UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

BIOLOGY **0610/32**

Paper 3 Extended **May/June 2010**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

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	
Total	

This document consists of **14** printed pages and **2** blank pages.

1 **(a)** Define the terms *sensitivity* and *involuntary action*.

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sensitivity .....

.....

involuntary action .....

.....

..... [3]

Fig. 1.1 shows the reflex arc for the knee jerk reflex.

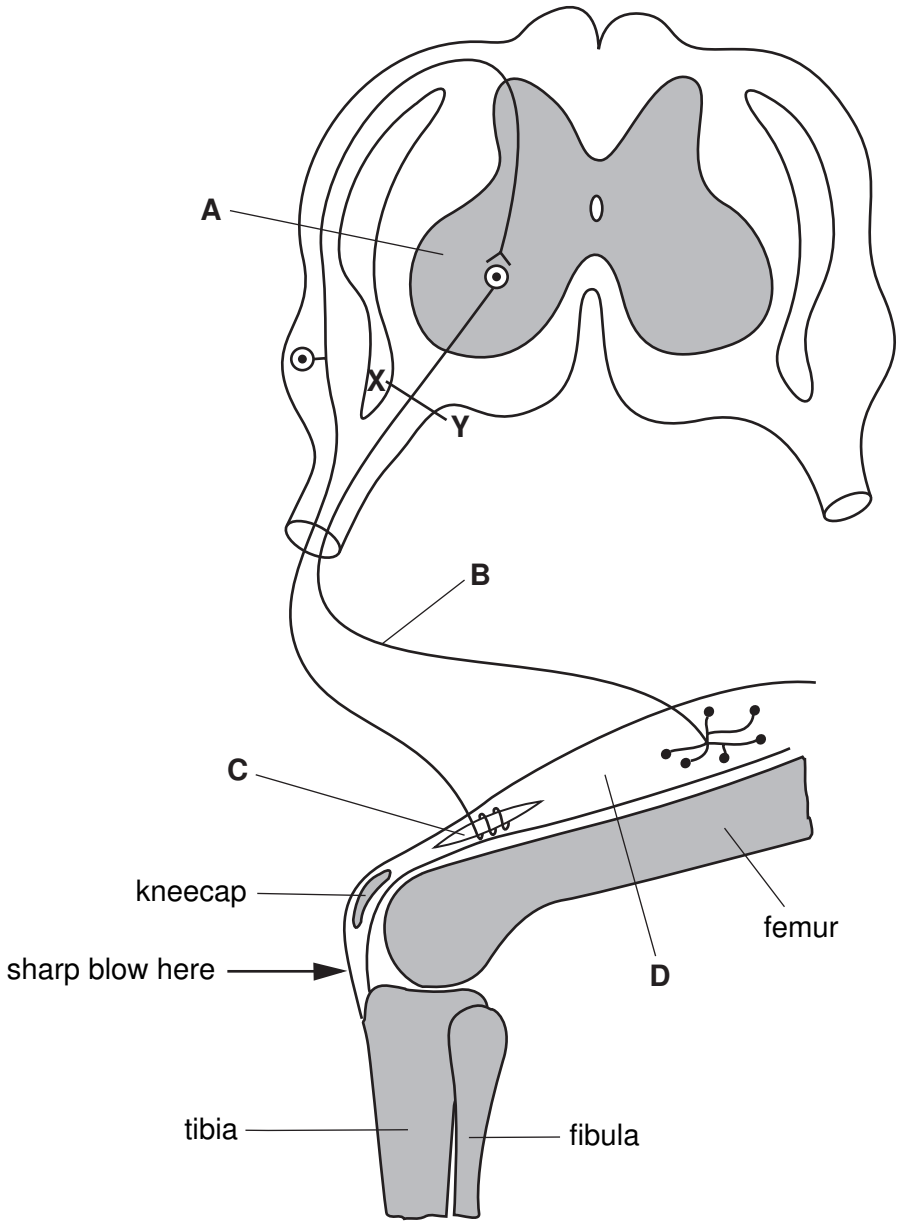

Fig. 1.1

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(b) (i) Name parts **A** to **D**.

A .....

B .....

C .....

D ..... [4]

(ii) Nerve cells use active transport to move ions across their cell membranes.

Explain what is meant by the term *active transport.*

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..... [2]

(c) Explain what would happen to the reflex shown in Fig. 1.1 if the nerve was cut across at **X**-**Y**.

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(d) Fig. 1.2 shows the grasping reflex of a baby.

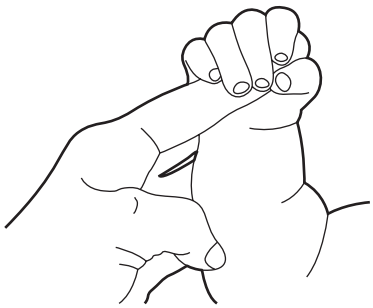

Fig. 1.2

Suggest why it is a good idea to test a baby's reflexes immediately after birth.

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..... [1]

[Total: 13]

2 Fig. 2.1 shows the root systems of two species of desert plant, **A** and **B**.

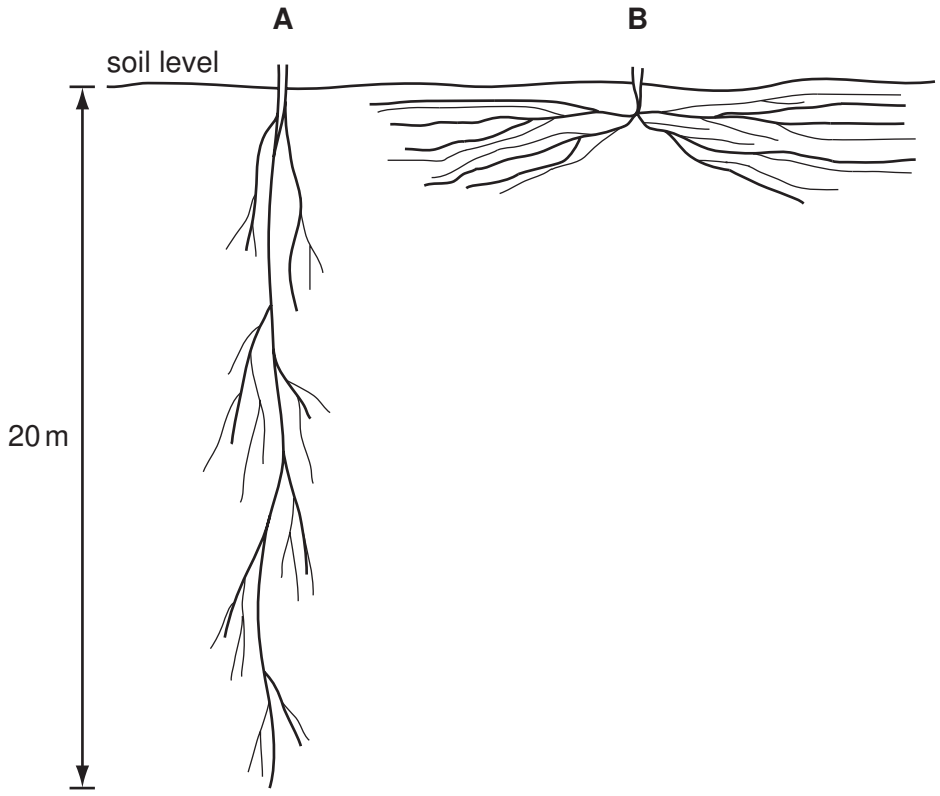

Fig. 2.1

For Examiner's Use

(a) Describe the two root systems shown in Fig. 2.1 **and** explain how each is an adaptation for survival in a desert ecosystem.

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..... [4]

(b) Describe **and** explain two ways in which the **leaves** of desert plants reduce water loss in transpiration.

1. .....

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2. .....

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..... [4]

(c) Xylem and phloem are transport tissues in plants. They transport substances from organs that are known as sources to organs known as sinks.

Complete the table to show:

- **two** substances being transported in each tissue
- an organ that is a source for substances being transported in each tissue
- an organ that is a sink for substances being transported in each tissue.

tissue	substances being transported	source of substances in the plant	sink for substances in the plant
xylem	1 …… 2 ……		
phloem	1 …… 2 ……		

[6]
[Total: 14]

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3 The highest yields of potatoes are obtained in the USA. In Bangladesh they are very much lower. Scientists investigated the effects of improving soil fertility on the growth and yields of potatoes in Bangladesh.

They carried out an investigation by dividing a field into four plots, **E** to **H**. The potatoes in each plot received different treatments:

E – no fertiliser or manure

F – manure only

G – chemical fertiliser only

H – manure and chemical fertiliser

The scientists measured different aspects of growth and final yield of the potato plants. Their results are shown in Table 3.1.

Table 3.1

plot	treatment	mean plant height at maturity / cm	mean fresh mass of potato tubers per plant / g	yield of potato tubers / tonnes per hectare
E	no fertiliser or manure	46.2	190.0	12.6
F	manure only	59.3	285.0	19.3
G	chemical fertiliser only	66.1	320.5	21.2
H	manure and chemical fertiliser	71.5	365.0	24.3

(a) (i) The yield of potato tubers was greater in plot **H** than in plot **E**.

Calculate the difference in yield as a percentage of the yield in plot **E**.
Show your working.

Answer = ...% [2]

(ii) Suggest **and** explain the importance of increased plant height in the production of tubers.

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..... [2]

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(iii) Describe the effect of adding manure and chemical fertilisers on the yield of potato tubers.

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(iv) Manure and chemical fertilisers provide plants with nitrate ions.
Explain how extra nitrate ions in the soil may have increased the yield of the potatoes.

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..... [2]

(v) State why plot **E** was included in this investigation.

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..... [1]

(b) Discuss the advantages and disadvantages of adding chemical fertilisers to crops.

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..... [5]

[Total: 15]

4 When bacteria are spread onto agar in a Petri dish they form colonies. Each colony forms from one bacterium. Fig. 4.1 shows an investigation into antibiotic resistance in a species of bacterium that causes disease.

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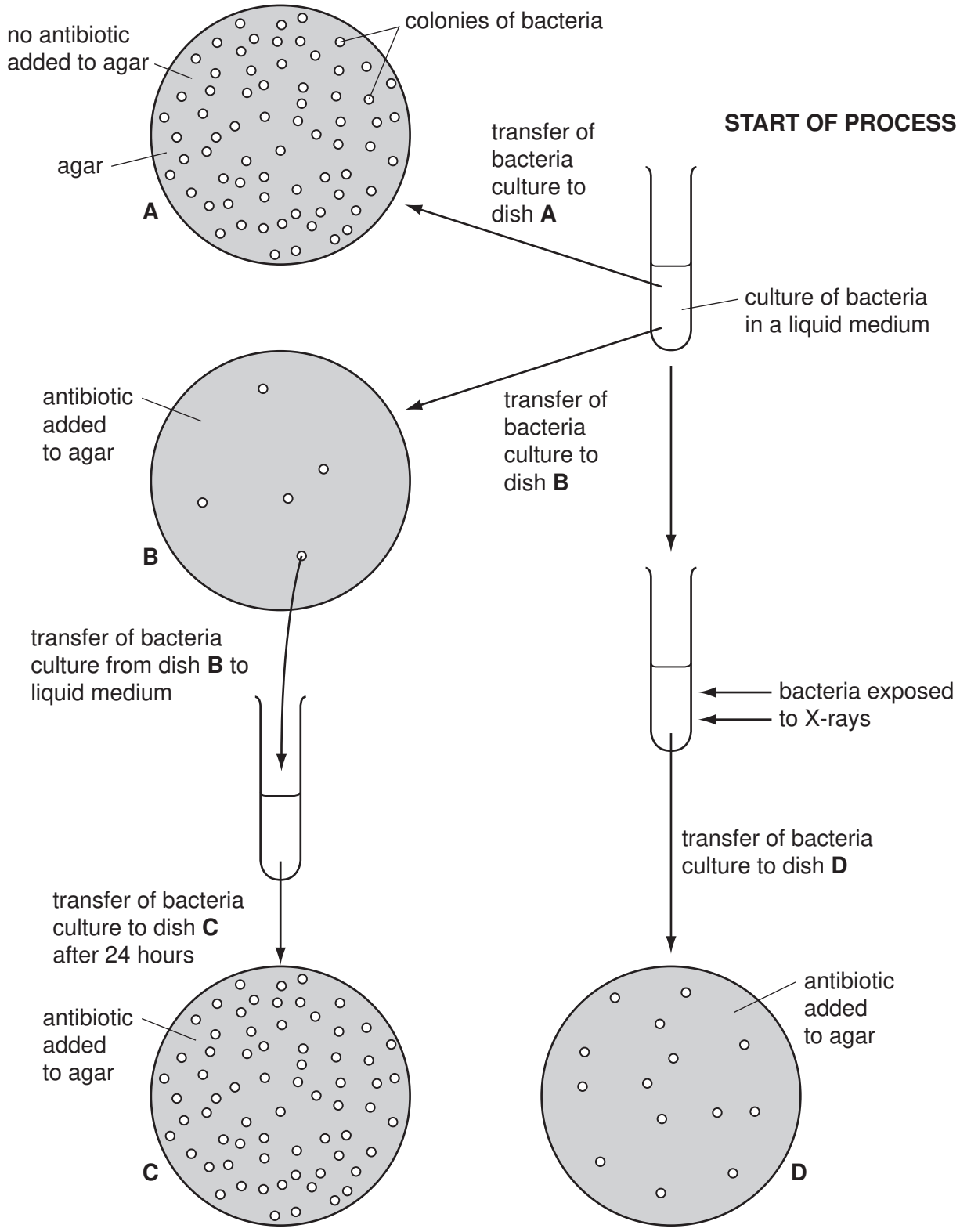

Fig. 4.1

(a) Explain what is meant by the term *antibiotic*.

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..... [2]

(b) Explain why

(i) only a few bacteria grew in dish **B** compared with dish **A**,

.....

..... [1]

(ii) more bacteria grew in **C** than in **B**.

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..... [1]

(c) Fig. 4.1 shows the effect of an antibiotic on a species of disease-causing bacterium.

Suggest why antibiotics should not be used too often.

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..... [2]

(d) Explain the possible effect of the X-rays on the bacteria.

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..... [3]

(e) State two ways in which the **structure** of a bacterium differs from the **structure** of a virus.

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1. .....

2. ..... [2]

(f) Human Immunodeficiency Virus (HIV) infects cells of the immune system.

Describe the effects of HIV on the immune system.

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..... [4]

[Total: 15]

5 Fig. 5.1 shows a capillary inside a tissue.

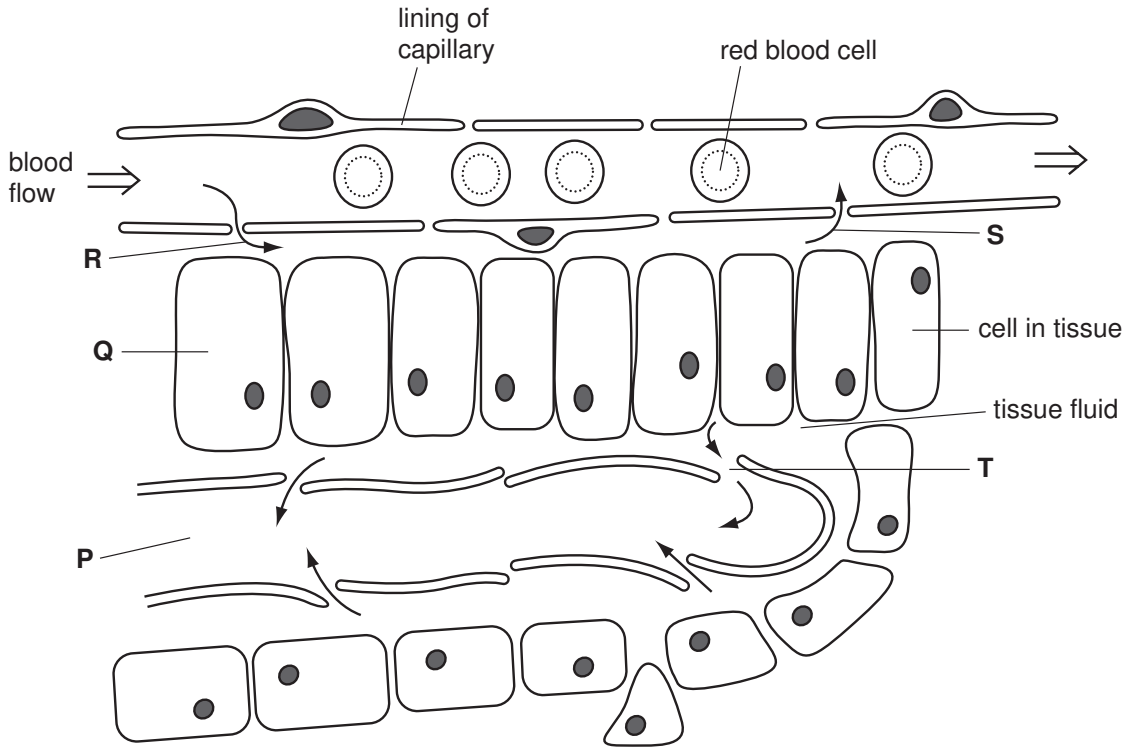

Fig. 5.1

For Examiner's Use

(a) (i) State how oxygen passes from the capillary into cell **Q and** describe the function of this gas in a cell.

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..... [2]

(ii) Name two substances required by cells, **other than oxygen**, that pass from the blood to the tissue fluid at **R**.

1. .....

2. ..... [1]

(iii) Name two substances **produced by cells** that pass from the tissue fluid to the blood at **S**.

1. .....

2. ..... [1]

(b) With reference to Fig. 5.1, describe and explain **two** ways in which capillaries are adapted to their function.

1. .....

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2. .....

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..... [4]

(c) Tissue fluid drains into vessel **P** at **T** and eventually returns to the blood.

(i) Name the type of vessel labelled **P**.

..... [1]

(ii) Explain how fluid passes along these vessels.

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..... [1]

[Total: 10]

6 Carbon dioxide and methane are two important greenhouse gases. The effect of human activities in increasing the concentration of greenhouse gases, such as carbon dioxide and methane, is known as the enhanced greenhouse effect.

Fig. 6.1 shows the concentrations of carbon dioxide and methane in the atmosphere over the past 1000 years.

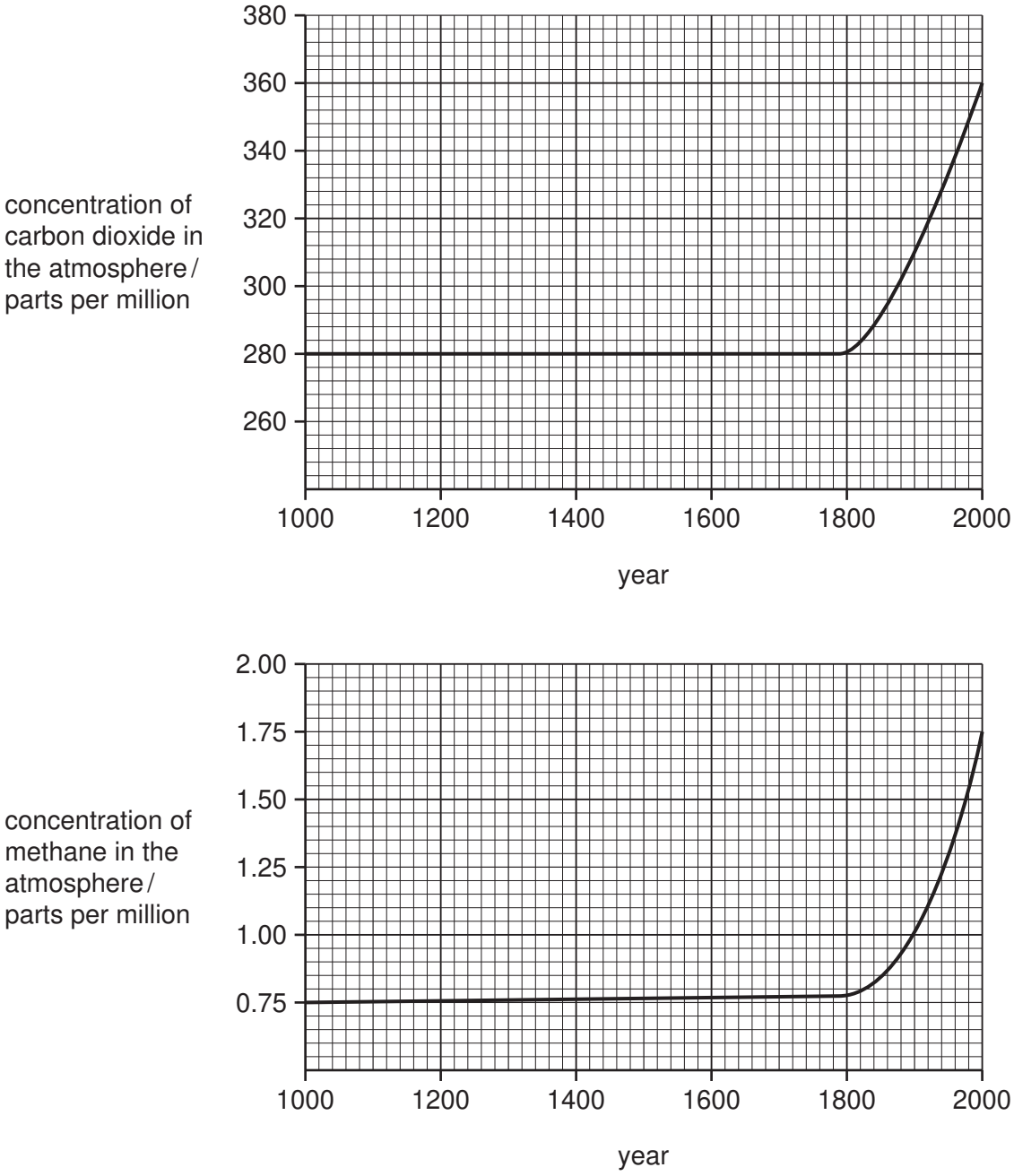

Fig. 6.1

For Examiner's Use

(a) Using information in Fig. 6.1, describe the trend in the concentrations of carbon dioxide and methane over the past 1000 years.

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..... [3]

(b) Suggest **and** explain reasons for the trend in the concentrations of carbon dioxide and methane that you described in **(a)**.

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..... [4]

(c) Explain how gases, such as those shown in Fig. 6.1, contribute to the greenhouse effect.

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(d) People are encouraged to recycle materials, such as paper and plastics.

Discuss the advantages of recycling materials, such as paper and plastics.

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..... [3]

[Total: 13]

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