



CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
NUMBER

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8291/12

October/November 2023

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

- Section A: answer **all** questions.
- Section B: answer **one** question.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [].

This document has **20** pages.

Section A

Answer **all** questions in this section.

- 1 (a) Fig. 1.1 shows the location of Canada.

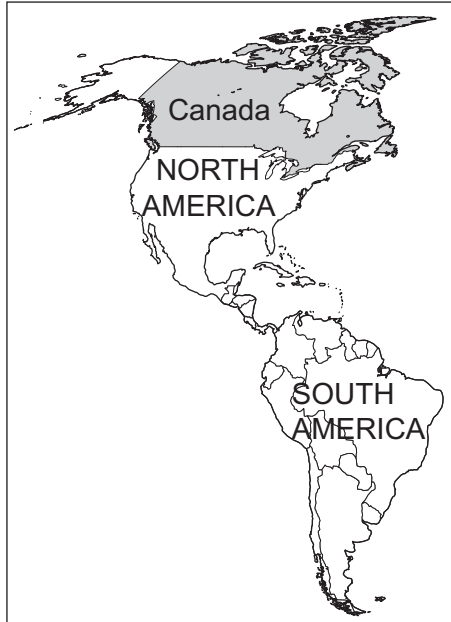


Fig. 1.1

Approximately 40% of Canada is covered by forests. These forest ecosystems are divided into three types, depending on the species of plants they contain. Fig. 1.2 shows the distribution of these three forest ecosystems.

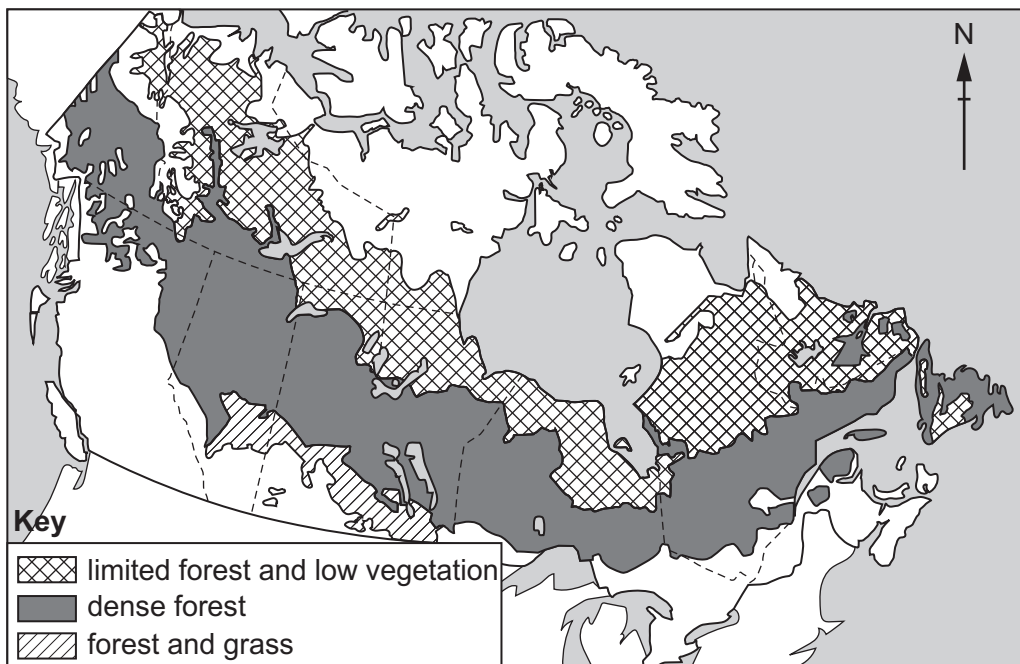


Fig. 1.2

- (i) Describe the distribution of the three forest ecosystems in Canada.

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..... [3]

- (ii) Suggest reasons for the distribution of the three forest ecosystems in Canada.

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- (b) Canada has introduced strategies for the sustainable harvesting of forests. In 2016, the Canadian government reported that the area covered by forests was stable and only 0.5% of forests had been lost in 30 years.

- (i) Define the term sustainability.

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..... [2]

- (ii) Suggest **three** strategies that Canada has introduced for the sustainable harvesting of forests.

1

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2

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3

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[3]

- (c) The area of land covered by trees can be estimated using airborne laser scanning, called lidar. Fig. 1.3 shows an aircraft collecting lidar data. The aircraft sends laser pulses to the ground and detects the reflected signals. The data is analysed to estimate the percentage of land that is covered by forests.

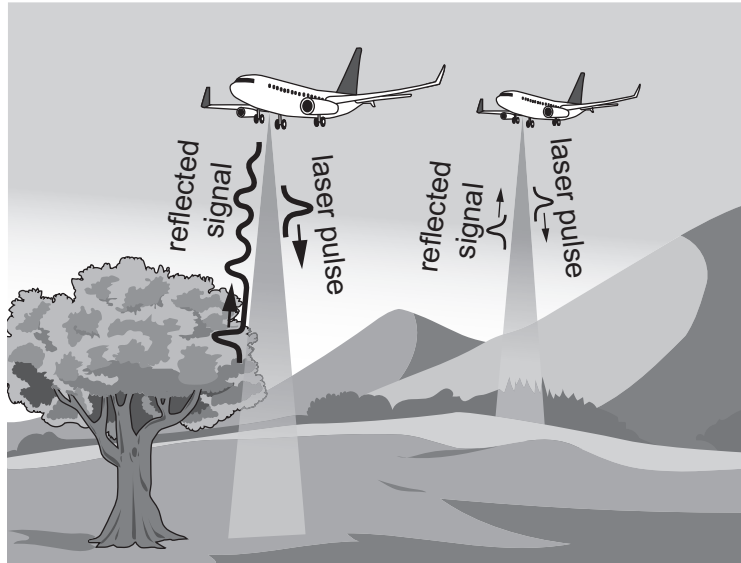


Fig. 1.3

- (i) Lidar can be used to generate 'big data'.

Describe what is meant by the term 'big data'.

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..... [2]

- (ii) The analysis of 'big data' has limitations.

Suggest **two** limitations of the analysis of 'big data'.

1

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2

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[2]

[Total: 15]

- 2 Fig. 2.1 shows a Hispaniolan solenodon, a small mammal, approximately 30 cm long. It is unusual in that it produces venom in its saliva that it uses to kill insects that it preys upon.

The Hispaniolan solenodon is only found on one island in the Caribbean.



Fig. 2.1

- (a) The Hispaniolan solenodon has been designated as an Evolutionarily Distinct and Globally Endangered (EDGE) species.

- (i) Suggest why the Hispaniolan solenodon was designated as an EDGE species.

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- (ii) Describe the role of the EDGE programme in the conservation of biodiversity.

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- (b) The population of Hispaniolan solenodons is decreasing.

Suggest **three** factors that may have caused the population to decrease.

- 1
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- 2
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- 3
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- [3]

- (c) List **five** strategies to conserve the Hispaniolan solenodon.

- 1
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- 2
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- 3
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- 4
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- 5
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- [5]

[Total: 14]

- 3 (a) The World Health Organization estimated that, in 2019, approximately 9% of the world population was living with food insecurity. One cause of food insecurity is agricultural disease.

(i) Define food insecurity.

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(ii) Explain how agricultural diseases in crops can increase food insecurity.

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- (b) One strategy for reducing food insecurity is the use of hydroponics. Fig. 3.1 shows plants grown in a hydroponic system.



Fig. 3.1

Evaluate hydroponics as a strategy for reducing food insecurity.

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..... [5]

[Total: 11]

4 Fig. 4.1 shows a population pyramid for Japan in 2020.

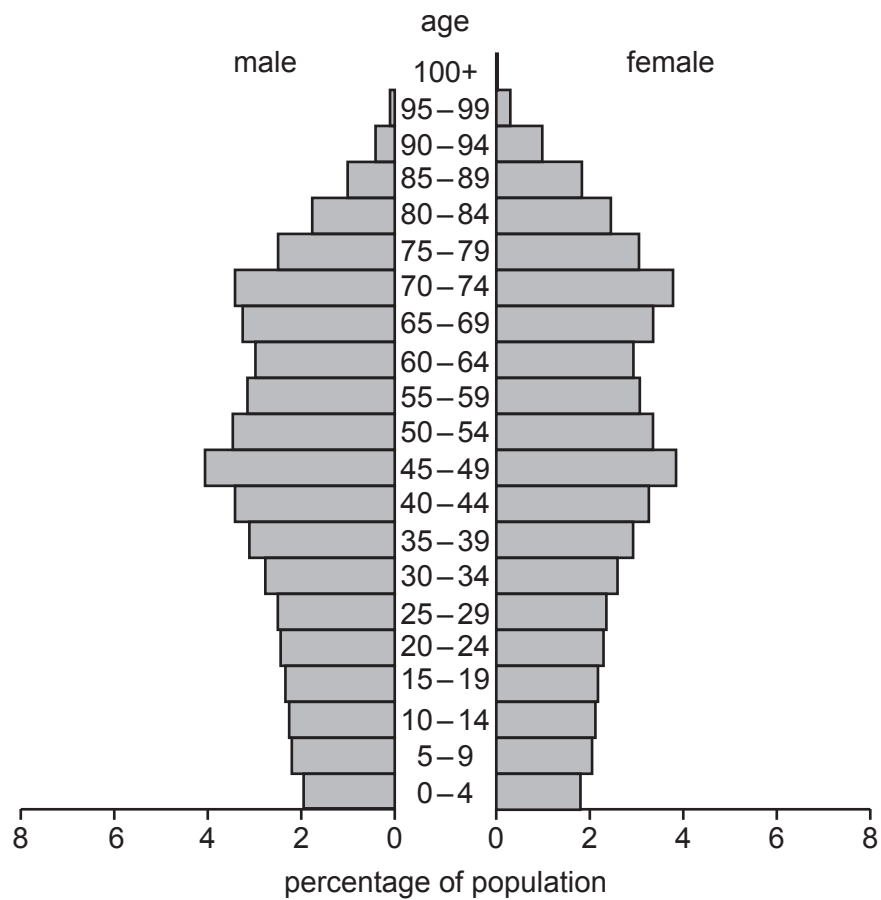


Fig. 4.1

(a) Compare the population of males and females in Japan in 2020.

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..... [3]

(b) Birth rate has decreased in the last 40 years in Japan.

(i) Identify the evidence on Fig. 4.1 which shows this decrease.

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..... [1]

(ii) Suggest reasons for this decrease in birth rate.

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(c) Fig. 4.2 shows a population pyramid for Haiti in 2020.

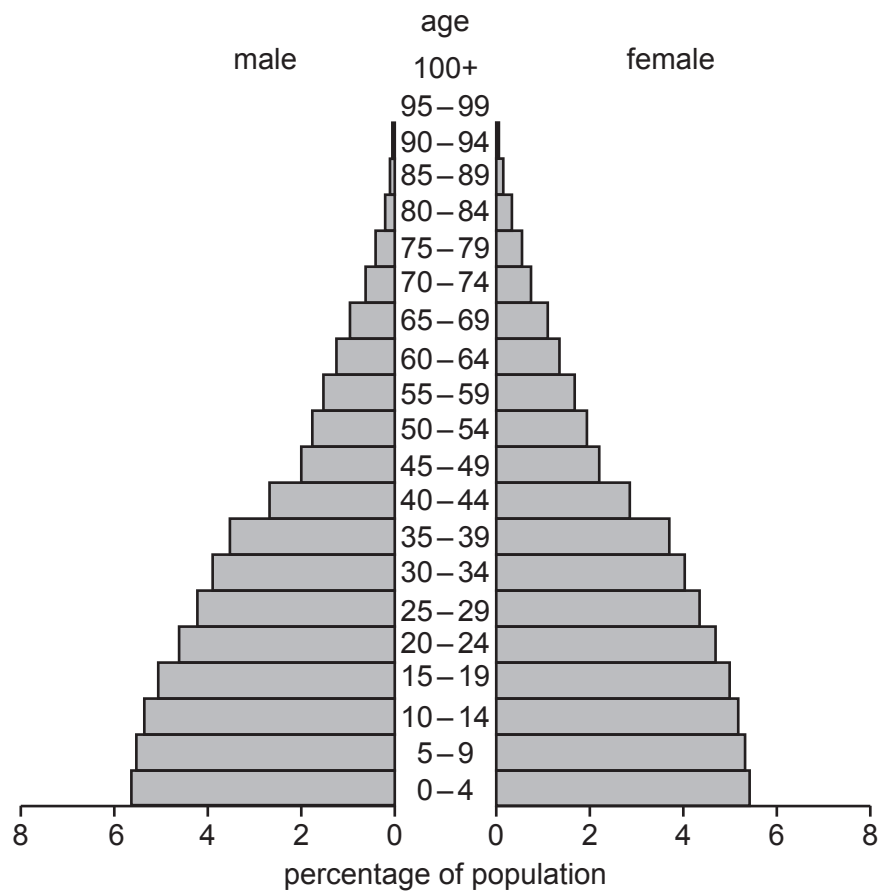


Fig. 4.2

Suggest reasons for the difference in population structure between Japan and Haiti in 2020.

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..... [4]

[Total: 11]

- 5 (a) The distribution of water on Earth can be described in four general categories. Salt water in oceans is one of these categories.

State **three** other categories for the distribution of water on Earth.

- 1
- 2
- 3 [3]

- (b) Fig. 5.1 is a compound line graph which shows the estimated global use of water by sector from 1920 to 2020.

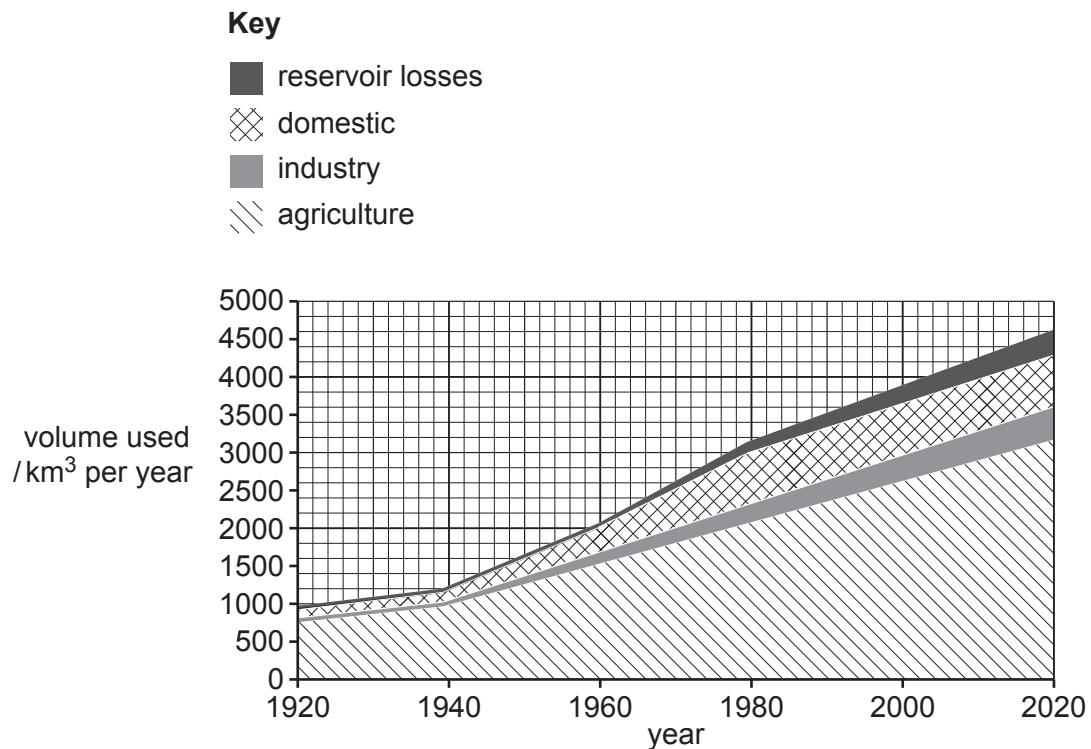


Fig. 5.1

- (i) Calculate the percentage of global water used by agriculture in the year 2020.

Give your answer to **two** significant figures.

percentage of global water used by agriculture = % [2]

(ii) Describe **two** strategies that farmers use to reduce water usage.

1

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2

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[4]

[Total: 9]

Section B

Answer **one** question.

Either

- 6** 'Reducing water usage will provide water security for all countries by the year 2040.'

To what extent do you agree with this statement?

Give reasons and include information from relevant examples to support your answer. [20]

Or

- 7** Evaluate habitat conservation and habitat creation as methods of conserving biodiversity.

Give reasons and include information from relevant examples to support your answer. [20]

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