Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

ENVIRONMENTAL SCIENCE **8290/01**

Paper 1

May/June 2004

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 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.

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	
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TOTAL	

This document consists of **18** printed pages and **2** blank pages.

Answer **all** questions

1 **(a)** Distinguish between the terms *biome* and *ecosystem*.

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(b) Fig.1.1 shows the locations of four of the world's biomes.

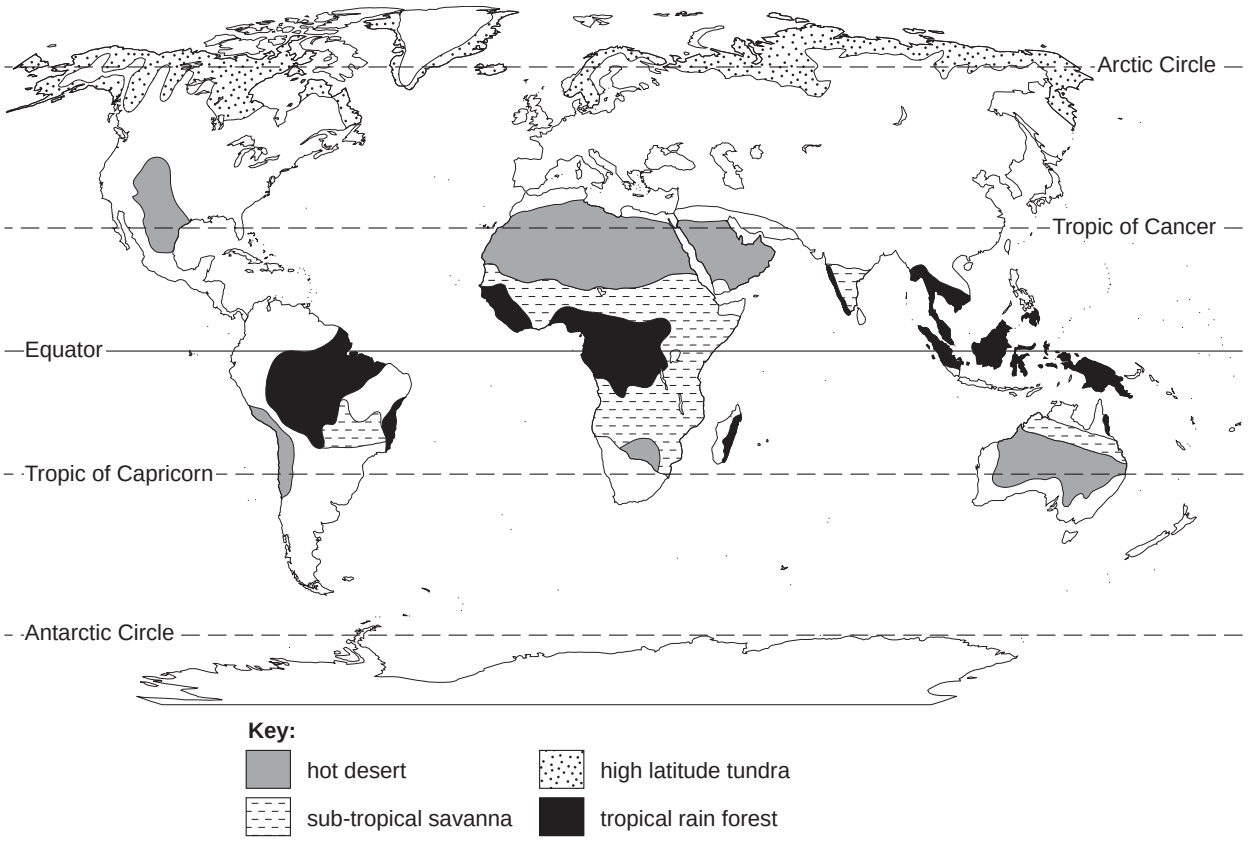

Fig. 1.1

(i) Complete the table below to show the relationship between the four biomes and their climates.
The first line has been completed.

biome	temperature	rainfall
hot desert	high temperatures, summer 35⇓C, winter 20⇓C	very low amounts in each month, under 10mm
sub-tropical savanna	maximum temperatures in early summer of 28⇓C, winter minimum of 16⇓C	
high latitude tundra		low annual precipitation, under 20 mm in each month
tropical rain forest		

[6]

(ii) For **one** of the biomes in Fig. 1.1 describe how its vegetation is related to the climate of the region.

biome.....

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(c) Fig. 1.2 is a model of a plant succession.

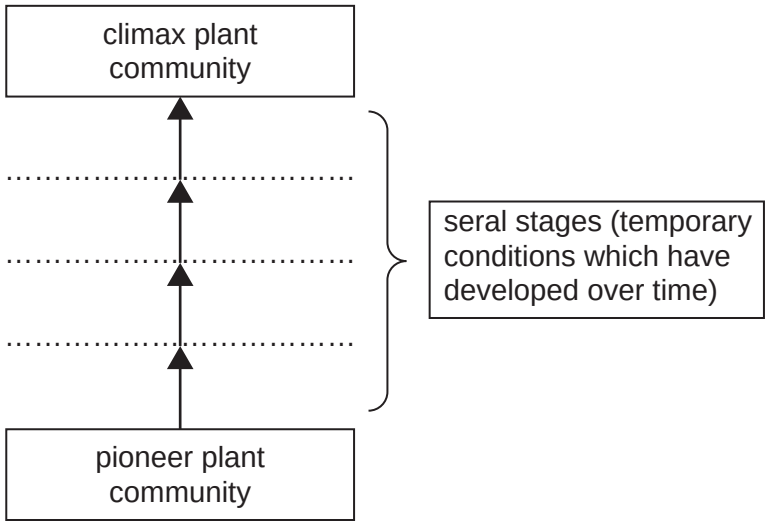

Fig. 1.2

Use the model (Fig. 1.2) to describe a plant succession you have studied.

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2 Fig. 2.1 shows the rock cycle. This can be used to show how rocks form and change.

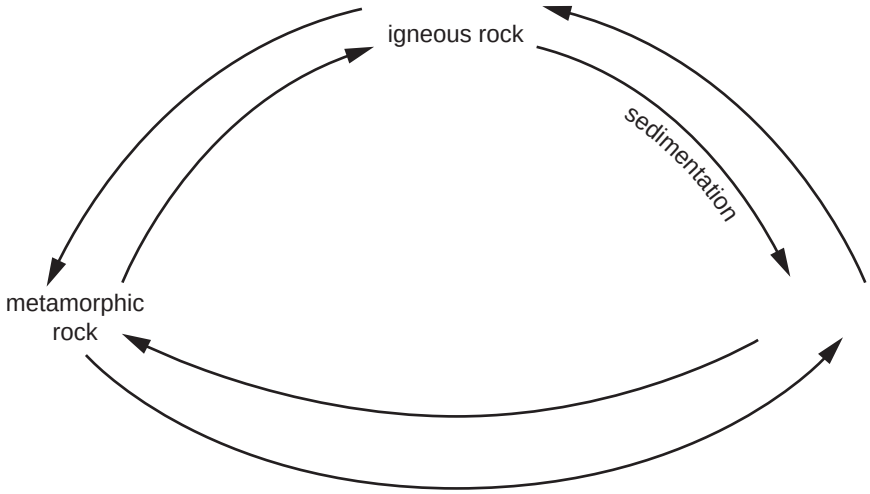


Fig. 2.1

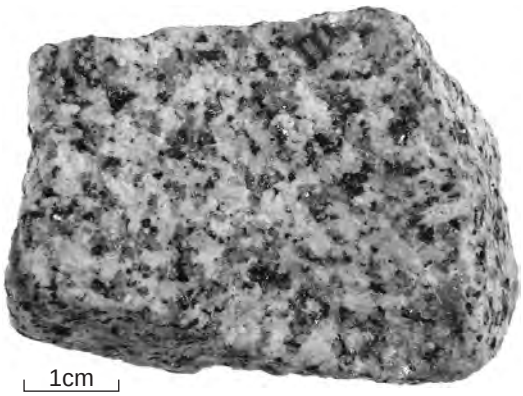
(a) Write the following labels in their correct positions on Fig. 2.1.

heat and pressure
sedimentary rock
weathering and erosion [3]

[Turn over

(b) Fig. 2.2 shows photographs of limestone and granite.

limestone



granite

Fig. 2.2

Describe **one** feature of each type of rock.
Explain how this feature indicates how the rock was formed.

limestone

feature .....

explanation .....

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granite

feature .....

explanation .....

.....[4]

(c) Fig. 2.3 shows two soil profiles.
A is typical of a limestone region.
B is typical of a granite moorland.

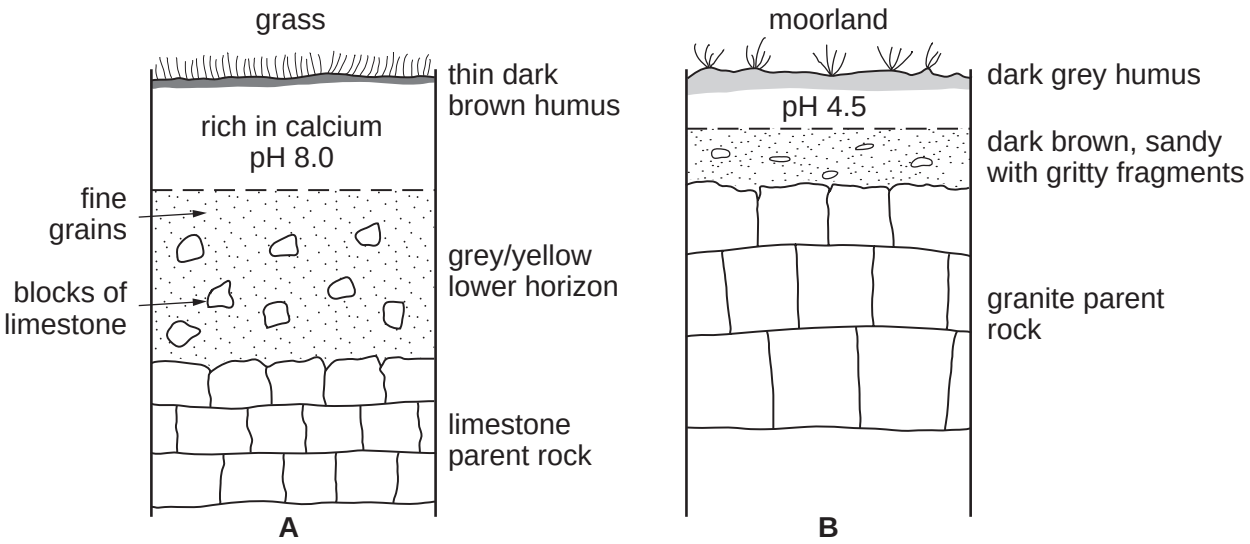

Fig. 2.3

Describe the formation of the two soils in terms of the progressive weathering of the parent rock

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B .....

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3 Fig. 3.1 shows the global pattern of horizontal air movement.

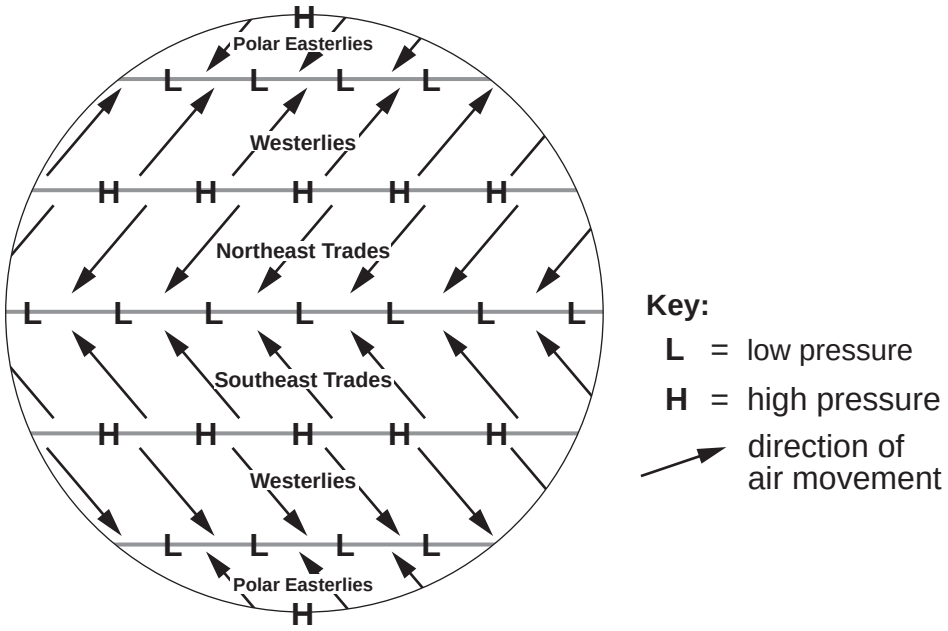

Fig. 3.1

(a) Explain why air moves in the directions shown in Fig. 3.1.

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(b) Draw a simple weather chart to show the pattern of pressure and wind direction for an anticyclone in **either** the northern **or** the southern hemisphere.
Label your diagram clearly to show whether it is the southern or northern hemisphere.

[4]

(c) Describe and explain the types of weather associated with **either** a winter **or** a summer anticyclonic system.
Your answer should state which season you are describing.

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4 **(a)** Fig. 4.1 shows the structural divisions of the Earth.

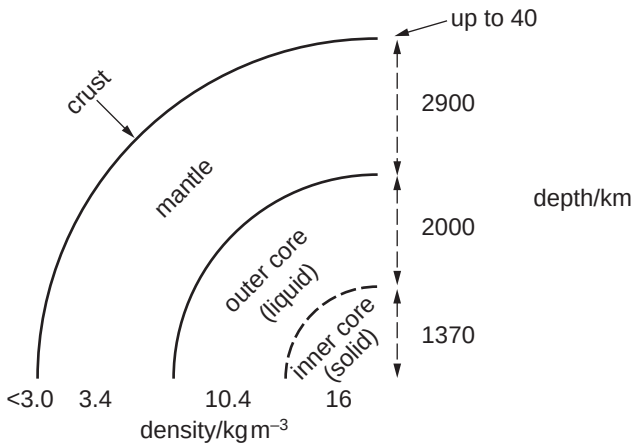

Fig. 4.1

Describe how the behaviour of seismic waves can be used to explain the structure of the Earth.

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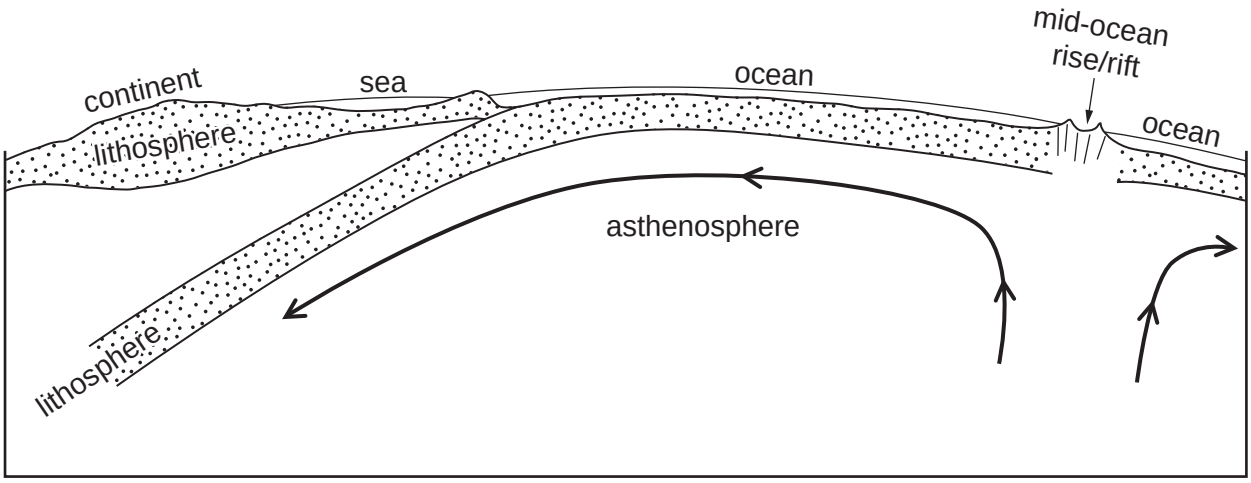
(b) **(i)** Fig. 4.2 is a simplified illustration of the behaviour of tectonic plates.
Label Fig. 4.2 with letters **A**, **B** and **C** to show

A the convection currents which help drive the movement of the tectonic plates,

B a region of ocean floor spreading,

C a subduction zone.



[3]

Fig. 4.2

(ii) What contribution does the asthenosphere make to the movement of the Earth's plates?

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(c) Use **one** example to explain how the palaeontological (fossil) record provides evidence for continental drift.

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5 Fig. 5.1 shows the nitrogen cycle.

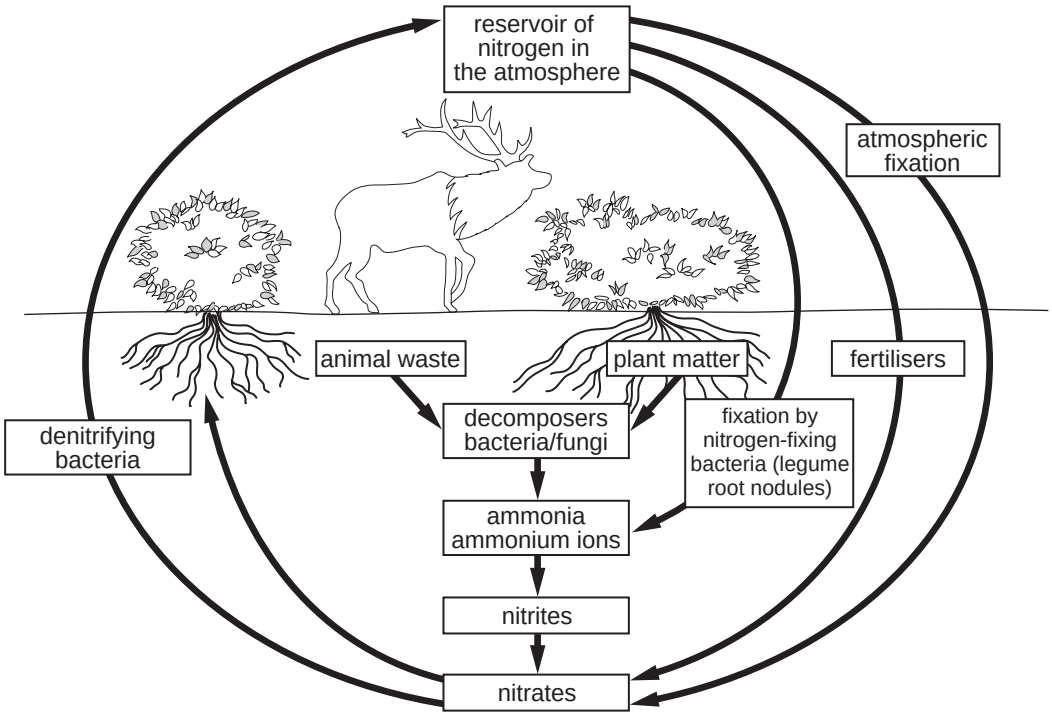

Fig. 5.1

(a) State two sources of atmospheric nitrogen.

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(b) What is meant by the term *nitrogen fixation*?

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(c) What is meant by the term *denitrification*?

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(d) Describe the role of bacteria in the nitrogen cycle.

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(e) State two sources of soil nitrogen.

1 .....

2 .....[2]

(f) State and describe **one** factor which might reduce the amount of nitrogen in a soil.

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6 Fig. 6.1 shows what happens to incoming solar radiation.

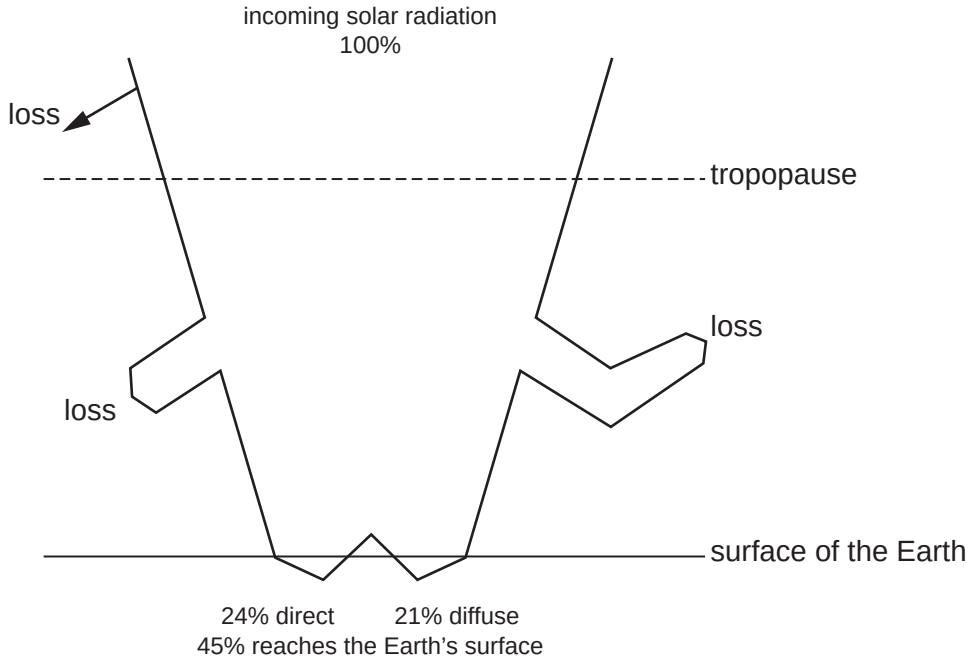

Fig. 6.1

(a) (i) Explain why only 45% of incoming radiation reaches the Earth's surface.

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(ii) Explain why only 24% of this incoming radiation is received directly at the Earth's surface.

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(iii) Describe how the radiation emitted by the Earth differs from that emitted by the Sun.

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(b) (i) What is meant by the term *albedo*?

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(ii) Fig. 6.2 shows ground level albedo values for different surface conditions.

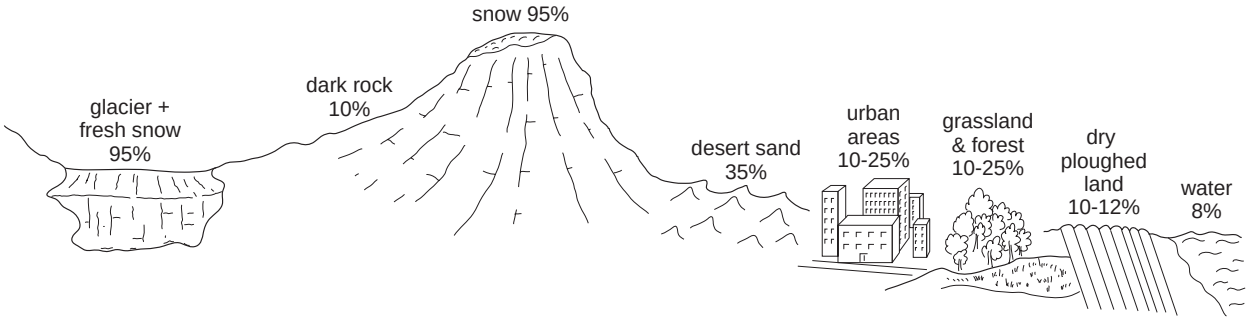

Fig. 6.2

Account for the variations in the values shown in Fig. 6.2

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7 Fig. 7.1 represents the size of the human population in a country.

Fig. 7.1

(a) (i) Use the information in Fig. 7.1 to construct an equation that shows how the total population could remain unchanged over a period of time.

[1]

(ii) Outline **one** economic and **one** social factor that would lead to rapid population growth.

economic .....

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social .....

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(b) Fig. 7.2 plots the growth in population of a country, **X**, between 1950 and 2000.

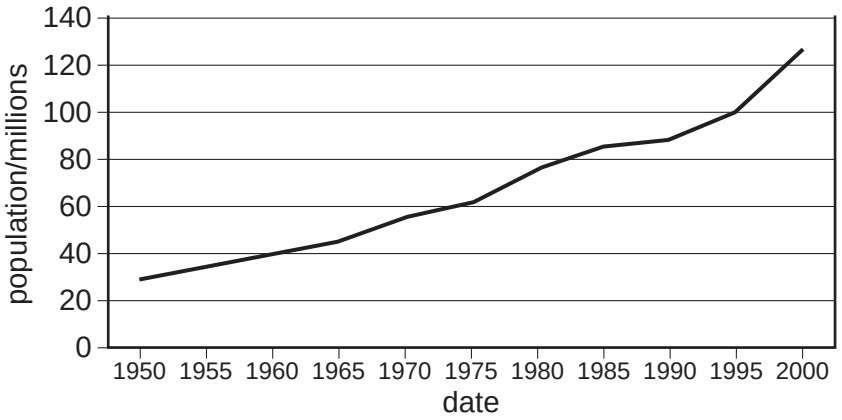

Fig. 7.2

By how much did the population of country **X** rise between

(i) 1950 and 1970, ...

(ii) 1990 and 2000? .....[2]

(c) One estimate places the population of country **X** at 338 million in 2050.
Although **X** is rich in minerals (particularly oil) its Gross National Product (GNP) per capita fell from $320 in 1992 to $260 in 1997. Currently 45% of the population live below the poverty line and literacy is 51%.

(i) Suggest why it is important for countries like **X** to reduce their rate of population growth.

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(ii) Suggest **two** reasons why a country like **X** may find it difficult to reduce its birth rate.

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