain the advantages and disadvantages of controlling insects with insecticides. [6]

6 (a) List the structural features of a vein which distinguish it from an artery. [3]

(b) (i) Explain what is meant by a *double circulation*.

(ii) Describe and explain how blood flows from the foot to the lungs. [12]

7 (a) Describe the signs, symptoms and effects of the disease syphilis. [6]

(b) Explain

(i) how HIV is transmitted, and

(ii) how its spread can be prevented. [7]

(c) Explain why the methods for treating syphilis cannot be used for the treatment of AIDS. [2]

8 (a) Use the information in Fig. 7 to draw a diagram of the carbon cycle. Your diagram must include the letters A to E, and identify the process represented by each letter. [9]

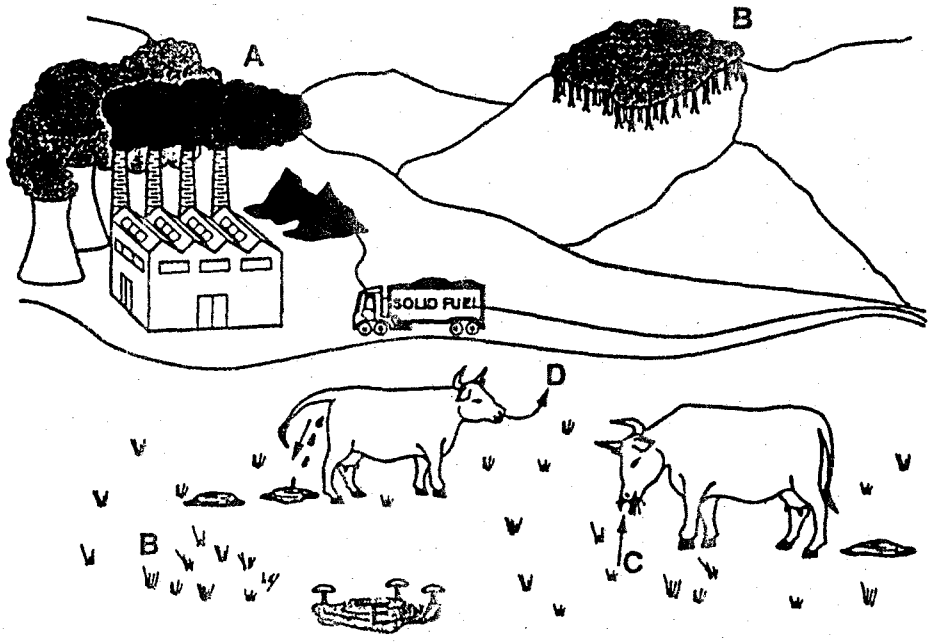

Fig. 7

(b) With reference to letters A to E, describe and explain the flow of energy through the organisms and processes shown in Fig. 7. [6]

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BIOLOGY 0610/3

PAPER 3

Friday **11 JUNE 1999** Morning 1 hour 15 minutes

Additional materials:
Answer paper
Calculator

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

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You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

For Examiner's Use

Section A

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

1 Fig. 1 shows the proportion of all known species in each of the main groups of organisms.

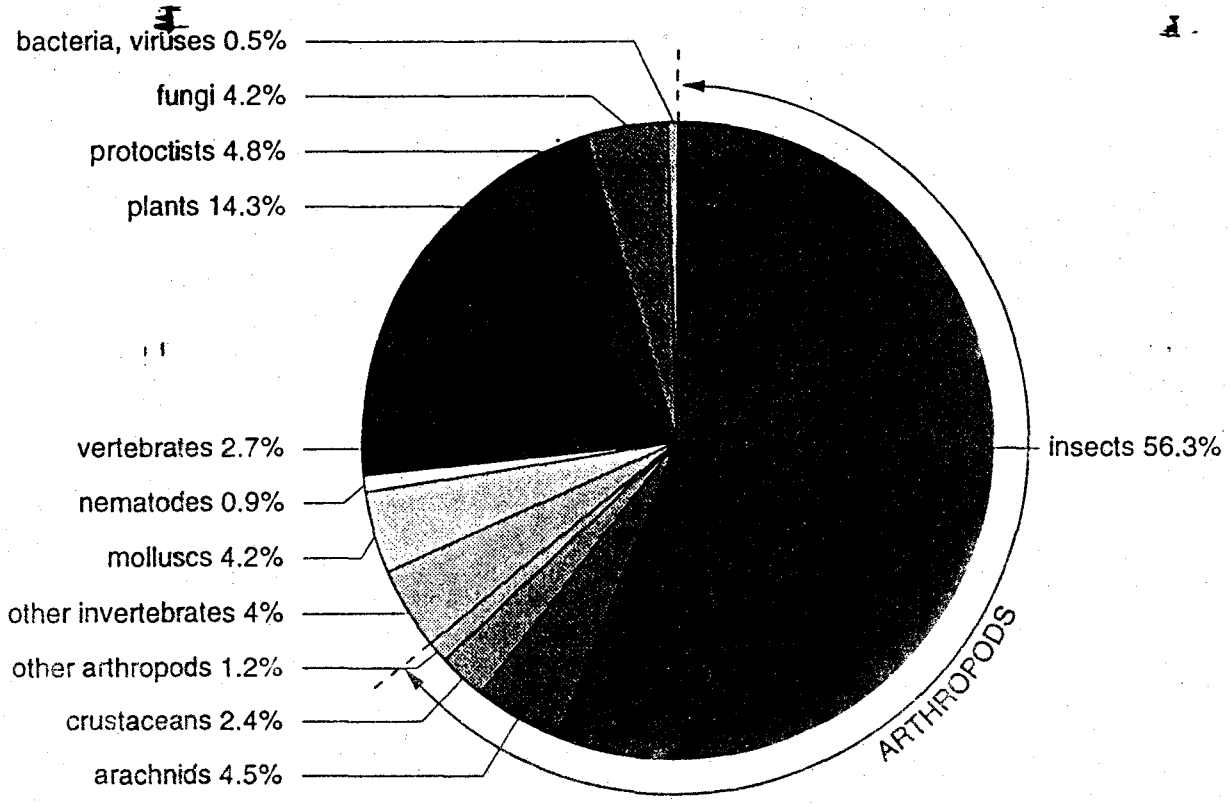

Fig. 1

(a) (i) Apart from insects, which group of organisms in Fig. 1 has the most known species?

.....[1]

(ii) Fungi are shown as a separate group of organisms. State **two** reasons why fungi are **not** classified as plants.

1. .....

2. .....[2]

(b) (i) Use information from the pie chart to calculate what percentage of the arthropods are insects. Show your working.

.....% [2]

(ii) State **one** feature of insects which contributes to their success and explain how this feature is beneficial to the group.

Feature .....

Explanation .....

.....

.....[3]

(c) 2.7% of all known species are vertebrates. Birds is one class of vertebrates.

(i) State **one** feature which distinguishes this class from all the other vertebrate classes.

.....[1]

(ii) State one external feature which birds have in common with fish.

.....[1]

(d) It is estimated that 1.7 million species of organisms have been named. Use data from the pie chart to calculate the total number of plant species known. Show your working.

Total ..... [2]

[Total: 12]

For Examiner's Use

2 Fig. 2 is a longitudinal section through a root tip showing the regions of growth and development.

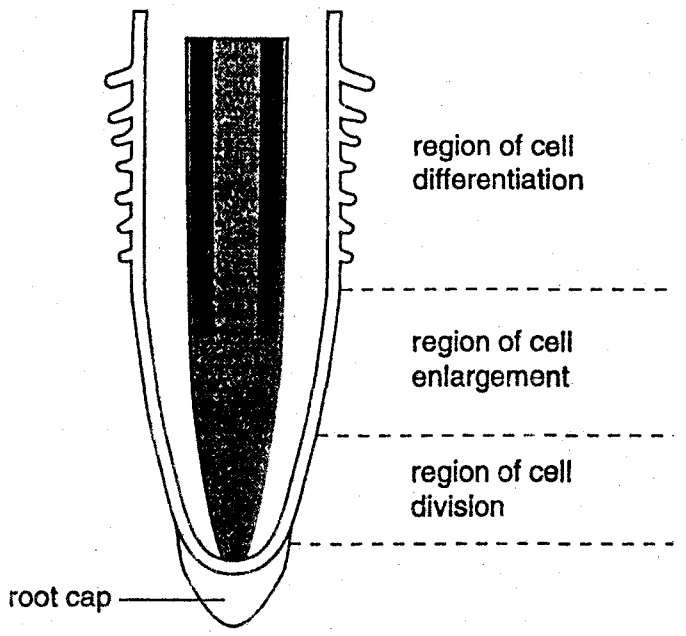

Fig. 2

(a) Distinguish between the terms *growth* and *development*.

.....

.....

.....[3]

(b) Outline what happens in the region of cell division.

.....

.....

.....

.....[3]

The enlarging cells get bigger by absorbing water.

(c) (i) Name the process responsible for this absorption of water.

.....[1]

(ii) What condition must exist in a cell for water absorption to occur?

.....

.....[1]

(iii) Which cell feature prevents the enlarging cells from bursting?

.....[1]

(iv) Suggest how the enlargement of these cells makes the root grow longer.

.....

.....

.....[2]

In the region of cell differentiation, a number of different tissues are formed.

(d) (i) Define the term *tissue*.

.....

.....[2]

(ii) Table 1 contains some information about root tissues and their functions. Complete the table.

Table 1

name of tissue	function
xylem	
	transport of sugars
	absorption of water from the soil

[3]

[Total: 16]

For Examiner's Use

3 Fig. 3 shows how mercury, released into the sea in chemical waste from a plastics factory, results in the poisoning of local fishermen.

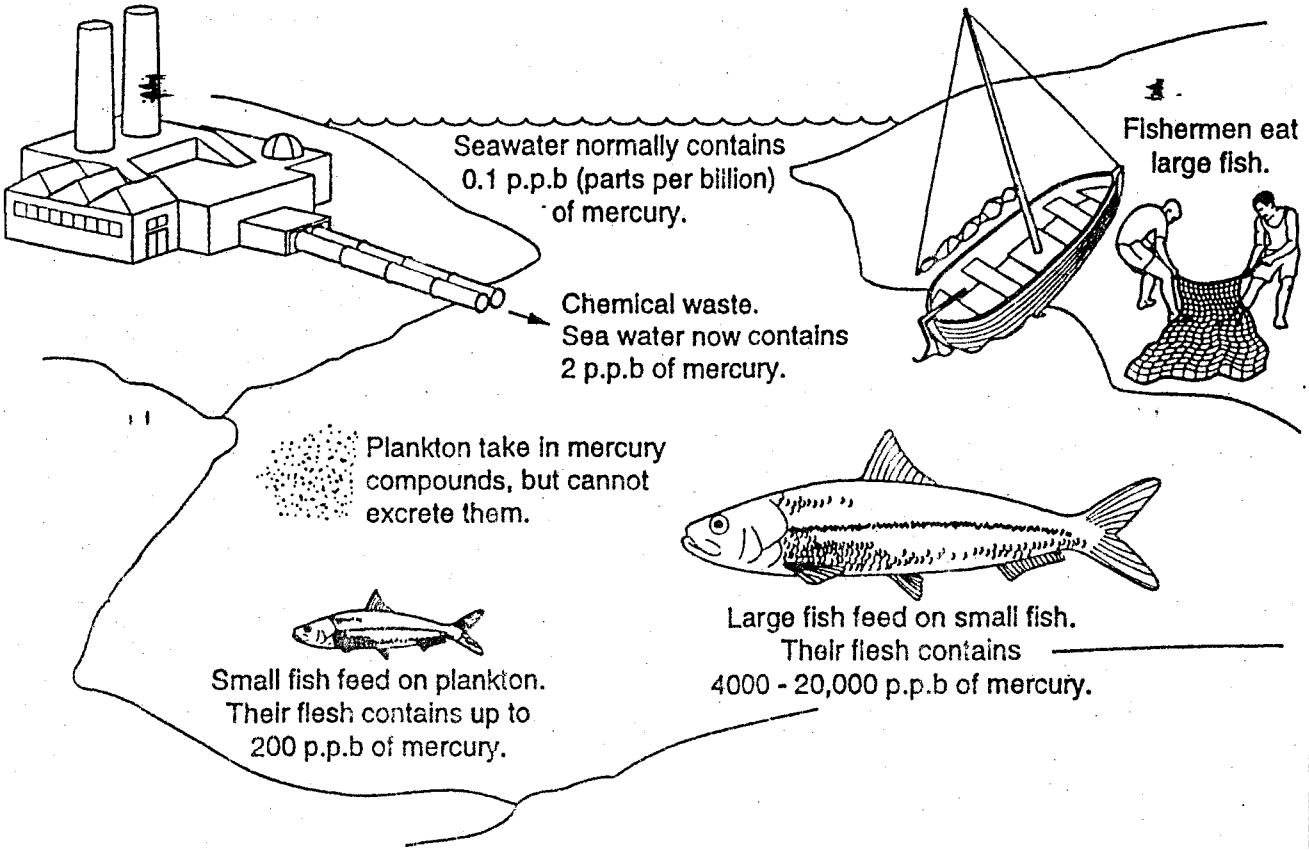

Fig. 3

(a) Draw a food chain to show how the fishermen become poisoned with mercury.

[3]

(b) (i) What information, missing from Fig. 3, is needed in order to construct a bar graph to show the levels of mercury in each organism?

.....

.....[2]

(ii) Suggest why the fishermen are poisoned by the mercury, but the other organisms in the food chain are not affected.

.....

.....

.....[2]

120

For Examiner's Use

(c) As a result of the mercury poisoning, the fishermen suffer from uncontrollable shaking. Suggest which organ is likely to have been affected.

.....[1]

(d) (i) Mercury compounds are non-biodegradable.

Explain the term *non-biodegradable.*

.....

.....

.....[2]

(ii) The factory was making plastics. Suggest **two** ways by which these plastics could pollute the environment.

1. .....

.....

2. .....

.....[2]

[Total: 12]

Section B

Answer **two** questions from this section.

4 (a) Define the term *pollination*. [2]

(b) Describe the structure of a **named** insect-pollinated flower and state the functions of its parts. [10]

(c) Describe how cross-pollination leads to variation in a species. [3]

5 (a) Explain the differences between mechanical digestion and chemical digestion. [3]

(b) Name and describe the different types of human teeth and state their functions. [8]

(c) Discuss the part played by diet in maintaining healthy teeth. [4]

6 (a) Discuss, giving examples, how the use of modern technology has resulted in increased food production. [9]

(b) How is plant growth affected by a deficiency of magnesium ions? [3]

(c) How can minerals, trapped in the bodies of dead animals, become available for plant use? [3]

7 (a) What is an *enzyme*? [3]

(b) State the conditions in which enzymes work best. [3]

(c) Outline the parts played by **named** enzymes in each of the following processes:

(i) germination of seeds;

(ii) the use of biological washing powders to remove protein stains;

(iii) fat digestion in the alimentary canal.

[9]

Centre Number	Candidate Number

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International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

Wednesday **17 NOVEMBER 1999** Morning 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

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Section A

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INFORMATION FOR CANDIDATES

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You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 8 printed pages. 123

For Examiner's Use

Section A

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

1 Fig. 1 shows how different factors in a lake change with depth. The changes in width of a column show how the factor named changes with depth.

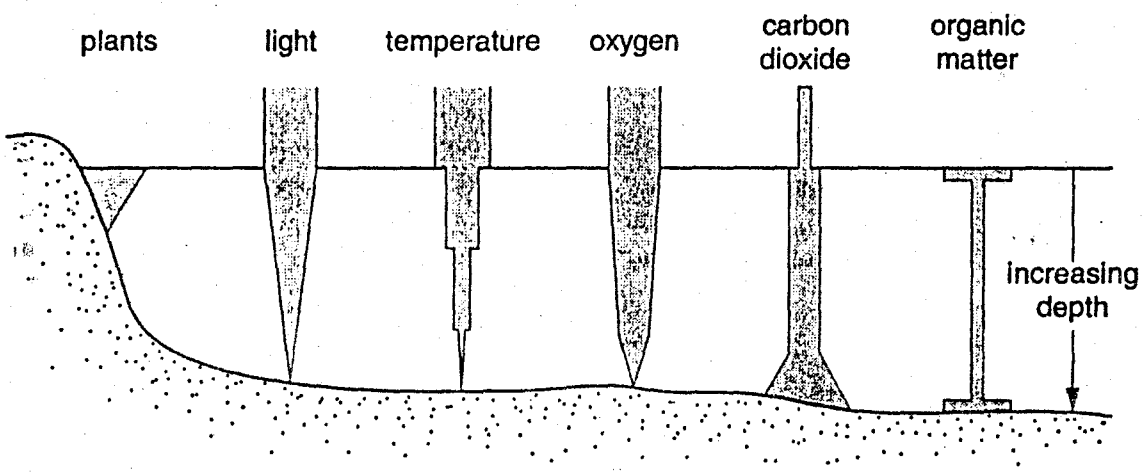

Fig. 1

(a) Describe the temperature changes from the surface of the lake to the bottom.

.....

.....

.....[2]

(b) Suggest why plants are found only near the edge of the lake.

.....

.....

.....[2]

(c) Suggest, with a reason, the type of respiration used by animals living in mud at the bottom of the lake.

.....

.....

.....[2]

Sewage, in the form of diluted sludge, is discharged into the lake.

(d) Suggest and explain the possible effects of this sewage on the levels of each of the following in the lake:

(i) organic matter;

.....

.....[2]

(ii) light penetration;

.....

.....

.....[3]

(iii) oxygen.

.....

.....

.....[3]

[Total : 14]

For Examiner's Use

2 Fig. 2 shows an aphid feeding on a plant stem. Its mouthparts are hollow tubes which are pushed into the stem to remove sugar solution.

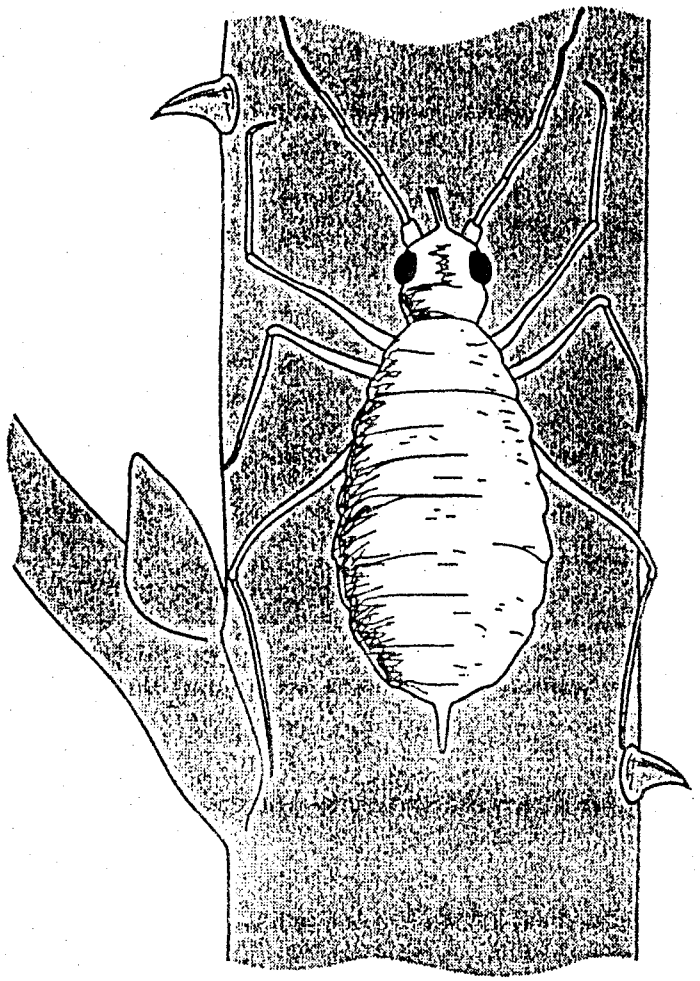

Fig. 2

(a) Aphids are arthropods. State two features, visible in Fig. 2, which are common to all arthropods.

1. .....

2. .....[2]

(b) In which tissue, and by what processes, does the sugar solution move through the plant?

Tissue .....

Processes .....

.....[3]

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For Examiner's Use

Some of the sugar solution was collected from the plant stem. Plant cells were placed on a microscope slide and covered with this sugar solution.

(c) (i) Describe what changes would occur to each of the cell parts listed below, if the sugar solution was more concentrated than the sap in the cell vacuole.

Sap vacuole

.....

.....

Cytoplasm

.....

.....

Cell wall

.....

.....[3]

(ii) Explain, in terms of water potential gradient, how these changes occur.

.....

.....

.....

.....[3]

(d) Systemic pesticides can be used to kill pests such as aphids. Describe how the application of these pesticides to leaves kills aphids feeding on the stem.

.....

.....

.....

.....[2]

[Total : 13]

For Examiner's Use

3 Some people suffer from sickle cell anaemia. They have abnormal red blood cells.

(a) (i) Describe the shape of a **normal** red blood cell.

.....

.....[1]

(ii) State how the appearance of an abnormal red blood cell from a sufferer of sickle cell anaemia differs from a normal red blood cell.

.....

.....[1]

(iii) What is the effect of sickle cell haemoglobin on the function of the red blood cell?

.....

.....[1]

The allele for normal haemoglobin is represented by the symbol H^A. The allele for sickle cell haemoglobin is represented by the symbol H^S. The alleles are codominant.

(b) State the genotypes for

(i) a person with normal haemoglobin;

.....[1]

(ii) a heterozygous person;

.....[1]

(iii) a person with sickle cell anaemia.

.....[1]

(c) Which of the genotypes stated in (b) is likely to result in

(i) the greatest protection from malaria?

.....[1]

(ii) the greatest risk of an early death in a malaria-free country?

.....[1]

For Examiner's Use

A man with sickle cell anaemia married a woman heterozygous for sickle cell.

(d) Using a genetic diagram, predict the possible percentage of their children that would suffer from sickle cell anaemia.

Percentage ..... [5]

[Total : 13]

Section B

Answer **two** questions from this section.

4 (a) (i) Define the term *limiting factor.* [2]

(ii) Sketch a graph, with suitably labelled axes, to show how a **named** factor affects the rate of photosynthesis

1. with no limiting factor present;

2. when there is a limiting factor present. [4]

(iii) Explain how **named** factors can limit the rate of photosynthesis. [6]

(b) How can conditions in a greenhouse be modified to achieve maximum growth of the plants kept in it? [3]

5 An athlete takes part in a race.

(a) Describe and explain what happens to her breathing rate as a result of the race. [5]

(b) The level of adrenaline increases at the start of the race. Describe the effect of this increased level of adrenaline in the athlete's body. [4]

(c) At the end of the race the athlete's body temperature has increased. Outline the body processes which cause her temperature to return to normal after the race. [6]

6 (a) Describe how the body

(i) responds to a bacterial infection;

(ii) prevents loss of blood from a cut. [9]

(b) Describe the movement of **named** materials from the mother to the fetus. [6]

7 (a) Distinguish between diffusion and active transport. State **one** example of each process in living organisms. [7]

(b) Construct a table, with suitable headings, to distinguish between nervous and hormonal control. [5]

(c) How do voluntary actions differ from involuntary actions? [3]

Candidate Name _____

Centre Number	Candidate Number

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

MAY/JUNE SESSION 2000 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

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,

1. fasten the separate answer paper securely to the question paper;
2. enter the numbers of the Section B questions you have answered in the grid below.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 7 printed pages and 1 blank page. 131

For Examiner's Use

Section A

Answer all questions in this section.

1 South Uist is a small island which provides one of the few remaining summer habitats for a bird called the Corncrake (*Crex crex*). It lives in hay fields where it feeds on insects, worms and seeds. South Uist provides a good habitat because there are plenty of hay fields where the Corncrake can nest and there are few predators.

However, a small mammal called the Hedgehog (*Erinaceus europaeus*) was released onto the Island. The Hedgehog also has few natural predators and will feed on the eggs of Corncrakes, as well as on insects and worms. The number of Hedgehogs on South Uist has risen rapidly to 10000 while Corncrakes are becoming endangered as their numbers worldwide are falling.

(a) (i) State **two** features which birds and mammals have in common.

1. .....

2. .....

(ii) State **two** features which distinguish birds from mammals.

1. .....

2. .....

[4]

(b) Suggest why isolated islands such as South Uist are more easily colonised by birds than mammals.

.....

.....[1]

(c) State **three** reasons why South Uist provides a good habitat for Corncrakes.

1. .....

2. .....

3. .....[3]

(d) Explain why Corncrakes are becoming endangered by Hedgehogs.

.....

.....

.....[2]

For Examiner's Use

(e) Draw a food web to show the feeding relationships described in the passage. Assume that insects and worms feed on leaves.

[4]

(f) Suggest two ways by which the extinction of the Corncrake may be prevented.

1. .....

.....

2. .....

.....[2]

[Total : 16]

For Examiner's Use

2 Fig. 2.1 shows part of the lower surface of a typical dicotyledonous leaf.

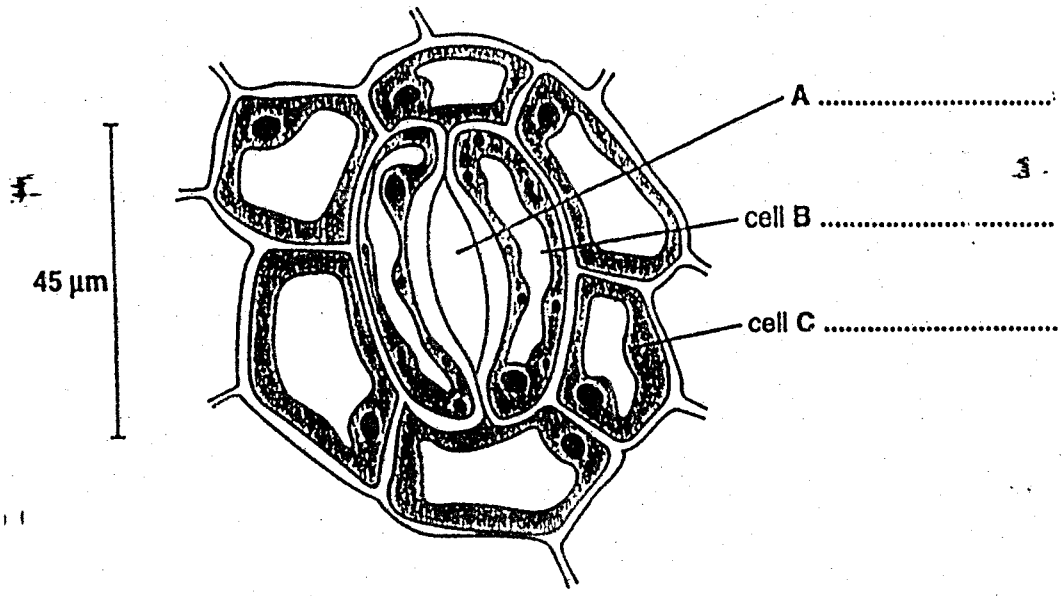

Fig. 2.1

(a) On Fig. 2.1, label part A and the cells B and C. [3]

The surfaces of the leaves of two species of plant were studied and the number of stomata per unit area (stomatal frequency) was recorded.

Cobalt chloride paper changes colour in the presence of water.

Pieces of cobalt chloride paper were attached to the upper and lower surfaces of leaves on both plants. The plants were set up for one hour during the day. Any colour changes were recorded. The experiment was repeated for one hour at night. Table 2.1 shows the results.

Table 2.1

plant species	stomatal frequency		colour change to cobalt chloride paper			
			day		night	
	lower surface	upper surface	lower surface	upper surface	lower surface	upper surface
Cassia fistula	0	18	✗	✓	✗	✗
Bauhinia monandra	22	0	✓	✗	✗	✗

Key

✓ colour change

✗ no colour change

(b) Describe the differences in stomatal distribution between the two species of plant.

.....

.....

.....[2]

For Examiner's Use

(c) (i) Explain the colour changes to the cobalt chloride paper during the day.

.....

.....

.....[3]

(ii) Suggest why there was no colour change for either plant at night.

.....

.....[1]

(d) Outline the mechanism by which water in the roots reaches the leaf.

.....

.....

.....

.....[3]

(e) State and explain the effect of the following on transpiration rate:

(i) Increasing humidity;

.....

.....

.....[2]

(ii) Increasing temperature.

.....

.....

.....[2]

[Total : 16]

3 Cystic fibrosis is an inherited disorder in humans in which an important protein is not produced. This protein is responsible for preventing the accumulation of thick and sticky mucus in the breathing tubes. The allele which causes cystic fibrosis is recessive to the normal allele (F).

(a) State the genotype of

(i) a carrier of cystic fibrosis; ..... [1]

(ii) a sufferer of cystic fibrosis. .....[1]

(b) Draw a genetic diagram to show if it is possible for a man with a dominant pair of alleles and a woman who is a carrier to produce a baby with cystic fibrosis. Identify the phenotypes of the children.

[4]

(c) Suggest how the build up of sticky mucus would affect a sufferer of cystic fibrosis.

.....

.....

.....[2]

[Total : 8]

Section B

Answer any two questions in this section on separate answer paper.

4 (a) Describe the functions of each of the following parts of the heart:

(i) right atrium;

(ii) right ventricle;

(iii) tricuspid valve.

[9]

(b) Outline the likely causes of a heart attack and suggest what preventive measures can be taken to maintain a healthy heart. [6]

5 (a) (i) Define the term *reflex action*. [3]

(ii) Describe the pupil reflex and explain its advantages. [5]

(b) Distinguish between rods and cones in terms of function and distribution. [4]

(c) Suggest how damage to **three named** parts of the eye could result in impaired vision or blindness. [3]

6 (a) Describe and explain the possible effects of allowing untreated sewage to enter a small lake. [5]

(b) Outline a treatment of sewage which would produce re-usable water. [6]

(c) Describe how a plant living in a dry habitat is adapted to conserve water. [4]

7 (a) Distinguish between *excretion* and *egestion*. [4]

(b) Describe the passage of water from blood in the aorta to its excretion via the urethra. Illustrate your answer with the aid of a simple, labelled diagram. [7]

(c) Outline the role of the liver in excretion. [4]

Centre Number	Candidate Number

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International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

Wednesday **15 NOVEMBER 2000** a.m. 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on any separate answer paper used.

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

1. fasten any separate answer paper used securely to the question paper,
2. enter the numbers of the Section B questions you have answered in the grid below.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.

You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

For Examiner's Use

Section A

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

1 Health workers in America were concerned about the diets of American people. In response a report was published called 'Dietary Goals'.

Fig.1.1 compares an average 1977 diet with the report's recommended dietary goals.

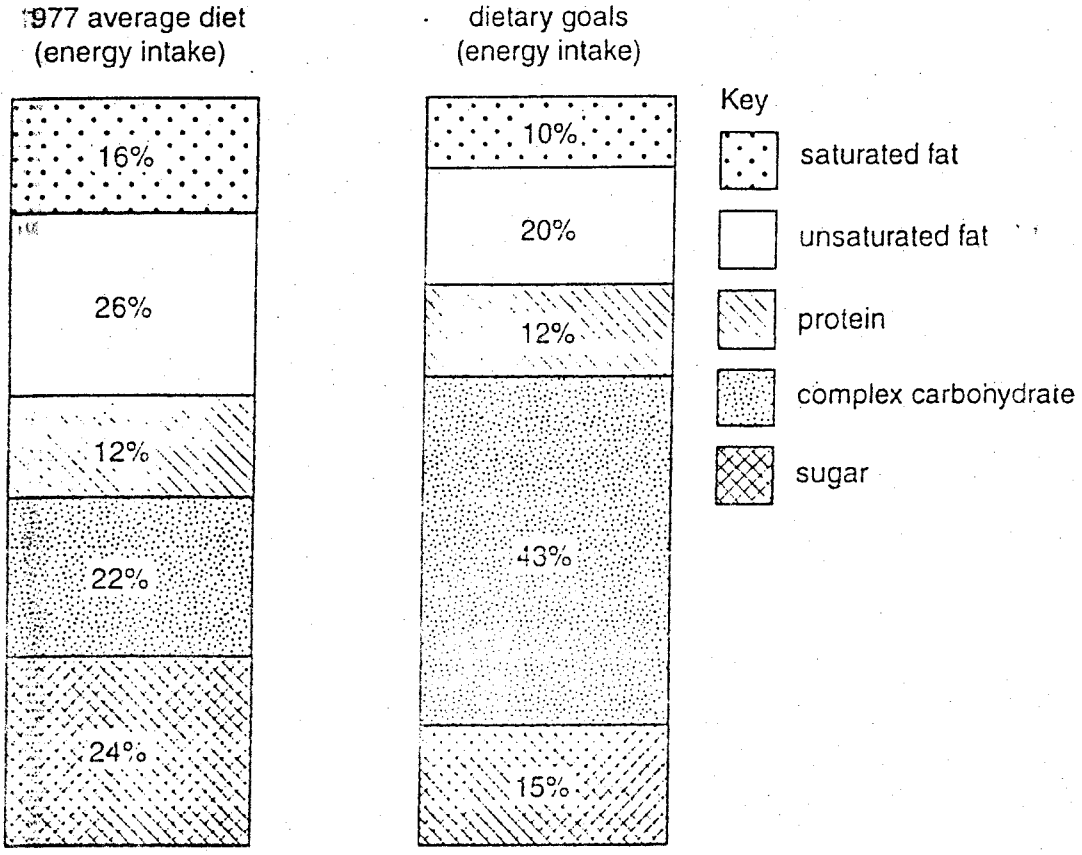

Fig. 1.1

(a) (i) What recommendations were made about changes to the fat content of the diet?

.....

.....

..... [2]

(ii) Suggest why these changes were recommended.

.....

.....

.....

..... 139

(h) Complex carbohydrates are long chain molecules.

Name a long chain carbohydrate present in

(i) plant tissue; .....

(ii) animal tissue. ..... [2]

(i) Suggest why a reduction in the sugar content of the diet was recommended.

.....

.....

..... [2]

It was also recommended that people should reduce their salt intake to about 3 g a day.

(j) Suggest why a high salt intake can be dangerous to health.

.....

..... [1]

Babies need a carefully controlled diet to keep them healthy. Mothers are often advised to feed their babies with breast milk rather than with milk derived from cows (formula milk).

(k) State three advantages of feeding a baby with breast milk compared with formula milk.

1. .....

2. .....

3. ..... [3]

[Total: 13]

2 Fig. 2.1 shows the growth of a yeast colony in a flask for 35 hours when provided with glucose solution in anaerobic conditions.

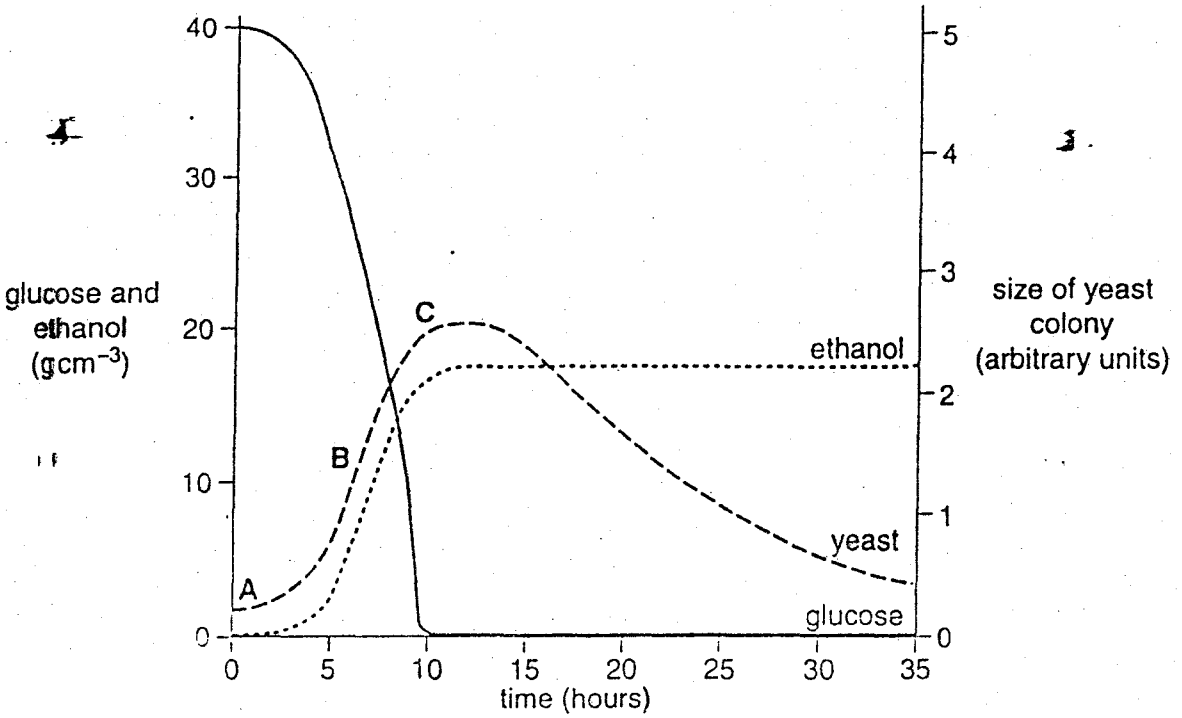

Fig. 2.1

(a) (i) Name the type of growth curve shown by the yeast population over the first 12 hours.

..... [1]

(ii) Name the phases labelled A, B and C.

A .....

B .....

C ..... [3]

(b) (i) Explain why ethanol (alcohol) appears in the flask.

.....

..... [1]

(ii) Suggest **two** reasons why the size of the yeast colony begins to decrease after 14 hours.

1. .....

2. ..... [2]

(c) (i) Describe how you could test for the presence of glucose in a sample of the mixture from the flask.

.....

.....

..... [2]

(ii) Describe the results of this test on a sample taken

1. at 0 hours; .....

2. at 10 hours. ..... [2]

(d) Write an equation **either** in words **or** symbols to show the reaction taking place in the flask while the yeast is active.

.....

[2]

(e) Over the 35 hour period, the pH of the mixture in the flask changes from pH7 to pH5. Suggest why this happens.

.....

..... [1]

[Total: 14]

3 Pregnant women at high risk of having a baby with Down's syndrome are often offered an amniocentesis. This technique is shown in Fig. 3.1.

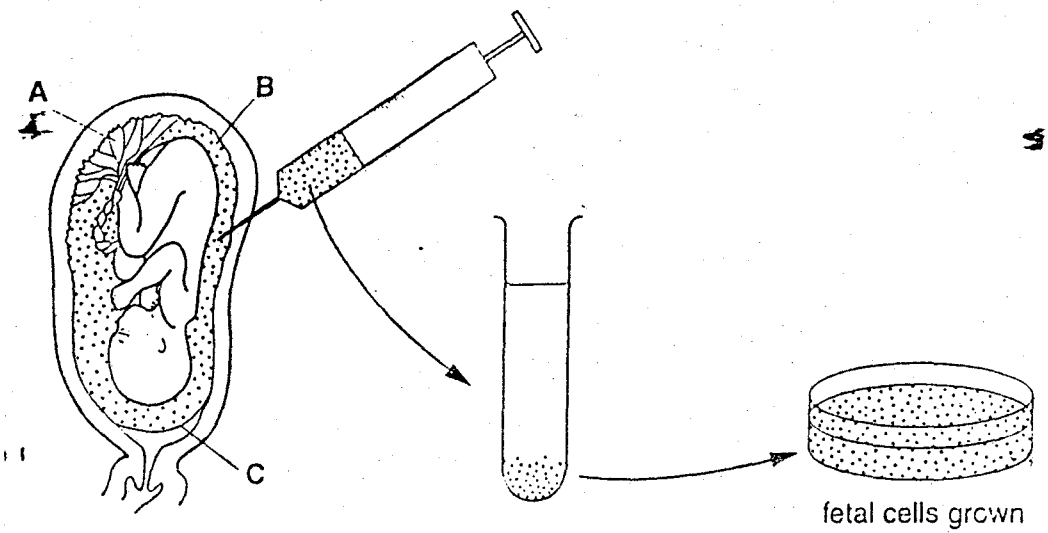

Fig. 3.1

(a) Complete the table by identifying the parts labelled A, B and C and stating a function of each one.

part	name	function
A		
B		
C		

[6]

The technique involves taking a sample of B from within the uterus. Fetal cells in the sample are then grown and analysed.

(b) (i) Suggest how the cells would be different from normal cells if the fetus has Down's syndrome.

.....

..... [1]

(ii) What is the cause of this difference?

.....

.....

(c) Suggest how the sex of the fetus could be identified by observation of fetal cells.

.....

.....

.....

..... [3]

During pregnancy women may also be monitored in other ways, including urine sampling.

(d) Suggest why the urine of pregnant women is analysed.

.....

.....

..... [2]

[Total: 13]

Section B

Answer **two** questions from this section on separate answer paper.

4 (a) Draw a labelled diagram of a **named** specialised plant cell and describe its function. [6]

(b) Describe the structure and functions of mammalian blood cells. [9]

5 (a) Explain what is meant by the term *hormone*. [3]

(b) Describe the function of a **named** hormone found in humans. [4]

(c) Explain how

(i) synthetic plant hormones can be used as weedkillers;

(ii) systemic pesticides can be used to protect crops. [8]

6 (a) Distinguish between the following groups of organisms:

(i) viruses and bacteria;

(ii) arachnids and crustacea;

(iii) monocotyledons and dicotyledons. [12]

(b) Using an example, explain the term *binomial system*. [3]

7 (a) Describe the processes, beginning with nutrition, which result in the formation of proteins in the leaves of a photosynthetic plant. [8]

(b) (i) Explain how amino acids in the small intestine of a mammal are assimilated into muscle tissue. [3]

(ii) Outline the role of proteins in animals. [4]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

MAY/JUNE SESSION 2001 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

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,

1. fasten all separate answer paper securely to the question paper;
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INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 8 printed pages. 146

Section A

Answer all the questions.

Write your answers in the spaces provided.

1 Fig. 1.1 shows *Euglena gracilis*, a single-celled organism, often found in freshwater ponds.

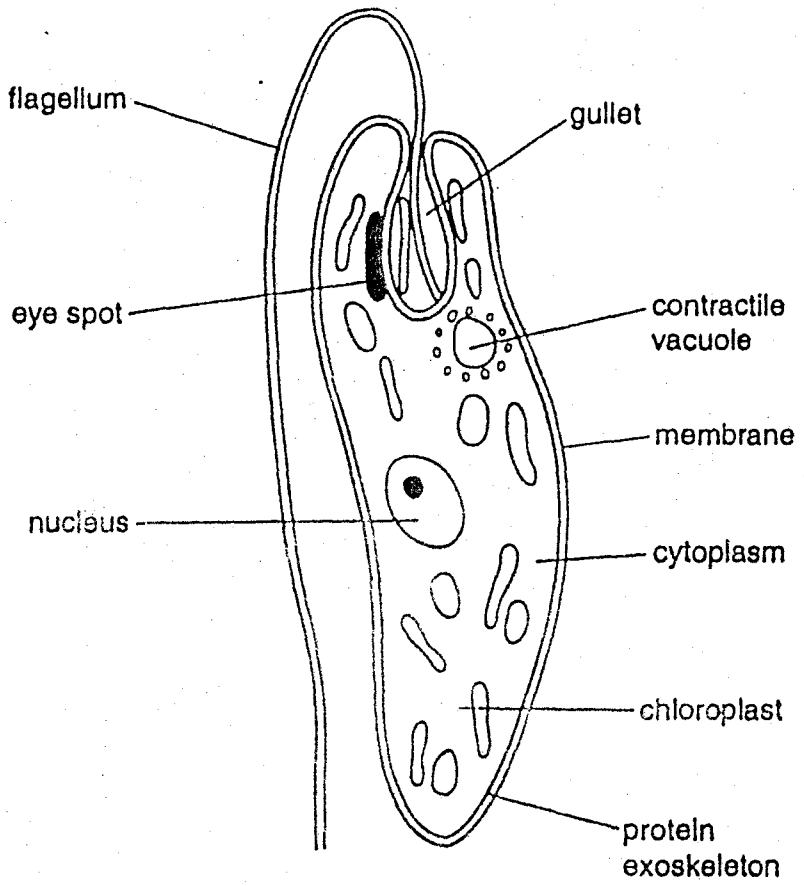

Fig. 1.1

Euglena shows a number of the characteristics of living things such as excretion, nutrition and irritability.

(a) Name three other characteristics of living things that you would expect this organism to show.

1. .....

2. .....

3. .....[3]

(b) *Euglena* is difficult to classify because it shows animal characteristics and plant characteristics, some of which are listed in the table below. For each characteristic, identify it as an animal, plant or bacterial cell feature by putting a tick (✓) for present or a cross (✗) for absent in each box in the table.

feature	animal cell	plant cell	bacterial cell
chloroplast			
cytoplasm			
membrane			
nucleus			

[4]

(c) The cytoplasm of *Euglena* contains salts that are more concentrated than those in the surrounding water. The contractile vacuole excretes any excess of water.

Explain why this function of the contractile vacuole is important to this organism.

.....

.....

.....

.....[3]

(d) *Euglena* has an eye spot that is sensitive to light.

(I) Suggest and explain how the organism would respond if there was an area of brighter light nearby.

.....

.....

.....[2]

(II) Explain how the organism would benefit from this reaction.

.....

.....

.....[2]

[Total : 14]

2 Nitrogen and phosphorus are elements that are essential for plant growth. These occur in the form of nitrate and phosphate respectively. In most freshwaters, phosphate occurs in far smaller amounts than nitrate, which is normally in excess. As a result, it is variations in the phosphate concentration that determine whether plant growth is promoted or inhibited. Phosphorus is, therefore, known as the limiting nutrient.

(a) (i) Explain why phosphorus is considered to be the limiting nutrient for water plants.

.....

.....

.....[2]

(ii) State, with a reason, the effect of a small decrease in the nitrate supply to water plants.

.....

.....[1]

(b) Name two factors, other than nutrients or light, that can limit plant growth.

1. .....

2. .....[2]

(c) Describe an investigation you could carry out to show that phosphate is a limiting nutrient for water plants.

.....

.....

.....

.....

.....

.....

.....[6]

(d) Table 2.1 shows the concentration of phosphate and algal cells in water samples collected upriver and downriver of a fish farm.

Table 2.1

concentration	water tested	
	upriver	downriver
phosphate (μg per dm^3)	10.0	58.0
algal cells (number per cm^3)	3.8	13.0

(I) Describe the effect of the fish farm on phosphate levels in the river.

.....

.....

.....[2]

(II) Suggest a reason for this effect.

.....

.....[1]

(III) Explain how the presence of the fish farm may be harmful to life in the river.

.....

.....

.....

.....

.....[4]

[Total : 18]

3 Table 3.1 shows the effects of drinking alcohol on a man's responses. The response time was the time taken for him to press a button after a light was switched on.

Table 3.1

test	response time (seconds)	
	before drinking	after drinking
1	0.25	0.40
2	0.20	0.40
3	0.15	0.35
4	0.10	0.35
5	0.05	0.30
6	0.05	0.30
7	0.05	0.35
8	0.05	0.35
9	0.10	0.30
10	0.10	0.30
mean		

(a) Complete the table by calculating the mean response times for the man before and after drinking alcohol. [1]

(b) State and explain the effect of drinking on the man's mean response time.

Effect .....

Explanation .....

.....[3]

(c) Outline the dangers of excessive consumption of alcohol.

.....

.....

.....

.....

.....[4]

[Total : 8]

Section B

Answer any **two** questions.

Write your answers on the separate answer paper provided.

4 (a) Describe how glucose is absorbed in the small intestine, passes to the liver and is subsequently stored in the body. [6]

(b) Outline how the blood glucose level is corrected when it rises above normal and when it falls below normal. [5]

(c) Glucose can be converted to lactic acid in the body. Describe the circumstances that cause this to happen. [4]

[Total : 15]

5 (a) With reference to sulphur dioxide as a pollutant, describe its source, effects on the environment and possible methods of control. [6]

(b) Outline the undesirable effects of deforestation. [6]

(c) Explain why non-biodegradable plastics are less environmentally friendly than biodegradable plastics. [3]

[Total : 15]

6 (a) Using suitable examples, distinguish between *continuous* and *discontinuous variation*. [6]

(b) (i) Define *mutation*. [2]

(ii) State the factors that cause an increase in the rate of mutation and describe the effects of these mutations in humans. [4]

(iii) Explain the incidence of sickle cell anaemia in relation to that of malaria. [3]

[Total : 15]

7 (a) Define *asexual reproduction*. [3]

(b) Describe the process of asexual reproduction in a potato plant. [7]

(c) Potatoes can also reproduce sexually, forming seeds. Discuss the advantages **to potato plants** of asexual and sexual reproduction. [5]

[Total : 15]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/3

PAPER 3

OCTOBER/NOVEMBER SESSION 2001 1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

Section A

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Section B

Answer any **two** questions.

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INFORMATION FOR CANDIDATES

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You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

For Examiner Use

Section A

Answer **all** the questions.

Write your answers in the spaces provided.

1 Three species of squirrel, known as Loga, Jirit and Soksak, live in trees in the same forest in Indonesia. The squirrels were observed and a record kept of their heights above ground. Fig. 1.1 shows the vertical distribution of these species.

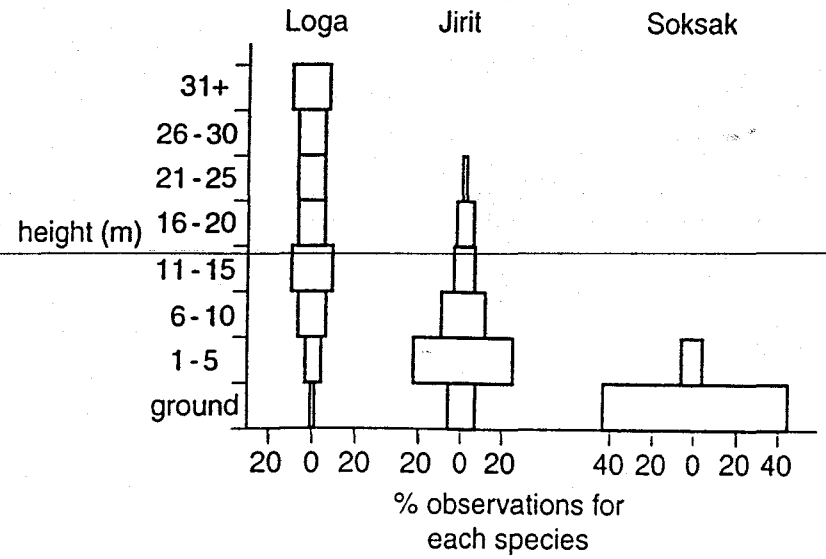


Fig. 1.1

(a) (i) Using Fig. 1.1, describe the distribution of each species.

Loga .....

.....

Jirit .....

.....

Soksak .....

.....[6]

(ii) Suggest why the Soksak may be at greater risk of predation than the other two species.

.....

.....[1]

Fig. 1.2 shows the diets of the three species of squirrel.

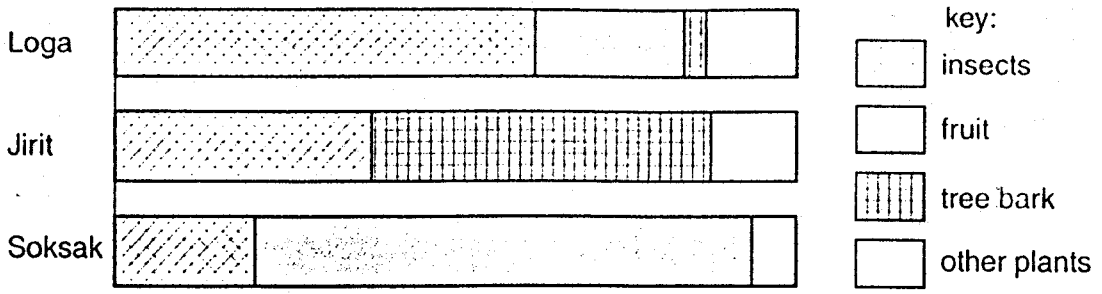


Fig. 1.2

(b) (i) State which types of food are found in all three diets.

.....[1]

(ii) Suggest two reasons why the three species can survive together in the same forest, even though they have these types of food in common.

1. .....

.....

2. .....

.....[2]

(c) (i) The insects in the diet of Loga feed on fruit.

Draw a food web for Loga using information from Fig. 1.2.

[3]

(ii) Name the trophic level in this food web for

insects; .....

fruit; .....

Loga (when feeding on insects). .....[3]

[Total : 16]

2 Young mosquitoes (larvae) feed on water plants, such as *Chlorella*.

However, adult female mosquitoes feed on the blood of mammals, such as cows, horses and humans. During the process, they can transmit diseases, such as malaria.

The mosquitoes produce only one protease enzyme, called trypsin. Scientists have identified a hormone that switches off the ability of mosquitoes to secrete trypsin. They genetically modified *Chlorella* to make the hormone and introduced the plant into lakes where mosquitoes are a problem. This reduces the population of mosquitoes and should help to prevent the spread of malaria. Other animals that eat *Chlorella* are not affected because they do not depend on trypsin alone.

(a) (i) Explain why an adult female mosquito needs to secrete trypsin.

.....

.....

.....[2]

(ii) What product would be present in the gut of a mosquito if trypsin had been active?

.....[1]

(iii) Suggest **one** use of this product in the body of the mosquito.

.....[1]

(b) Suggest why developing the genetically modified *Chlorella* may be a better way of killing mosquitoes than using insecticides.

.....

.....

.....

.....[3]

(c) Food supply is one factor that affects the growth of a population.

State two other factors that also affect population growth.

1. .....

2. .....[2]

(d) (i) Define the term *hormone*.

.....

.....

.....[2]

(ii) Hormones are used medically to control or improve human fertility.

Name a hormone used for this purpose and state its function.

.....

.....

.....[2]

[Total : 13]

For Examiner Use

3 Fig. 3.1 shows the relationship between a group of alveoli and its blood supply.

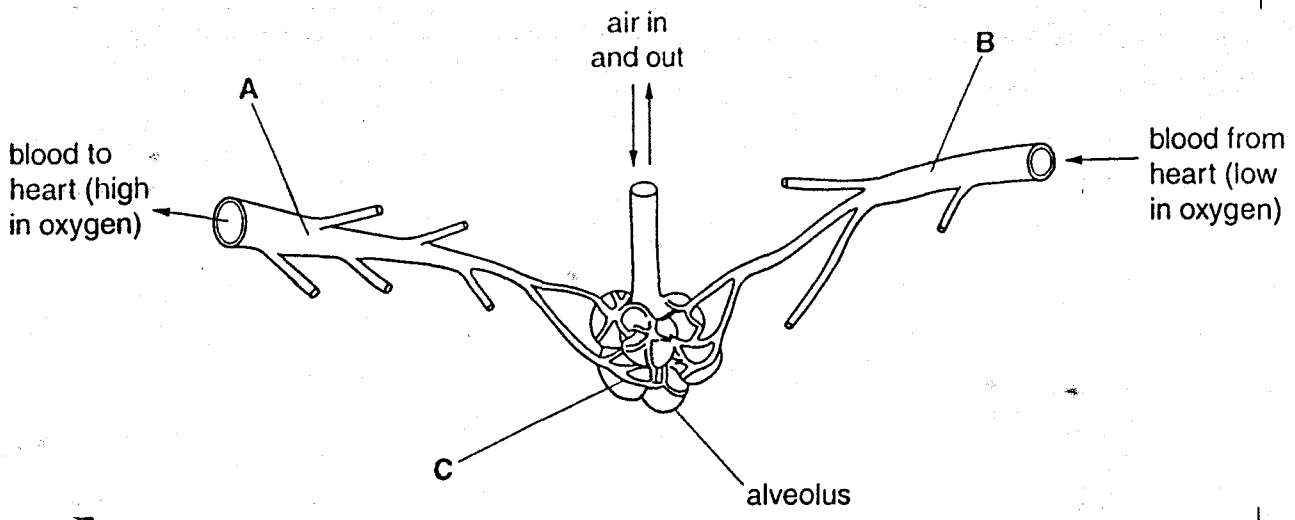


Fig. 3.1

(a) Name the types of blood vessels labelled **A**, **B** and **C**.

A .....

B .....

C .....[3]

(b) The alveolus is a structure involved in gaseous exchange.

(i) List two features of such structures.

1. .....

2. .....[2]

(ii) Oxygen is absorbed into the blood from the alveolus.

Explain how this oxygen is carried in the blood.

.....

.....

.....[2]

(c) Explain the effect on a person of a lack of iron in the diet.

.....

.....

.....

.....

.....[4]

[Total : 11]

Section B

Answer any **two** questions.

Write your answers on the separate answer paper provided.

4 **(a)** Construct a table to compare the main features used in the classification of viruses, bacteria and fungi. [9]

(b) Describe how a **named** type of microorganism is used in the food industry to produce a **named** product. [6]

[Total : 15]

5 Explain how

(a) malnutrition can lead to coronary heart disease; [5]

(b) food moves from the mouth to the stomach; [6]

(c) carbon dioxide levels in the air during the day may be lower than at night. [4]

[Total : 15]

6 When pure breeding tall pea plants (T) are crossed with pure breeding dwarf pea plants (t), 100% of the first generation appear tall. When these plants are self-pollinated, 75% of the second generation are tall, while the remainder are dwarf.

(a) Draw genetic diagrams to help explain how the percentages in the first and second generations come about. Use appropriate genetic terms in your answer. [9]

(b) Explain why it would be undesirable for a farmer to use too much fertiliser to grow a leguminous crop such as pea plants. [6]

[Total : 15]

7 **(a)** Compare the different structural adaptations of an insect-pollinated flower and a wind-pollinated flower. [9]

(b) Describe how fertilisation in a human differs from that in a flower. [6]

[Total : 15]

Candidate Name _____

Centre Number	Candidate Number

International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS

BIOLOGY 0610/3

PAPER 3

MAY/JUNE SESSION 2002
1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

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,

1. fasten all separate answer paper securely to the question paper;
2. enter the numbers of the Section B questions you have answered in the grid below.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.

You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 9 printed pages and 3 blank pages. 161

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

[Turn over

For Examiner's Use

Section A

Answer **all** the questions.

Write your answers in the spaces provided.

1 Pond snails are invertebrates which are often found in ponds amongst the pondweed *Elodea*.

(a) Suggest two reasons why pond snails live amongst *Elodea*.

1. .....

.....

2. .....

.....[2]

(b) Six boiling tubes were filled with fresh pond water, to which some hydrogencarbonate indicator solution was added. This indicator is red in water of pH 7, purple when carbon dioxide levels are low and yellow when carbon dioxide levels are high.

The tubes and their contents were set up in daylight, as shown in Table 1.1.

Table 1.1

tube	organisms added	conditions
1	one piece of *Elodea*	uncovered
2	one pond snail	uncovered
3	one piece of *Elodea* and one pond snail	uncovered
4	one piece of *Elodea* and several pond snails	uncovered
5	one piece of *Elodea*	covered with black paper
6	none	uncovered

Table 1.2 shows the results after one hour.

Table 1.2

tube	1	2	3	4	5	6
colour of indicator	purple	yellow	red	yellow	yellow	red

For Examiner's Use

(i) Explain the results for tubes 1–5.

tube 1 .....

.....

tube 2 .....

.....

tube 3 .....

.....

tube 4 .....

.....

tube 5 .....

.....[10]

(ii) Suggest why tube 6 was used.

.....

.....

.....[2]

[Total : 14]

For Examiner's Use

2 Fig. 2.1 shows a human sperm cell.

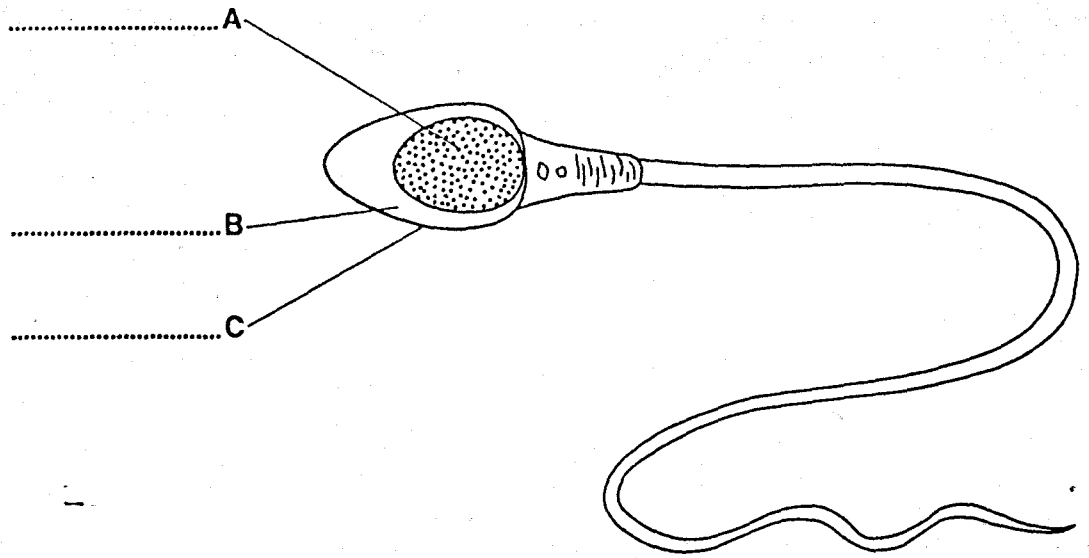


Fig. 2.1

(a) On Fig. 2.1, label the cell parts **A**, **B** and **C**. [3]

(b) Sperm cells contain only half the number of chromosomes present in other body cells.

(i) State the term used to describe this reduced number of chromosomes.

.....[1]

(ii) Define the term *chromosome*.

.....

.....[2]

For Examiner's Use

(c) Using the symbols **X** and **Y**, draw a genetic cross to show how sex is inherited in humans and state the ratio of males to females produced.

[4]

[Total : 10]

For Examiner's Use

3 A student cut pieces of potato to the same length and placed them in boiling tubes containing a range of sugar solutions. Two pieces were placed into each boiling tube.

Each piece was remeasured after 24 hours. Table 3.1 shows the results of the experiment.

Table 3.1

concentration of sugar solution (mol)	length of potato at start (mm)	length of potato after 24 hours (mm)		mean length (mm)	mean change in length (mm)	% change in length
		piece 1	piece 2			
0	60	60	64	62.0	+2.0	+3.3
0.2	60	58	59	58.5	–1.5	–2.5
0.4	60	55	55	55.0	–5.0	–8.3
0.6	60	54	54	54.0	–6.0	–10.0
0.8	60	53	54			
1.0	60	52	53	52.5	–7.5	–12.5

Space for rough work.

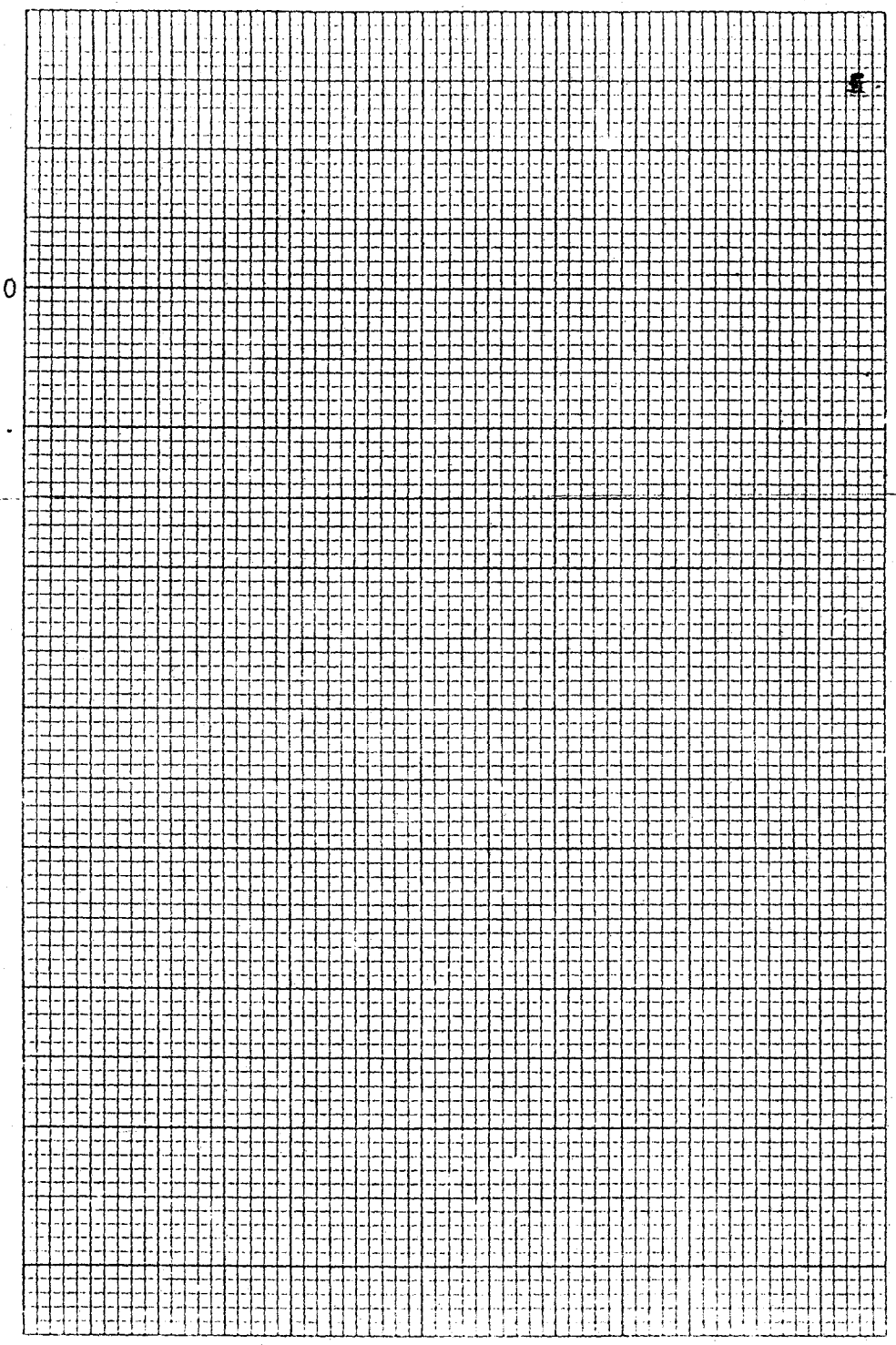
The percentage change in length was calculated using the equation shown below.

$$\% \text{ change in length} = \frac{\text{mean change in length}}{\text{original length}} \times 100$$

(a) Complete the table by calculating the mean length, the mean change in length and the percentage change in length for the potato pieces in 0.8 mol sugar solution. Use the space under the table for rough work. [3]

For Examiner Use

(b) Plot a line graph of percentage change in length against concentration on the grid provided.



[6]

(c) (i) Use your graph to predict in which sugar concentration there would be no change in length.

.....[1]

For Examiner's Use

(ii) Explain why there would be no change in length at this concentration.

.....

.....

.....[2]

(d) The student thought that not all the measurements recorded in Table 3.1 were correct.

(i) Which measurement is most likely to be incorrect?

.....[1]

(ii) State the effect of this inaccuracy on the calculations for the concentration concerned.

.....

.....[1]

(e) Changes in length of the pieces of potato were due to osmosis.

State two ways in which osmosis is beneficial to plants.

1. .....

.....

2. .....

.....[2]

[Total : 16]

Section B

Answer any **two** questions.

Write your answers on the separate answer paper provided.

4 **(a)** **(i)** Define the term *transpiration.* [3]

(ii) Describe how you would carry out an experiment to compare the rate of transpiration from a small plant **or** a leafy shoot in cool and in hot conditions. Predict the results you would expect to obtain. [8]

(b) Explain how wilting occurs. [4]

[Total : 15]

5 **(a)** **(i)** Describe how nitrogen in the air can become part of a protein molecule in the muscle of a herbivorous mammal. [9]

(ii) Outline the functions of proteins in mammals, other than for muscle formation. [3]

(b) Explain how a deficiency of magnesium ions can result in poor plant growth. [3]

[Total : 15]

6 **(a)** Name and describe **one** example of each of the following methods of birth control:

(i) natural; [3]

(ii) chemical; [3]

(iii) mechanical; [3]

(iv) surgical. [3]

(b) Describe the process of reproduction in bacteria. [3]

[Total : 15]

7 (a) Construct a table to distinguish between arteries and veins. [5]

(b) Describe how capillaries enable the transfer of **named** materials between blood and tissue fluid. [4]

(c) (i) Outline the pathway taken when blood flows through the double circulatory system. [4]

(ii) Suggest the advantages of a double circulatory system. [2]

[Total : 15]

10

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11

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Centre Number	Number

Candidate Name _____

International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS

BIOLOGY 0610/3

PAPER 3

OCTOBER/NOVEMBER SESSION 2002
1 hour 15 minutes

Additional materials:
Answer paper

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

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,

1. fasten any separate answer paper used securely to the question paper;
2. enter the numbers of the Section B questions you have answered in the grid below.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.

You are advised to spend no longer than 30 minutes on Section A.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 8 printed pages.

SPA (NF/KN) S17699/2

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

[Turn over

For Examiner Use

Section A

Answer **all** the questions.

Write your answers in the spaces provided.

1 Fig. 1.1 shows a food web in an ecosystem.

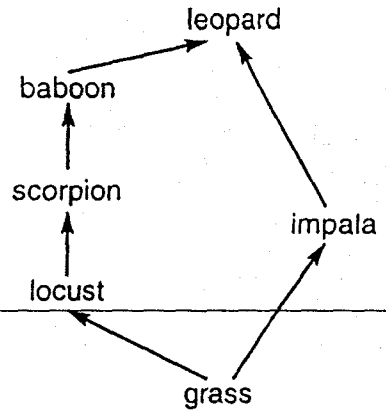


Fig. 1.1

(a) Define the following terms:

(i) *ecosystem*;

.....

.....[1]

(ii) *food web*.

.....

.....

.....[2]

(b) **(i)** Name the herbivores shown in the food web.

.....[1]

(ii) Suggest why it is difficult to state the trophic level to which the leopard belongs in this food web.

.....

.....[1]

Examiner's Use

(c) In some years, there are plagues of locusts.

State and explain the effect such a plague might have on numbers of

(i) impala;

.....

.....[1]

(ii) scorpions.

.....

.....[1]

(d) During one locust plague, although the baboons had more food, their numbers subsequently dropped.

(i) In terms of the food web, explain how this happened.

.....

.....

.....[2]

(ii) Suggest another reason, **not** related to the food web or hunting, for the drop in baboon numbers.

.....

.....[1]

(e) Leopards are sometimes hunted for their fur and other uses.

Suggest two reasons for banning the hunting of leopards.

1. .....

.....

2. .....

.....[2]

[Total : 12]

For Examiner's Use

2 Fig. 2.1 shows a nerve cell.

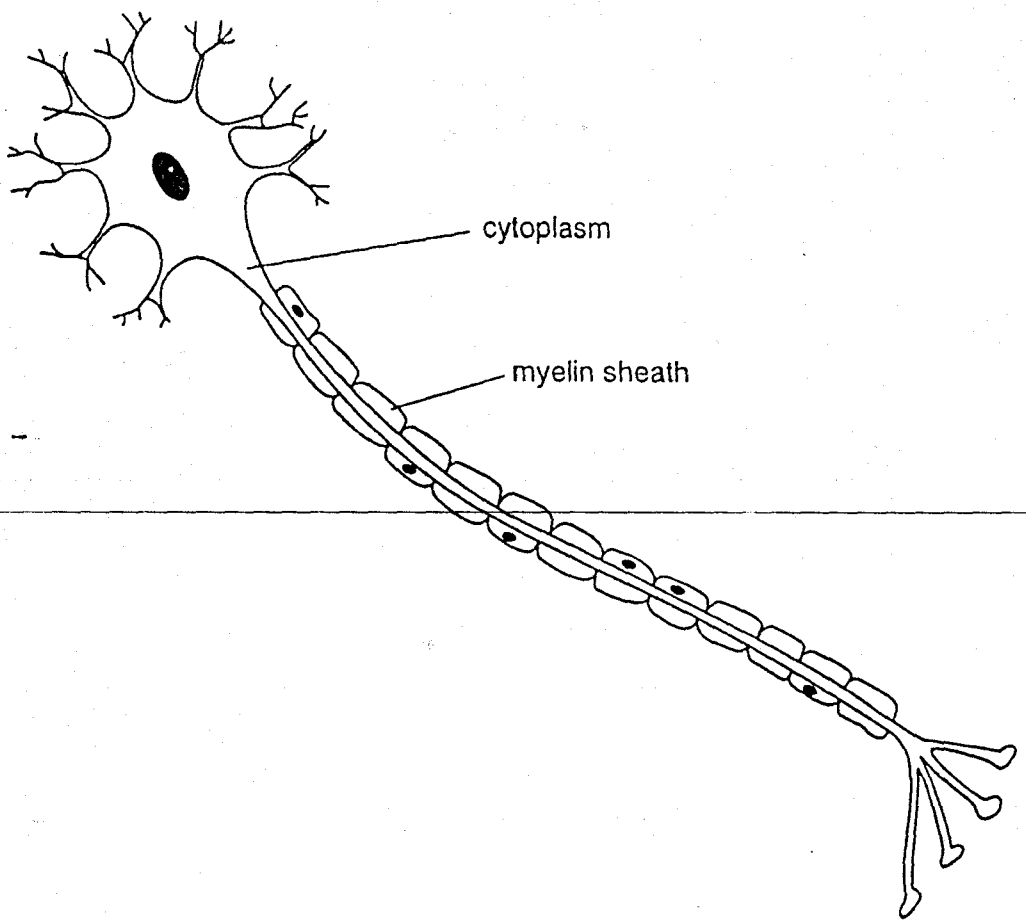


Fig. 2.1

(a) (i) Name the type of nerve cell shown in Fig. 2.1.

.....[1]

(ii) State two features that distinguish it from other types of nerve cell.

1. .....

2. .....[2]

(iii) Where, in the nervous system, is this cell located?

.....[1]

For Examiner's Use

(b) Nerve cells are specialised cells.

Suggest how the parts of the nerve cell labelled in Fig. 2.1 enable the nerve cell to function successfully.

cytoplasm .....

.....

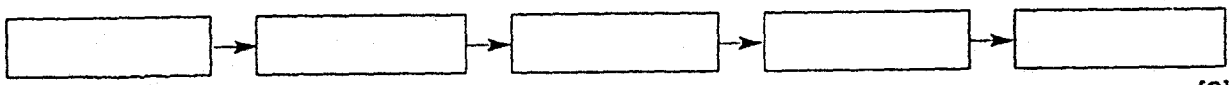
myelin sheath .....

.....[4]

(c) Reflexes involve a response to a stimulus.

(i) Complete the flow chart by putting the following terms in the boxes to show the correct sequence in a reflex.

coordinator **effector** **receptor** **response** **stimulus**



[2]

(ii) For the pupil reflex, identify each of the parts of the sequence by completing Table 2.1. The first has been done for you.

Table 2.1

part of sequence	part in pupil reflex
coordinator	brain
effector	
receptor	
response	
stimulus	

[4]

[Total : 14]

For Examiner's Use

3 Fig. 3.1 shows part of a villus in the small intestine.

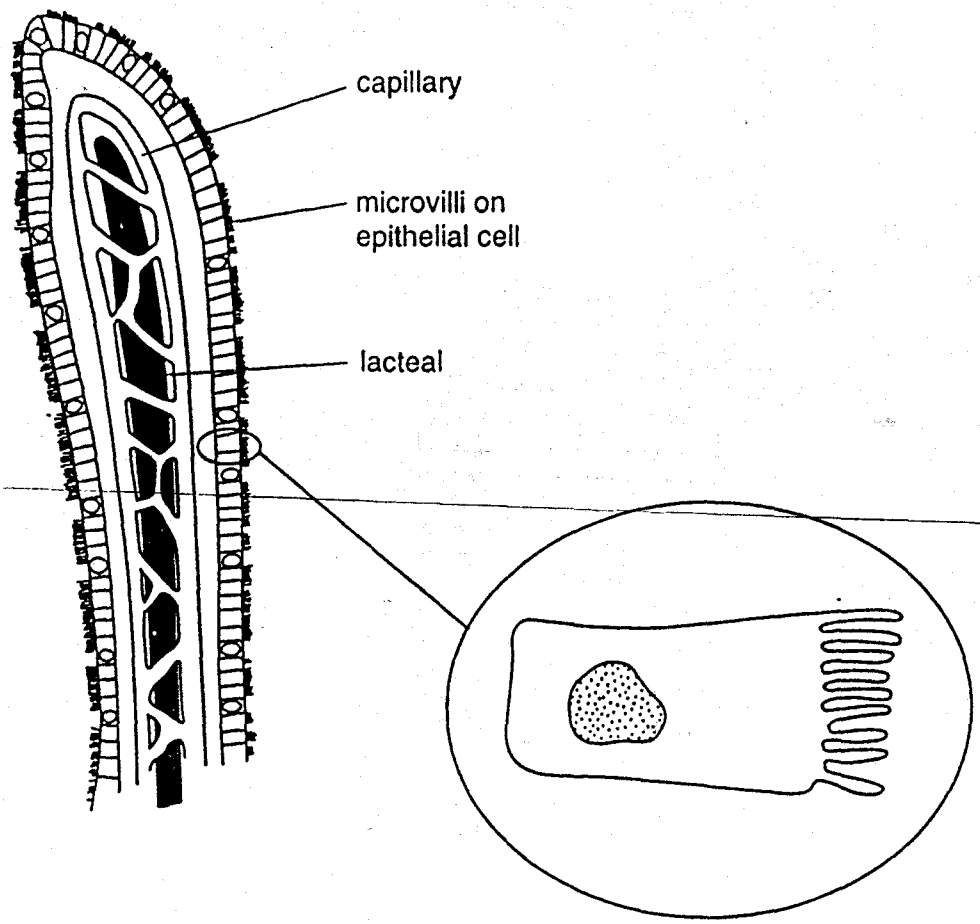


Fig. 3.1

(a) (i) State the roles of the following structures in the villus:

capillary; .....

.....

lacteal. .....

.....[4]

(ii) The epithelial cells, one of which is shown enlarged on Fig. 3.1, have microvilli on their exposed surface.

Suggest an advantage of these microvilli to the epithelial cells.

.....

.....[1]

For Examiner's Use

(b) (i) Name the process by which the products of digestion, present in high concentrations in the ileum, would pass into the capillaries.

.....[1]

(ii) Describe how the capillaries are adapted to allow this process to happen efficiently.

.....

.....

.....[2]

(c) Some substances are absorbed into the capillaries by active uptake.

(i) Explain why active uptake is sometimes necessary.

.....

.....

.....[2]

(ii) Suggest why active uptake stops when the epithelial cells of the ileum are exposed to a respiratory poison.

.....

.....

.....[2]

(d) The lacteal, seen in the middle of the villus, is part of the lymphatic system.

State two functions of the lymphatic system, **not** associated with the ileum.

1. .....

2. .....[2]

[Total : 14]

Section B

Answer any **two** questions.

Write your answers on the separate answer paper provided.

4 (a) Explain how auxins in a shoot that is placed horizontally change the direction of its growth. [5]

(b) State the sites of production and describe the roles of oestrogen and progesterone

(i) in the menstrual cycle; [6]

(ii) during pregnancy. [4]

5 (a) Fig. 5.1 shows some of the features of a typical wind-pollinated flower.

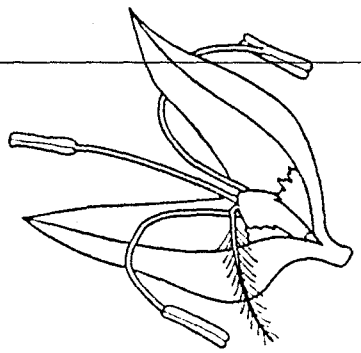


Fig. 5.1

(i) Describe the features that make a typical wind-pollinated flower different from a typical insect-pollinated flower. [9]

(ii) Suggest how pollen of a wind-pollinated flower would be different from that of an insect-pollinated flower. [3]

(b) Outline the implications to a species of self-pollination. [3]

6 (a) Define the term *respiration*. [3]

(b) By means of a table, distinguish between aerobic respiration and anaerobic respiration. [5]

(c) Explain how a mammal regulates its body temperature after a period of strenuous exercise. [7]

7 (a) Distinguish between each of the following pairs of terms:

(i) phenotype and

(ii) dominant and

(iii) homozygous and

(b)

(i)

(ii)

Centre Number	Candidate Number	Name

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

BIOLOGY 0610/03

Paper 3

May/June 2003

1 hour 15 minutes

Additional Materials: Answer 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 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,
1. fasten all your work securely together;
2. enter the numbers of the Section B questions you have answered in the grid below.

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	
Total	

For Examiner's Use

Section A

Answer **all** the questions.

Write your answers in the spaces provided.

1 Fig. 1.1 shows an incomplete diagram of the female urinary system.

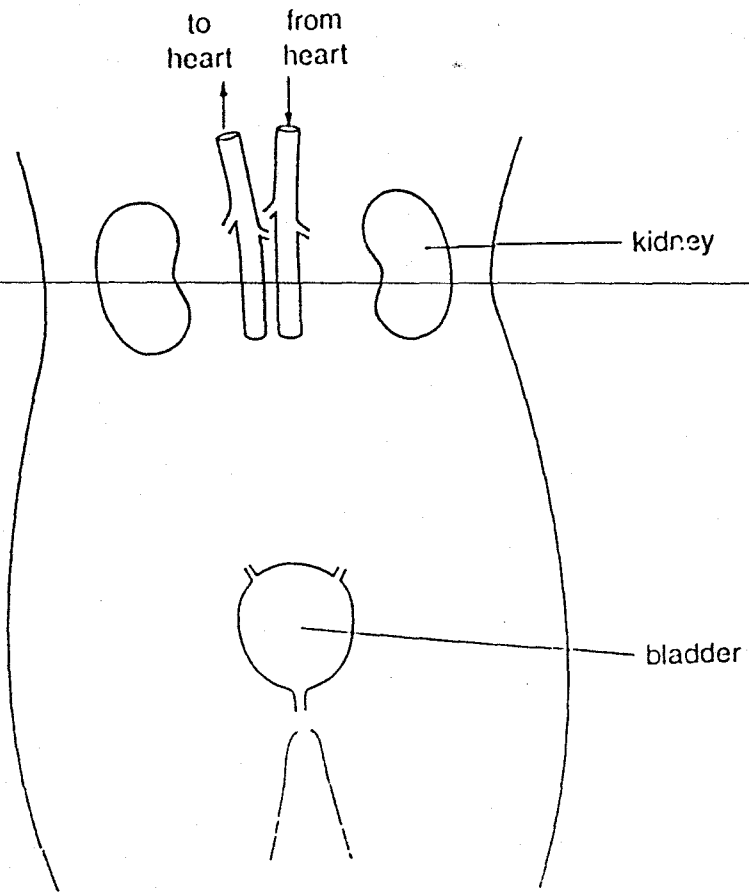


Fig. 1.1

(a) On Fig. 1.1, draw and label the following parts:

renal artery, urethra and ureter. [4]

(b) Name three components that are present in the urine of a healthy person.

1. .....

2. .....

3. ..... [3]

(c) If the kidneys fail, the patient may be put on a kidney machine.

Explain how a kidney machine works.

.....

.....

.....

.....

.....[4]

(d) The kidneys are part of the body's homeostatic mechanism.

(i) Define *homeostasis*.

.....

.....

.....[2]

(ii) Outline the role of the kidneys in homeostasis.

.....

.....

.....[2]

(iii) Name another organ of the body also involved with homeostasis and outline its role.

name of organ .....

role .....

.....

.....[3]

[Total : 18]

For Examiner's Use

2 A study was carried out to compare the amount of tooth decay in the children of two different towns. Town A had drinking water containing fluoride at a concentration of 2 parts per million. Town B had no fluoride in its drinking water.

Fig. 2.1 shows the results of the study, but the graph is incomplete.

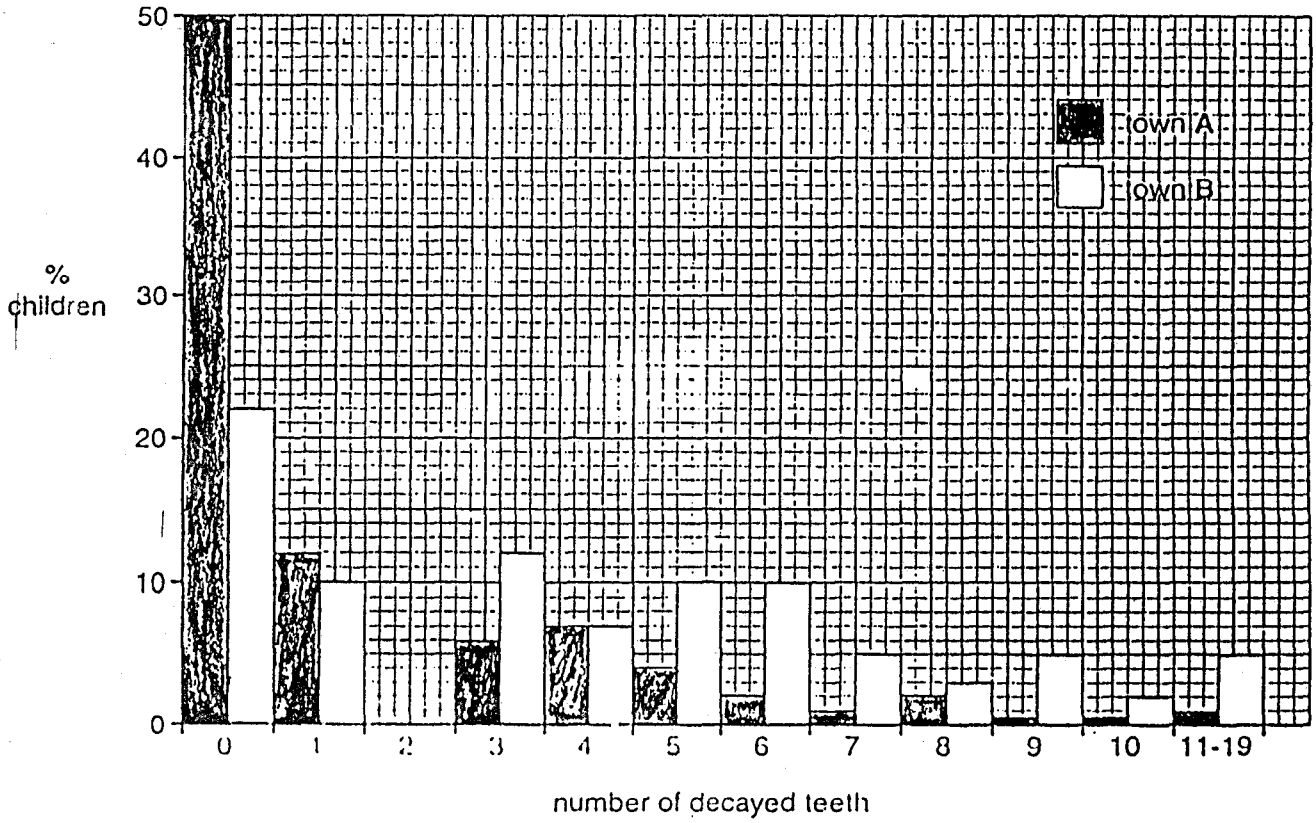


Fig. 2.1

(a) Complete Fig. 2.1, using the following data.

town	number of decayed teeth	% children
A	2	13
B	2	9

[2]

(b) (i) For town B, state the percentage of children with three decayed teeth.

.....[1]

(ii) For town **A**, calculate the total percentage of children with **less** than five decayed teeth. Show your working.

total percentage .....[2]

(c) (i) What conclusion, relating to the effect of fluoride, can be drawn from this study?

.....

.....[1]

(ii) Based on your conclusion, what recommendation should be given to town B?

.....

.....[1]

(iii) Explain why some people may object to this recommendation.

.....

.....[1]

[Total : 8]

3 The seaweed, *Caulerpa taxifolia*, lives in tropical oceans but is now also found in the Mediterranean sea, where it grows at twice the rate of local seaweeds. As a result, the local seaweeds are becoming rare.

Although not poisonous, *Caulerpa* produces a chemical in its cells that makes it inedible to Mediterranean herbivores, such as sea urchins. They do not feed on it and their numbers are decreasing. Carnivorous fish populations have also decreased by up to 50 %.

Marine conservationists are very concerned. At first they used chlorine to kill *Caulerpa* but are now considering the introduction of tropical sea slugs (herbivorous molluscs). *Caulerpa* is part of their natural diet.

(a) The seaweed, *Caulerpa taxifolia*, is named using the binomial system.

Explain the term *binomial system*.

.....

.....

.....[2]

(b) (i) Suggest why the local seaweeds are becoming rare.

.....

.....[2]

(ii) Sea urchins are herbivores. Define the term *herbivore*.

.....

.....[1]

(iii) Suggest why the populations of carnivorous fish have decreased by up to 50%.

.....

.....

.....[2]

(c) Suggest why using chlorine to kill *Caulerpa* might not be a good idea.

.....

.....[1]

(d) (i) Suggest why conservationists are concerned about the effects of *Caulerpa* on other organisms in the Mediterranean.

.....

.....

.....[2]

(ii) Explain how the introduction of herbivorous sea slugs from the tropics could be effective in re-establishing a balanced ecosystem.

.....

.....

.....[2]

(iii) Outline the possible dangers of introducing tropical sea slugs.

.....

.....

.....[2]

[Total : 14]

For Examiner's Use

Section B

Answer any two questions.

Write your answers on the separate answer paper provided.

4 (a) (i) Describe the main similarities between insects and arachnids. [3]

(ii) By means of a table, show the differences between insects and arachnids. [5]

(b) Suggest and explain how a **named** insect could evolve over a period of time. [7]

[Total : 15]

5 (a) Explain why, in some parts of the world, not enough food is available to feed the people living there. [10]

(b) Describe the uses of hormones in food production. [5]

[Total : 15]

6 (a) Explain the term *codominance*. [3]

(b) Using a suitably labelled genetic diagram, explain how a baby can have blood group O (I^oI^o) when its mother is group A and its father is group B. [6]

(c) (i) Describe and explain what could happen when blood of different groups is mixed. [3]

(ii) Describe and explain the role of the placenta in relation to this problem. [3]

[Total : 15]

7 (a) State the functions of five named parts of the male reproductive system. [5]

(b) (i) Explain how sperm, deposited in the vagina during sexual intercourse, reach an egg. [4]

(ii) Describe the process of fertilisation. [3]

(c) Outline the ways in which HIV can be prevented from spreading. [3]

[Total : 15]

Centre Number	Candidate Number	Name

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

BIOLOGY 0610/03

Paper 3

October/November 2003

1 hour 15 minutes

Additional Materials: Answer 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 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,
1. fasten all your work securely together;
2. enter the numbers of the Section B questions you have answered in the grid below.

The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
Section A	
Section B	
Total	

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.

This document consists of 10 printed pages and 2 blank pages.

For Examiner's Use

Section A

Answer all the questions.

Write your answers in the spaces provided.

1 Fig. 1.1 shows a longitudinal section through a broad bean seed.

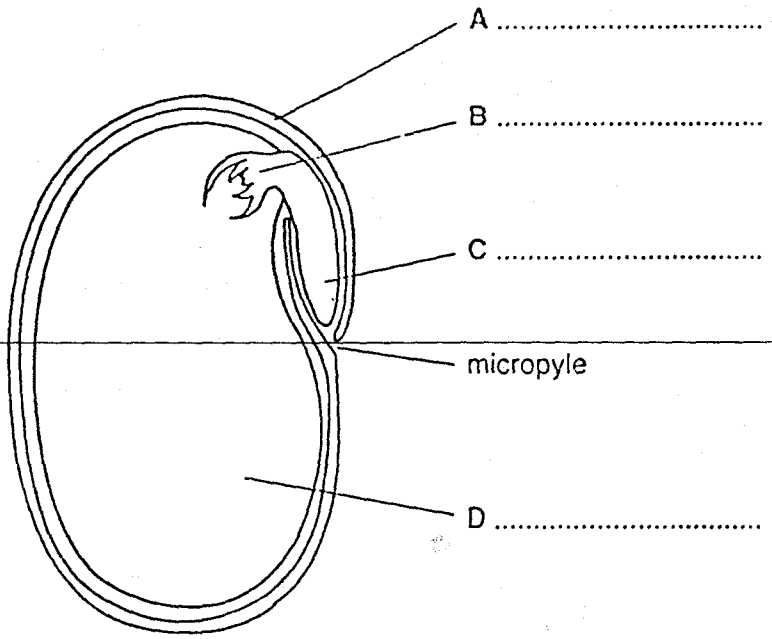


Fig. 1.1

(a) On Fig. 1.1, label parts A, B, C and D. [4]

(b) Name the part of the flower in which the seed was formed.

.....[1]

(c) Broad bean flowers are pollinated by insects such as bees.

(i) Describe the function of bees in pollination.

.....

.....

.....[2]

(ii) State two structural adaptations you would expect to find in a flower, such as a broad bean, that would attract bees.

.....

For Examiner's Use

(iii) The activity of bees usually results in cross-pollination.
Explain why cross-pollination may be an advantage to a species of plant.

.....

.....

.....[2]

(d) The micropyle is shown on Fig. 1.1.
Describe the role of the micropyle in

(i) fertilisation;

.....

.....

.....[2]

(ii) germination.

.....

.....[1]

(e) The carbohydrate stored inside the broad bean seed is mainly starch.

What must happen to the starch before the seed can use it for growth?

.....

.....[1]

[Total : 15]

For Examiner's Use

2 Table 2.1 shows the total carbohydrate, starch and fibre content of some vegetables.

Table 2.1

vegetable	total carbohydrate g / 100 g	starch g / 100 g	fibre g / 100 g
beans	15.1	9.3	3.5
broccoli	1.1	trace	2.3
cabbage	4.1	0.1	2.4
carrots (boiled)	4.9	0.2	2.5
chick peas	18.2	16.6	4.3
onions	3.7	trace	0.7
peas (frozen, boiled)	9.7	4.7	5.1
potato (boiled)	17.0	16.3	1.2
sweet potato (boiled)	20.5	8.9	2.3
tomatoes (raw)	3.1	trace	1.0

(a) Name the chemical elements present in a carbohydrate.

.....[1]

(b) State which vegetable in Table 2.1 contains

(i) the highest proportion of total carbohydrate;

.....[1]

(ii) the highest proportion of fibre.

.....[1]

(c) Total carbohydrate is calculated as the sum of starch and sugars in the vegetable.

(i) Name the vegetable that contains the highest proportion of sugar per 100 g vegetable.

.....[1]

(ii) Calculate the amount of sugar present in 500 g of the vegetable named in (i).
Show your working.

Amount of sugar = ...[2]

For Examiner's Use

(d) Potatoes can be cooked in oil (fat) or water.

(i) Suggest and explain how the energy content of the potato would change if cooked in oil.

.....

.....

.....[2]

(ii) Suggest why potatoes cooked in water may be considered to be a healthier food than potatoes cooked in oil.

.....

.....

.....[2]

(e) 100 g of frozen peas provide 17.0 mg of vitamin C, which represents 25% of the recommended daily allowance (RDA).

(i) Calculate the mass of peas a person would need to eat to achieve the RDA. Show your working.

.....[1]

(ii) Name one other good food source of vitamin C.

.....[1]

(iii) State the symptoms of a deficiency of vitamin C.

.....

.....[2]

[Total : 14]

3 Fig. 3.1 shows part of a river into which sewage is pumped. The river water flows from W to Z, with the sewage being added at X.

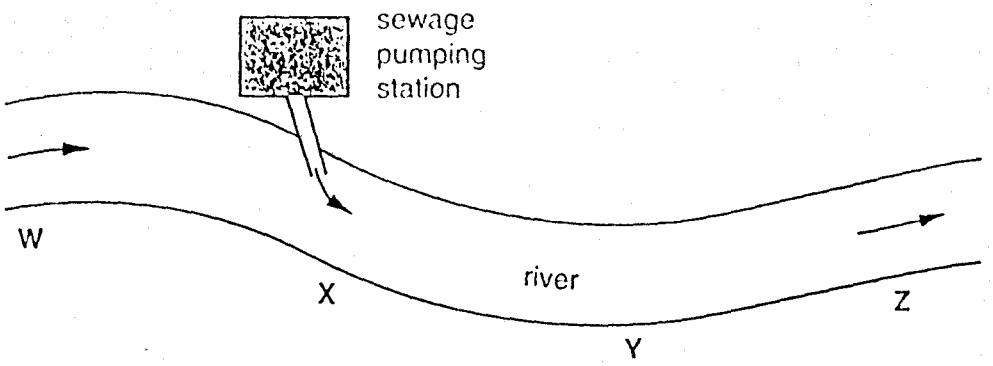


Fig. 3.1

Some of the effects of adding sewage to the river are shown in Fig. 3.2.

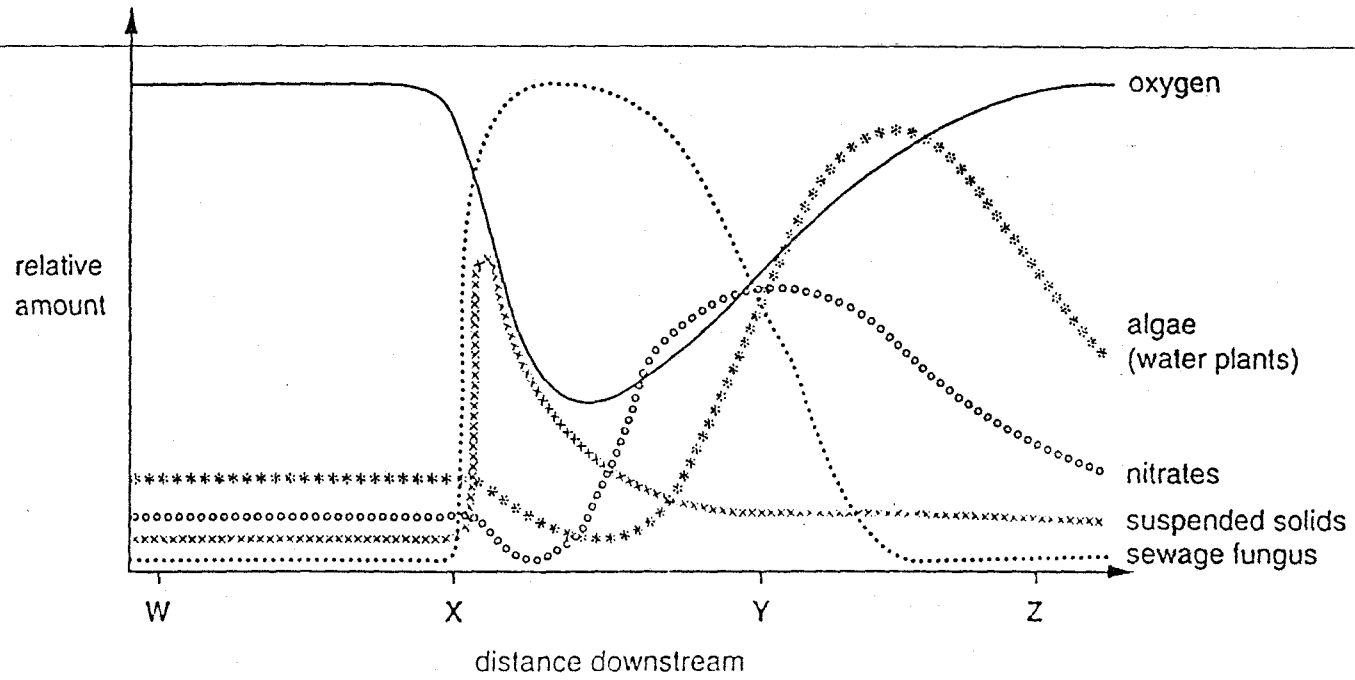


Fig. 3.2

(a) Describe the changes in the levels from W to Z of

(i) nitrates;

.....

.....

.....[2]

For Examiner's Use

(ii) suspended solids.

.....

.....

.....[2]

(b) Suggest why the level of oxygen

(i) drops at X;

.....

.....[1]

(ii) increases again towards Z.

.....

.....[1]

(c) Suggest two reasons why levels of algae drop

(i) when sewage is added to the river;

1. .....

2. .....[2]

(ii) towards Z.

1. .....

2. .....[2]

(d) A farm at Z used herbicides on the field next to the river.

Suggest why this could cause further problems in the river.

.....

.....[1]

[Total : 11]

For Examiner Use

Section B

Answer any **two** questions.

Write your answers on the separate answer paper provided.

4 (a) Describe and explain, with reference to the ribs, intercostal muscles and diaphragm, the process of exhalation (breathing out). [7]

(b) By means of a table with suitable headings, compare the composition of inhaled and exhaled air, stating the reasons for similarities and differences. [8]

[Total : 15]

5 (a) (i) Construct a food chain with **four** named organisms. [3]

(ii) Using appropriate biological terms, describe and explain the flow of energy through your chosen food chain. [8]

(b) With reference to a suitable example for each, outline the need for conservation of

(i) a named species

and

(ii) a named habitat. [4]

[Total : 15]

6 (a) Describe the function of the immune system, including antibody production and phagocytosis. [9]

(b) Outline the problems of organ transplantation and how they can be overcome. [6]

[Total : 15]

7 (a) With reference to a suitable example, define the term *tissue*. [3]

(b) Identify parts **A**, **B**, **C** and **D** shown on Fig. 7.1 and describe their main features and functions.

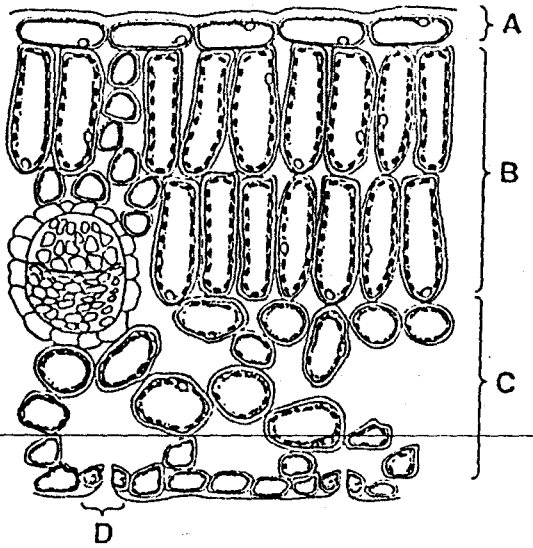


Fig. 7.1

[12]

[Total : 15]

Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

BIOLOGY **0610/03**

Paper 3 Extended

May/June 2004

1 hour 15 minutes

Candidates answer on the Question Paper.
There are no Additional Materials.

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 in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
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	
1	
2	
3	
4	
5	
6	
7	
Total	

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.

This document consists of 13 printed pages and 3 blank pages. **197**

1 In Africa, mammals called jackals are quite common. They feed on small herbivores such as young springboks and dik-diks, hunting in packs to catch their prey. They will also eat larger herbivores such as kudu that have been killed by larger predators such as lions.

A farmer in South Africa found that a number of his sheep, while feeding on grassland, were being killed by jackals. He noted that jackals always kill sheep by attacking their necks. He designed a plastic collar for the sheep that covered their necks. None of his sheep have been killed since fitting these collars. Other farmers are now buying the collars to protect their sheep from jackal attack.

(a) The prey species of the jackal are usually primary consumers.

State the type of food that all primary consumers eat.

.....[1]

(b) Name the two carnivores identified in the text.

1. .....

2. .....[1]

(c) Construct a food chain for the jackal to show its relationship with sheep.

.....[2]

(d) Suggest a reason why jackals survive better when they hunt in packs.

.....

.....[1]

(e) When the farmer started to use collars on his sheep, although none of his sheep were being killed, the population of jackals did not decrease.

Suggest why the number of jackals did not decrease.

.....

.....[1]

(f) Name two structures, found in the neck of a sheep, that could be damaged when jackals attack it.

1. .....

2. .....[2]

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For Examiner's Use

(g) Some of the protected sheep die of old age and their remains are eaten by other animals.

Suggest and explain why the collars of the dead sheep could create an environmental problem.

.....

.....

.....[2]

[Total : 10]

2 Experts predict that 75% of the British population will be obese in 8 years time. The problem is blamed on the popularity of 'junk food'. This sort of diet is unbalanced.

(a) Define the term *balanced diet*.

.....

.....

.....[2]

A human diet consists of:

carbohydrates **fats** **fibre** **minerals** **proteins** **vitamins** **water.**

(b) Underline **two** foodstuffs from the list above that, when eaten in excess, would be most likely to lead to obesity. [2]

(c) Fig. 2.1 shows a chart to find a person's ideal mass.

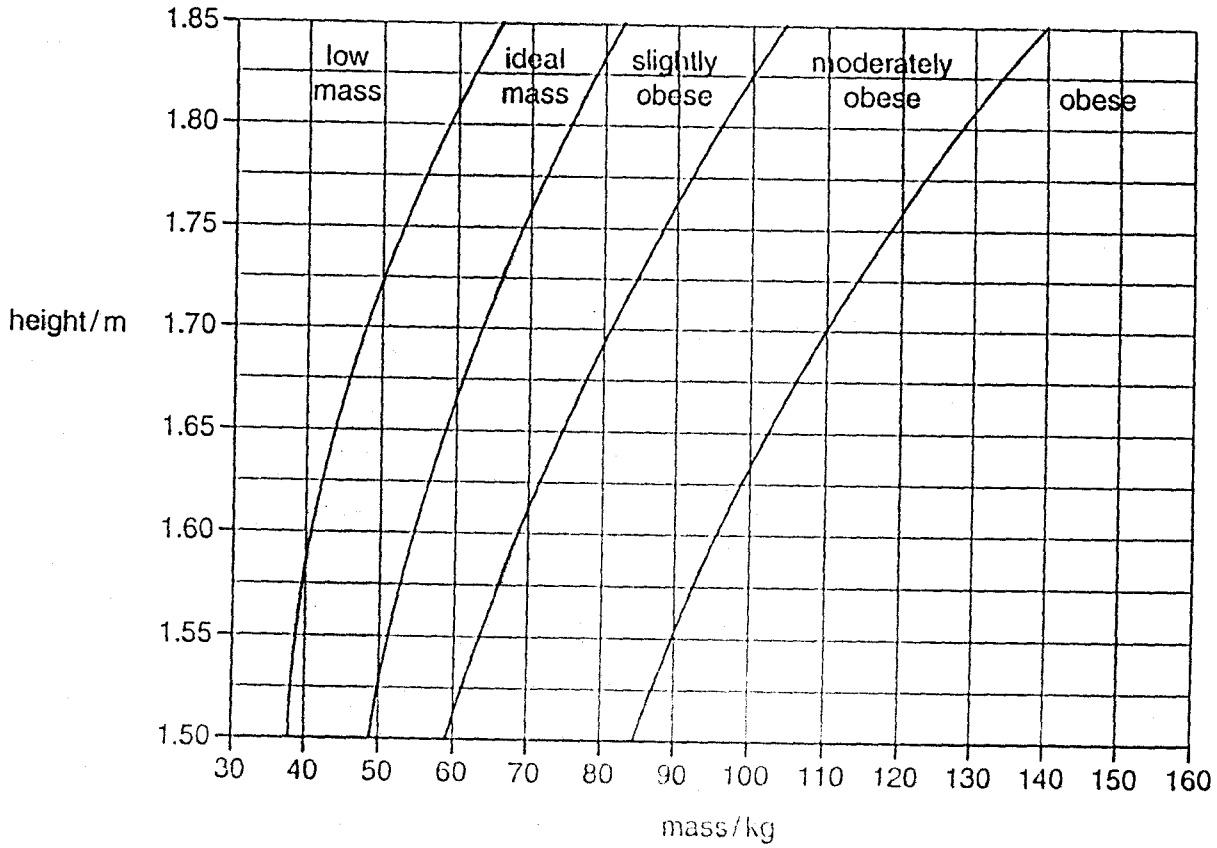

Fig. 2.1

For Examiner's Use

The following data was collected for three students, **X**, **Y** and **Z**.

student	mass / kg	height / m
X	50.8	1.55
Y	63.8	1.85
Z	114.3	1.65

(i) Identify the student who is

1. obese; .....

2. of low mass; .....

3. of ideal mass. ..... [3]

(ii) Suggest two health problems that could be caused by obesity.

1. .....

2. .....[2]

(d) Large food molecules are made up of smaller units. Some of these smaller units are listed below.

amino acids **fatty acids** **glycerol** **simple sugars**

Name the units that make up

1. starch; .....

2. fats; .....

3. protein. .....[4]

(e) Large food molecules are broken down to form smaller molecules in the digestive system.

(i) Name the type of chemical that speeds up digestion.

.....[1]

(ii) Explain why large molecules need to be broken down into small molecules in the digestive system.

.....

.....

.....[2]

[Total : 16]

For Examiner's Use

3 Table 3.1 shows a student's daily water gains and losses.

Table 3.1

water gain / cm^3		water loss / cm^3	
drink	1650	urine	1500
food	800	faeces	100
water released in chemical reactions	350	expired air	400
		sweat	.....
total	2800	total	2800

(a) Complete the table by calculating the volume of sweat lost by the student.

Show your working in the space below.

[1]

(b) Name the **organ** responsible for

1. excreting water in expired air; .....

2. releasing water by sweating; .....

3. forming urine; .....

4. reabsorbing water from undigested food to form faeces. .....

[4]

(c) On a hot day the student still took in 2800 cm^3 of water.

(i) Suggest and explain what would happen to the volume of sweat and urine produced.

sweat .....

.....

.....[2]

urine .....

.....

.....[2]

The volume of water gained and lost by the student is balanced.

(ii) Name the term used for the maintenance of a constant internal environment.

.....[1]

(d) Use words from the list below to complete the paragraph.

excretion **glucose** **glycogen** **insulin** **liver** **oestrogen**
pancreas **secretion** **starch** **stomach** **sucrose**

The blood stream transports a sugar called ..... .

The blood sugar level has to be kept constant in the body.

If this level falls below normal, a hormone called glucagon is released into the blood by an endocrine organ called the ..... .

The release of a substance from a gland is called ..... .

Glucagon promotes the breakdown of ..... to increase the blood sugar level.

If the blood sugar level gets too high, the endocrine organ secretes another hormone called ..... into the blood.

This hormone promotes the removal of sugar from the blood and its conversion to glycogen in the ..... . [6]

[Total : 16]

4 Fig. 4.1 shows part of a root.

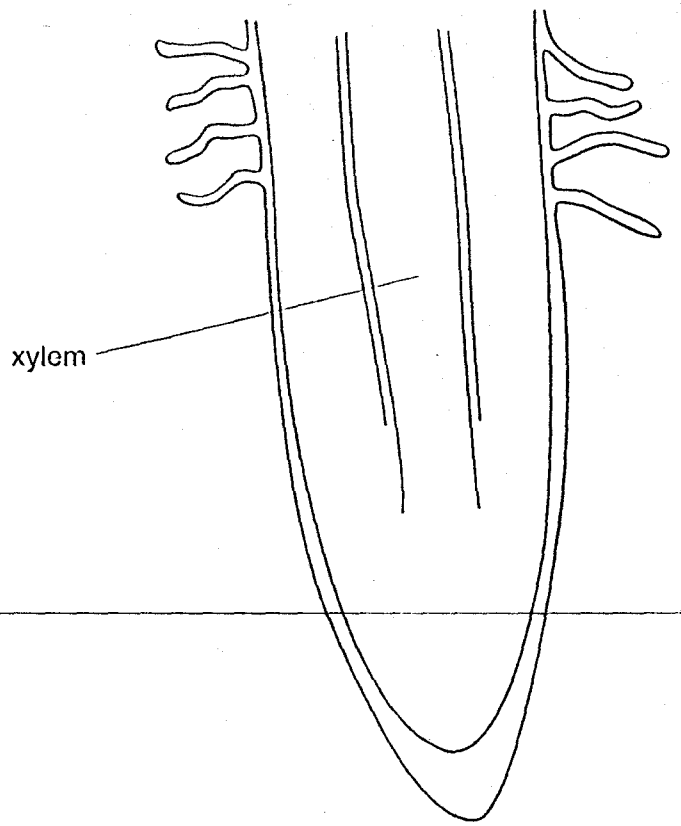

Fig. 4.1

(a) Explain how the presence of root hair cells on roots enables the efficient absorption of water and minerals.

.....

.....

.....[2]

(b) Root hair cells can absorb mineral ions by diffusion and active transport.

(i) Define the term *active transport*.

.....

.....[2]

(ii) Explain why respiration rates may increase in root hair cells during the uptake of mineral ions.

.....

.....[1]

For Examiner's Use

(c) Fig. 4.1 shows the position of xylem in the root.

(i) Describe how the structure of xylem tissue is adapted to its functions.

.....

.....

.....

.....[3]

(ii) Describe the mechanism of water movement through the xylem.

.....

.....

.....[2]

[Total : 10]

5 Fig. 5.1 shows vehicles driving past a power station in Namibia and women carrying firewood they have cut.

Fig. 5.1

(a) Describe how an increase of carbon dioxide in the atmosphere can affect the environment.

.....

.....

.....[2]

(b) Without further reference to carbon dioxide, explain how each of the following may have undesirable effects on the environment:

(i) the power station;

.....

.....

.....

.....[3]

(ii) cutting down trees and burning the wood;

.....

.....

.....

.....[3]

(iii) running motor vehicles such as the van or car.

.....

.....

.....

.....[3]

[Total : 11]

For Examiner Use

6 One variety of cat can have short hair or long hair. The allele for short hair **(H)** is dominant to the allele for long hair **(h)**.

A cat breeder has a short haired cat. Its genotype can be **HH** or **Hh**: there is no visible difference between these genotypes.

This short haired cat is crossed with a long haired cat, **hh**.

(a) Construct genetic crosses to predict the ratios produced if the short haired cat is:

(i) heterozygous, **Hh**;

[3]

(ii) homozygous, **HH**.

[3]

(b) Suggest how the offspring from **(a)(ii)** would be different if the alleles were co-dominant.

.....

.....

.....[1]

[Total : 7]

7 Breast milk contains all the nutrients a baby needs except for vitamin C and iron. However, the baby has sufficient iron stored in its liver for the first months of its life. The first milk a breast-fed baby receives is called colostrum. After a few days, normal breast milk is produced.
Table 7.1 compares the composition of colostrum and normal breast milk.

Table 7.1

	nutrient / g per 100 cm^3		
	fat	protein	sugar
colostrum	2.5	8.0	3.5
normal breast milk	4.0	2.0	8.0

(a) Use data from Table 7.1 to describe how the amounts of fat, protein and sugar are different in colostrum and normal breast milk.

.....

.....[1]

(b) A baby feeding on normal breast milk drinks one litre of milk per day.
Calculate how much protein the baby receives per day.
Show your working.

.....[2]

(c) **(i)** Suggest a suitable fruit juice a mother could give her baby to provide vitamin C.

.....[1]

(ii) Young children enjoy drinking fruit drinks with a high sugar content, sucked from a bottle with a teat. Explain how this habit can result in high levels of tooth decay.

.....

.....

.....

.....

.....[4]

(d) Children sometimes develop an iron deficiency. Describe the symptoms they would show.

.....

.....

.....[2]

[Total : 10]