

Centre Number	Candidate Number	Name
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CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education  
Advanced Subsidiary Level and Advanced Level

**ENVIRONMENTAL SCIENCE**

**8290/01**

Paper 1

October/November 2003

**1 hour 45 minutes**

Candidates answer on the Question Paper.  
No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.  
Write in dark blue or black pen in the spaces provided on the Question Paper.  
You may use a soft pencil for any diagrams, graphs, tables 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	
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7	
8	
<b>Total</b>	

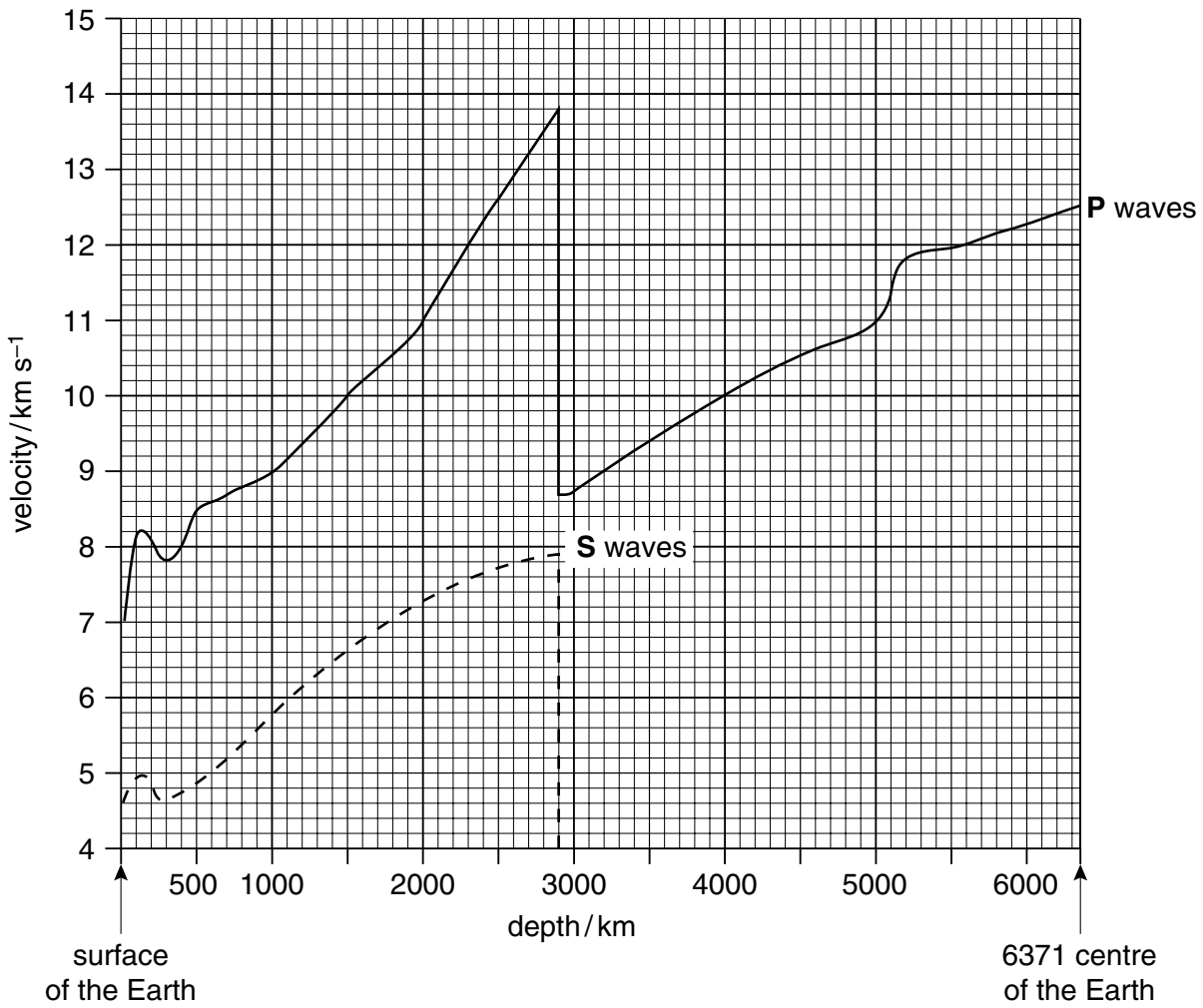
If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

This document consists of **19** printed pages and **1** blank page.

Answer **all** questions.

- 1 Fig. 1.1 shows how the velocities of **P** and **S** waves vary from the Earth's surface to its centre.



**Fig. 1**

- (a) Explain why **P** and **S** waves accelerate as they travel from the Earth's surface to a depth of 2900 kilometres.

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..... [2]

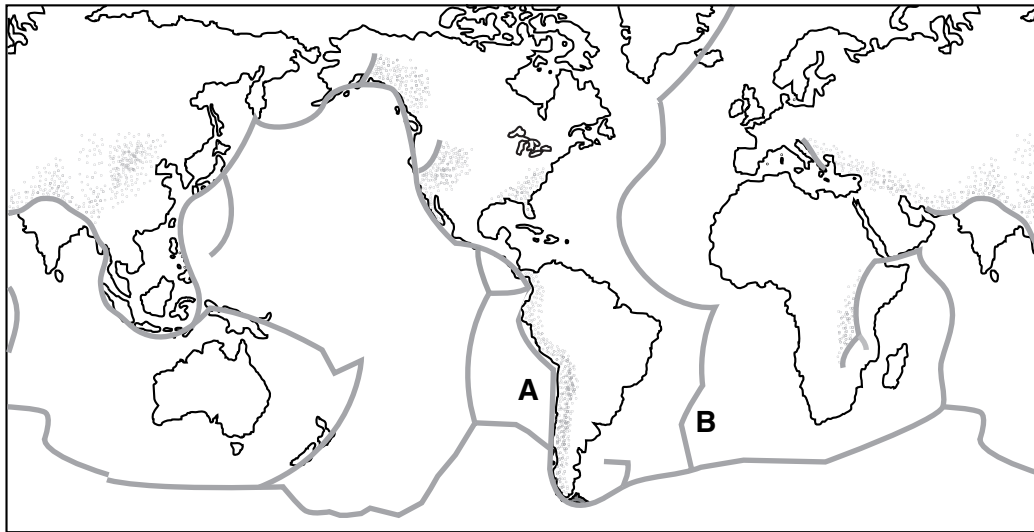
(b) Describe and explain the changes to the velocity of **P** waves at depths greater than 2900 kilometres.

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..... [2]

(c) Explain why **S** waves do not travel to depths greater than 2900 kilometres.

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.....  
.....  
..... [2]

Fig. 1.2 shows the distribution of those areas of the world likely to suffer from a combination of earthquake and volcanic activity. These areas lie over the boundaries of tectonic plates.



key

 areas of earthquake and volcanic activity

**Fig. 1.2**

**(d)** What type of plate boundary occurs

**(i)** at **A**,

.....

**(ii)** at **B**?

..... [2]

(e) Using Fig. 1.2 outline the evidence for sea floor spreading and continental drift.

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..... [4]

2 The triangular diagram Fig. 2.1 serves as a method of classifying soils according to texture.

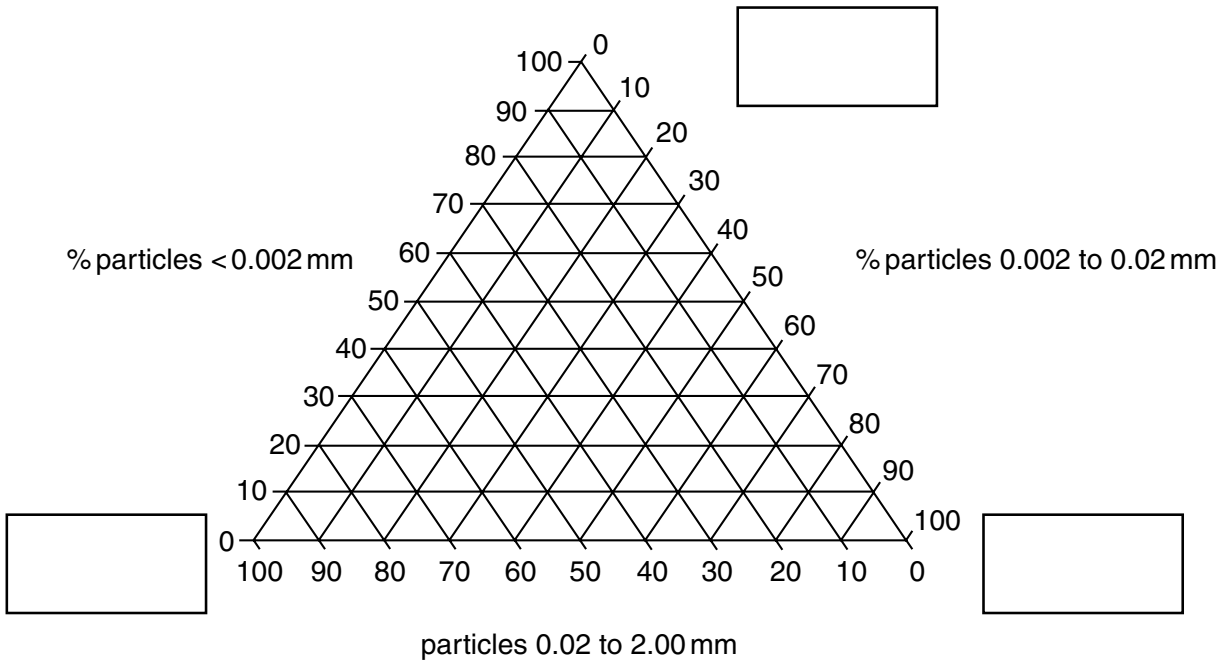


Fig. 2.1

- (a) (i) Write the labels sand, clay and silt into the correct boxes on the diagram. [3]
- (ii) On Fig. 2.1 place a letter **C** to indicate a loam soil. [1]

(b) Name and describe the role of **one** biotic and **one** abiotic soil component.

biotic .....

.....

.....

.....

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abiotic .....

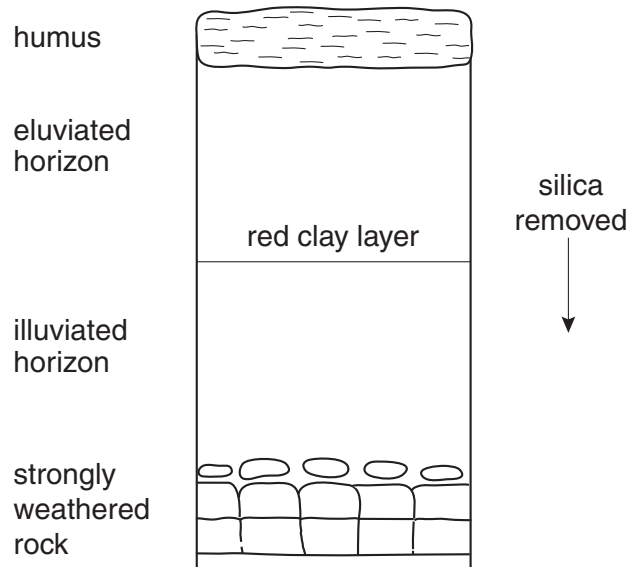
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..... [4]

(c) Fig.2.2 shows a profile of a soil which has formed under moist conditions in a tropical climate.



**Fig. 2.2**

(i) Describe and explain the characteristics of the illuviated and eluviated horizons shown in Fig. 2.2.

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..... [4]

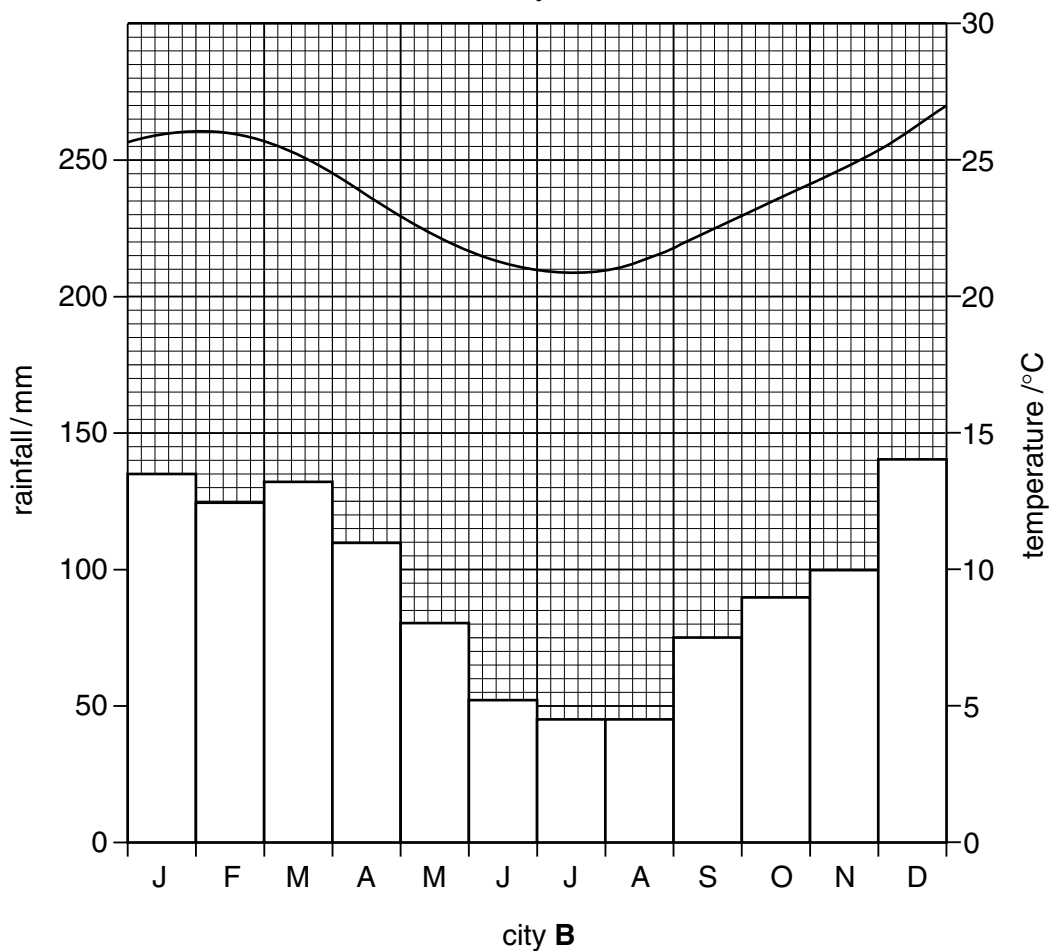
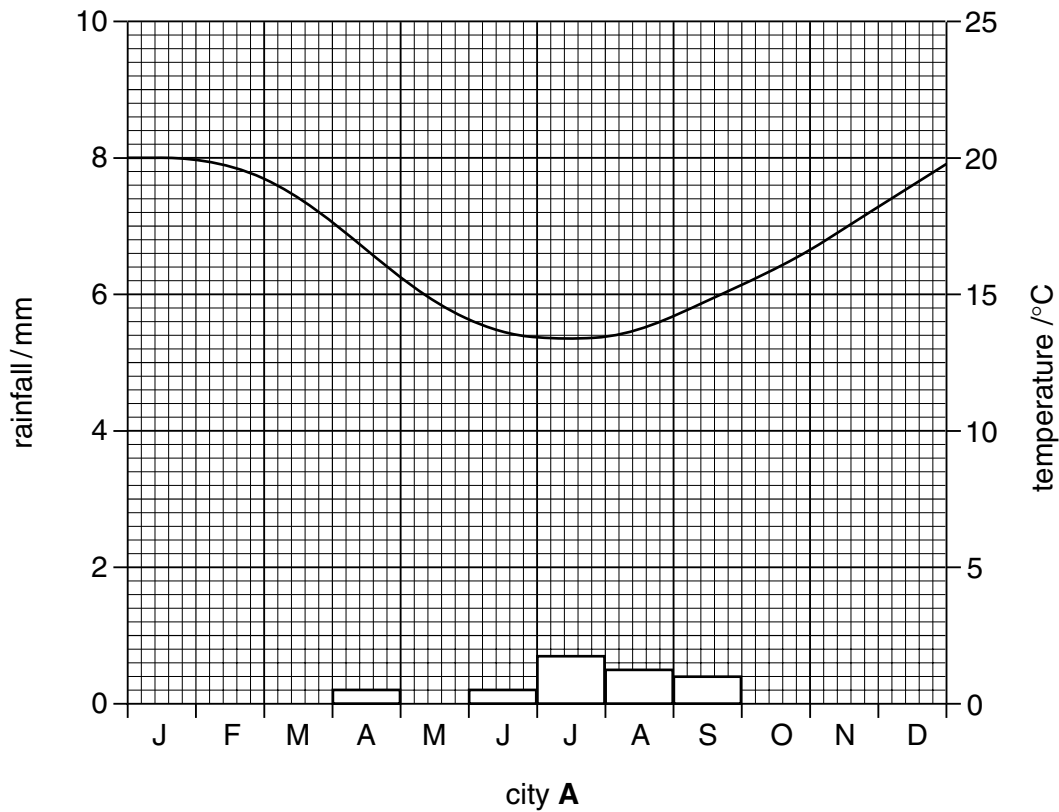
(ii) Explain why soils of this type are often regarded as infertile.

.....

.....

..... [2]

- 3 Fig. 3.1 shows the temperature and rainfall characteristics for two cities. The cities are in different climatic regions but at similar latitudes in the Southern hemisphere.



**Fig. 3.1**



(a) State the temperature range for each city.

city **A** = .....

city **B** = ..... [2]

(b) Contrast the pattern of rainfall for the two cities.

.....  
.....  
.....  
..... [2]

(c) Suggest a location for each city.

city **A** = .....

city **B** = ..... [2]

(d) Suggest reasons for the differences between the two cities in temperature and rainfall.

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..... [6]

4 Fig. 4.1 shows how temperature varies with altitude in the atmosphere.

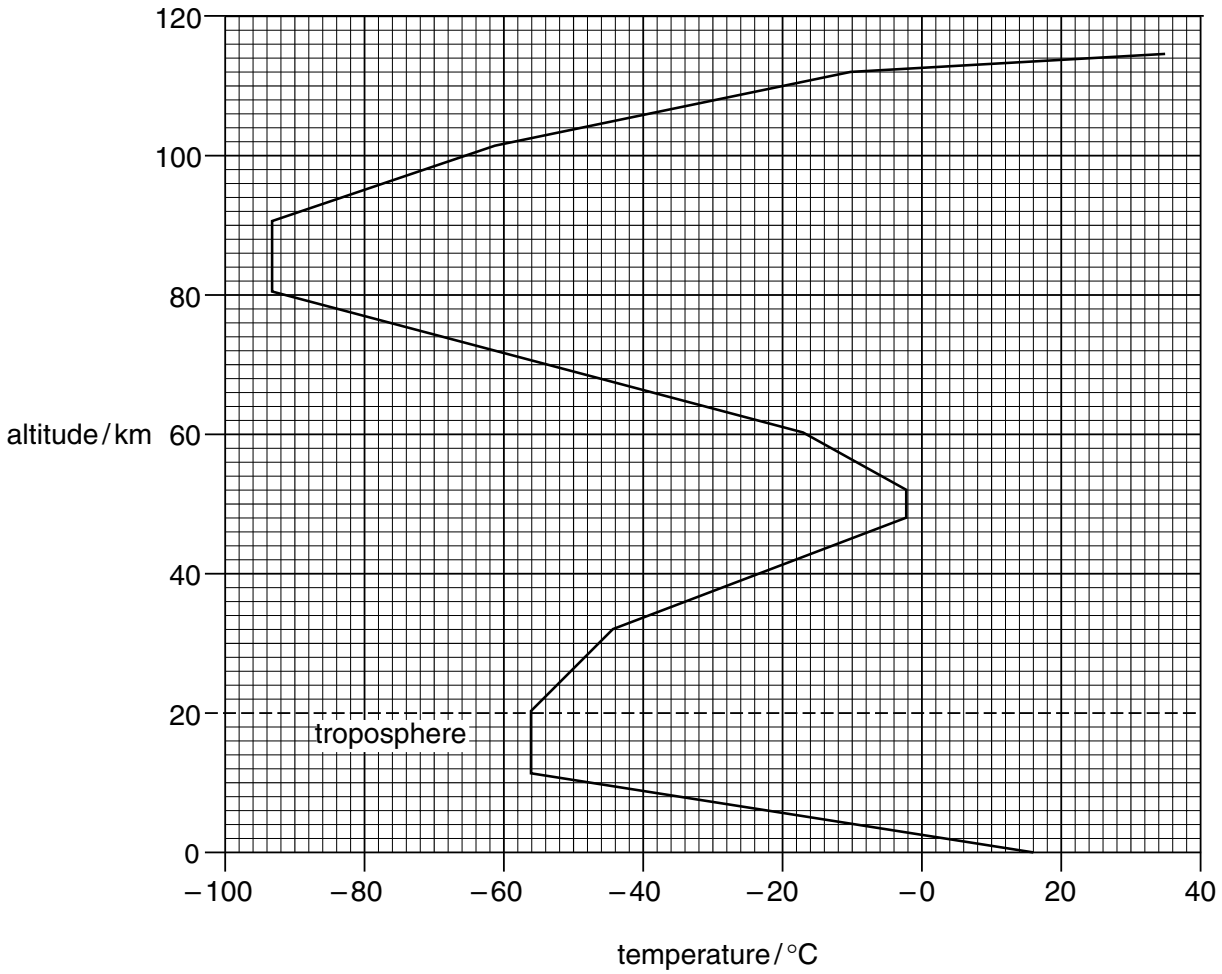


Fig. 4.1

(a) Label Fig. 4.1 to show the stratopause, mesopause and stratosphere. [3]

(b) Describe the variations in composition, temperature and density that occur between sea level and 100 km.

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[4]

(c) (i) Using the following equations, explain how ozone is formed in the Earth's stratosphere.



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.....  
..... [2]

(ii) Explain the role of chlorofluorocarbons (CFCs) in the depletion of stratospheric ozone.

.....  
.....  
.....  
..... [2]

(d) Outline two damaging effects caused by the depletion of upper atmosphere ozone.

1. ....  
.....  
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2. ....  
.....  
..... [2]

- 5 Fig. 5.1 shows the electromagnetic radiation that is received from the Sun and emitted from the Earth.

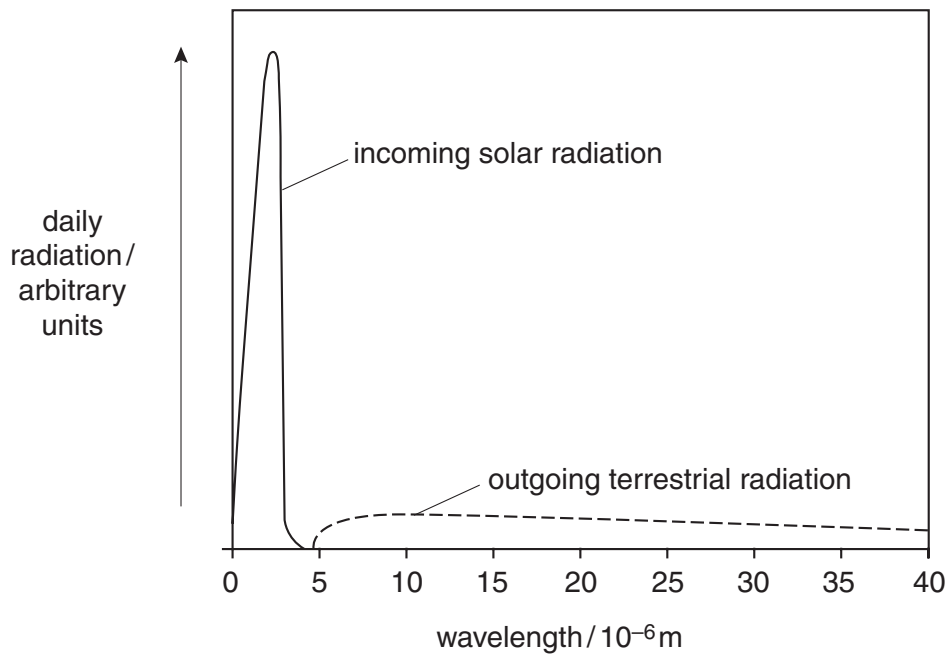


Fig. 5.1

- (a) What is *electromagnetic radiation*?

.....  
.....  
.....  
..... [2]

- (b) Describe how incoming electromagnetic radiation is utilised to heat the troposphere.

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.....  
.....  
..... [2]

(c) Explain the difference between incoming radiation and outgoing radiation shown in Fig. 5.1.

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..... [2]

(d) Fig. 5.2 shows the effect of latitude on incoming radiation.

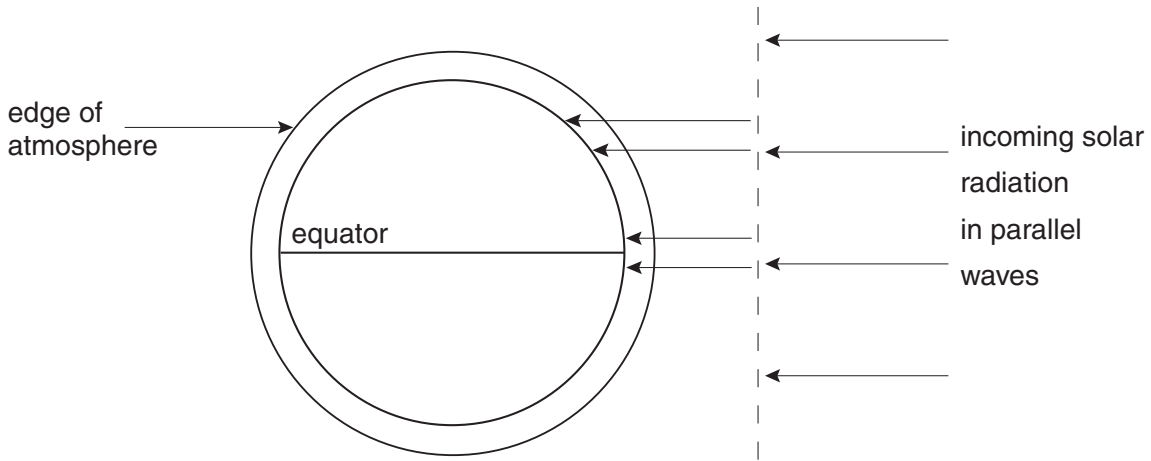


Fig. 5.2

Use Fig. 5.2 to explain why it is warmer at the equator than in polar regions.

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.....  
..... [3]

(e) Describe and explain how the length of day and night differ during the year between the equator and polar regions.

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..... [3]

6 Fig. 6.1 shows a food web.

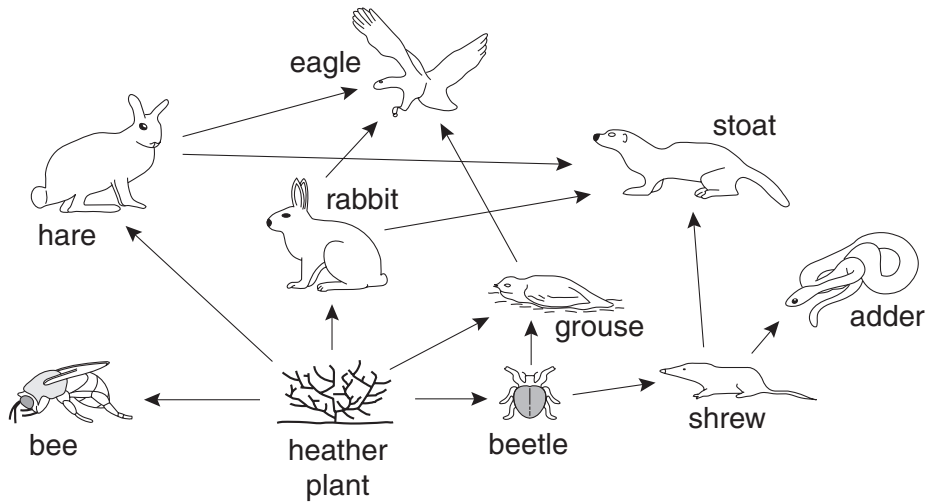


Fig. 6.1

(a) Distinguish between a food web and a food chain.

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..... [2]

(b) Explain how plants produce the energy needed to supply a food web.

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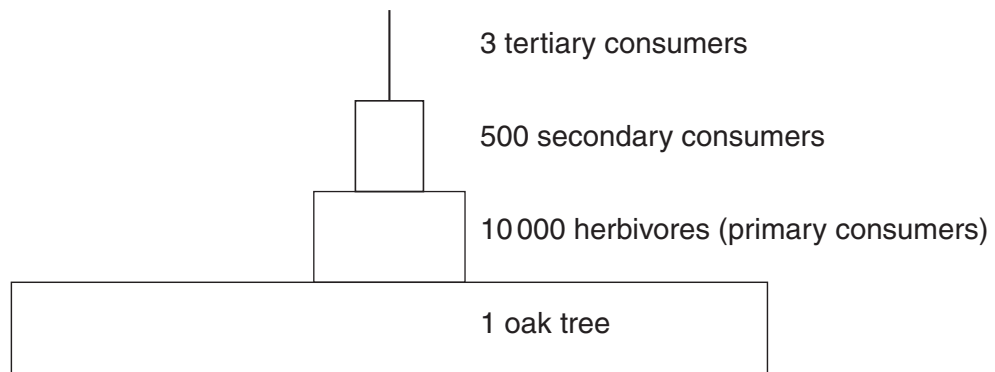
..... [3]

(c) Use a single food chain from Fig. 6.1 and complete the table below.

trophic level	example
tertiary consumer	
secondary consumer	
primary consumer	
producer	

[4]

(d) Fig. 6.2 is a pyramid of biomass based on an oak tree.



**Fig. 6.2**

Why does biomass decrease at each trophic level?

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..... [4]

7 Fig. 7.1 shows how the interaction of birth rates and death rates can produce variations in population growth over a period of time.

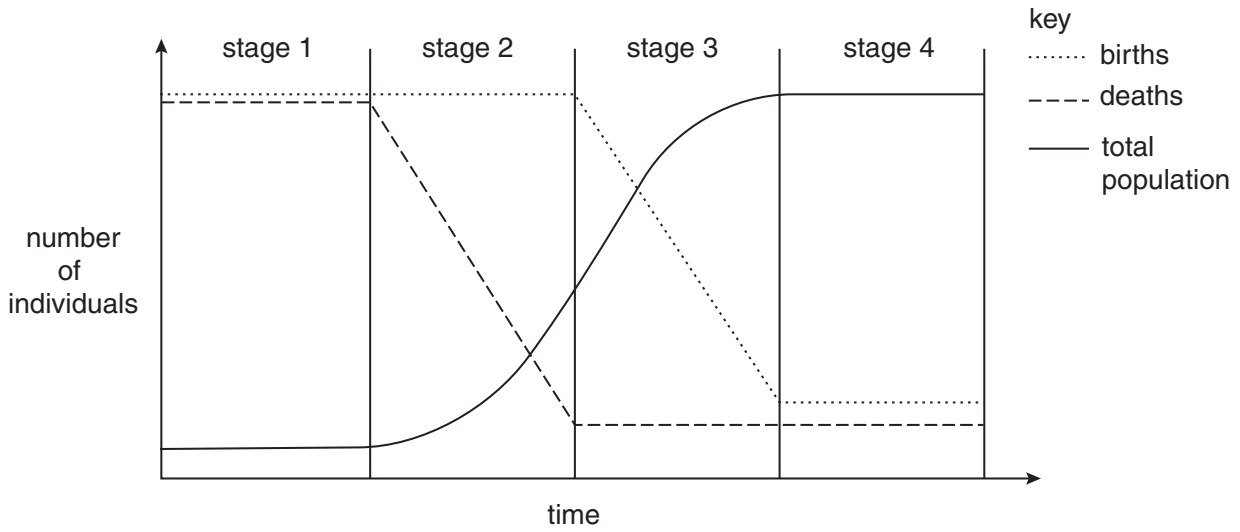


Fig. 7.1

(a) Which stage would represent

(i) a developing nation,

.....

(ii) a developed nation?

..... [2]

(b) Describe how the changes to the birth and death rates influence population growth.

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..... [3]



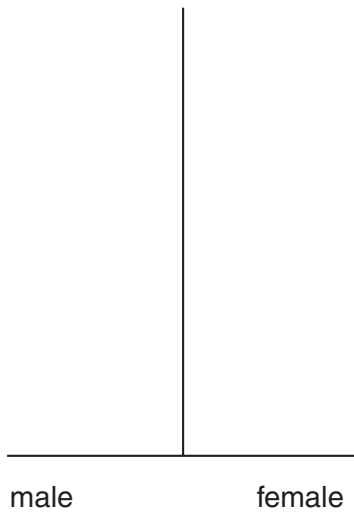
(c) State **one** factor, other than birth and death rates, that would lead to population growth.

.....  
..... [1]

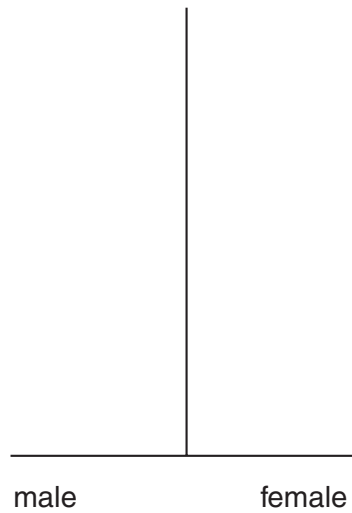
(d) Describe two social **or** cultural factors that might hinder the regulation of the birth rate by family planning.

1. ....  
.....  
.....  
2. ....  
.....  
..... [2]

(e) Using information from Fig. 7.1 sketch outlines of population pyramids that would be typical of a country in stage 2 and a country in stage 4. Use the axes given below for your sketches.



country in stage 2



country in stage 4

[4]

8 Fig. 8.1 shows part of the water cycle.

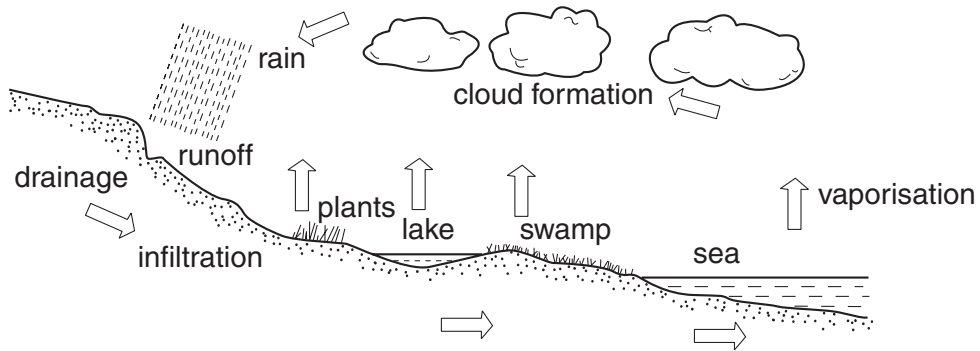


Fig. 8.1

(a) Using Fig. 8.1

(i) name two areas in which water is stored;

1. ....

2. ....

(ii) name two processes by which water flows between the stores.

1. ....

2. .... [4]

(b) Outline two different processes that would lead to the formation of the rain in Fig. 8.1.

1. ....

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2. ....

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..... [4]

(c) Briefly describe **two** situations that would lead to an increase in surface runoff.

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..... [4]

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