



CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
NUMBER

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8291/11

May/June 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. Any blank pages are indicated.

Section A

Answer **all** questions in this section.

- 1 (a) Fig. 1.1 represents a simplified water cycle.

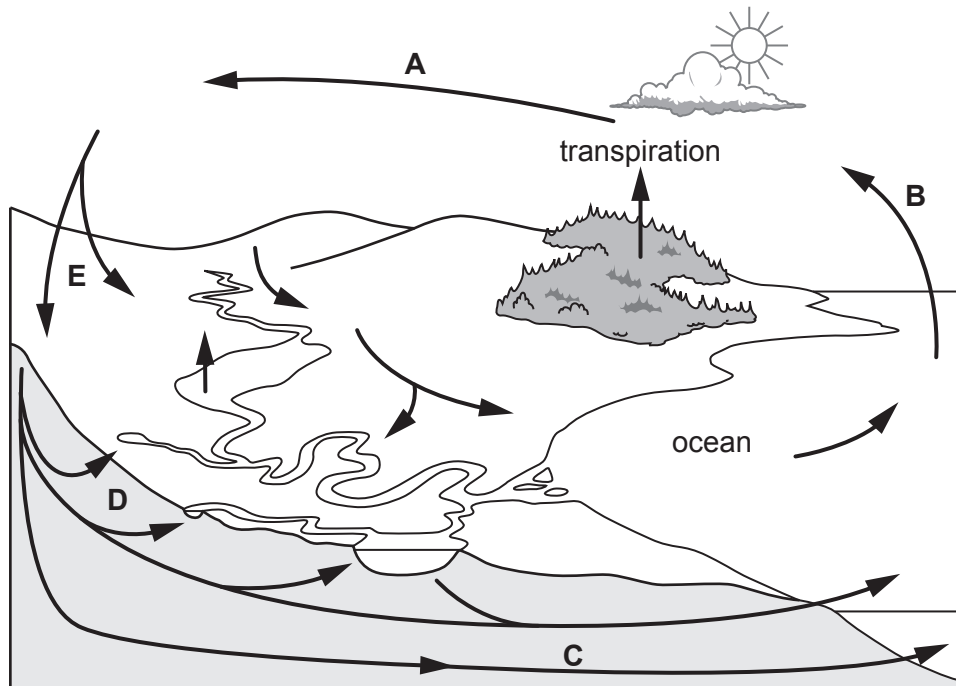


Fig. 1.1

- (i) Identify the letter on Fig. 1.1 that represents:

precipitation

infiltration.

[2]

- (ii) Describe the role of transpiration in the water cycle.

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.....

..... [2]

- (b) The mismanagement of water can affect the global distribution of water causing water insecurity.

State **three** other causes of water insecurity.

- 1
- 2
- 3

[3]

- (c) The Intergovernmental Hydrological Programme (IHP) is a programme started by the United Nations in 1975. The IHP promotes research into water security and water management.

Describe the benefits and limitations of programmes, like the IHP, on managing global water security.

benefits

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.....

.....

limitations

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[4]

- (d) Table 1.1 shows the volume of fresh water removed from ground water or surface sources per person, for two countries in 1970 and 2015.

Table 1.1

country	volume of fresh water removed per person in 1970 / m ³ per person	volume of fresh water removed per person in 2015 / m ³ per person	percentage change
Denmark	144.3	116.4	–19.3
South Korea	470.6	605.7	

- (i) Calculate the percentage change in the volume of fresh water removed per person for South Korea between 1970 and 2015.

Give your answer to **one** decimal place.

percentage change = [2]

- (ii) Suggest reasons for the change in the volume of fresh water removed per person for Denmark between 1970 and 2015.

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..... [4]

[Total: 17]

2 Fig. 2.1 shows staghorn coral in the Atlantic Ocean.

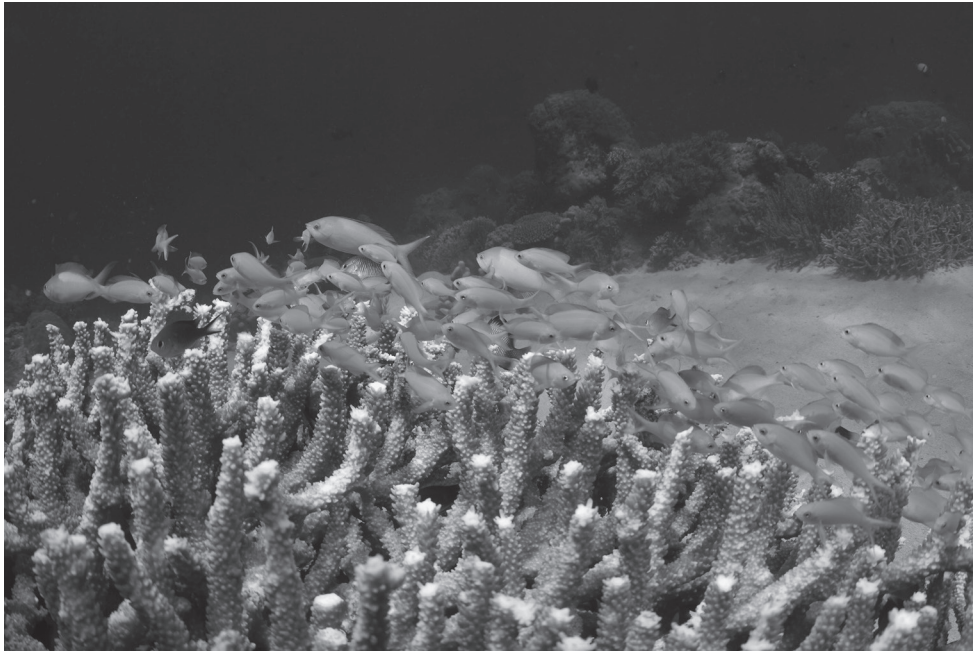


Fig. 2.1

One species of staghorn coral, *Acropora cervicornis*, is classed as critically endangered on the International Union for Conservation of Nature (IUCN) Red List.

(a) Describe the role of the IUCN Red List.

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..... [3]

- (b) Corals are very sensitive to environmental conditions.

Explain how climate change can decrease the population of staghorn corals.

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..... [4]

- (c) Fig. 2.2 shows a strategy for conserving staghorn corals. Small pieces of coral are attached to a nursery line and allowed to grow until they are large enough to be moved to new areas. The corals then form a new coral reef.

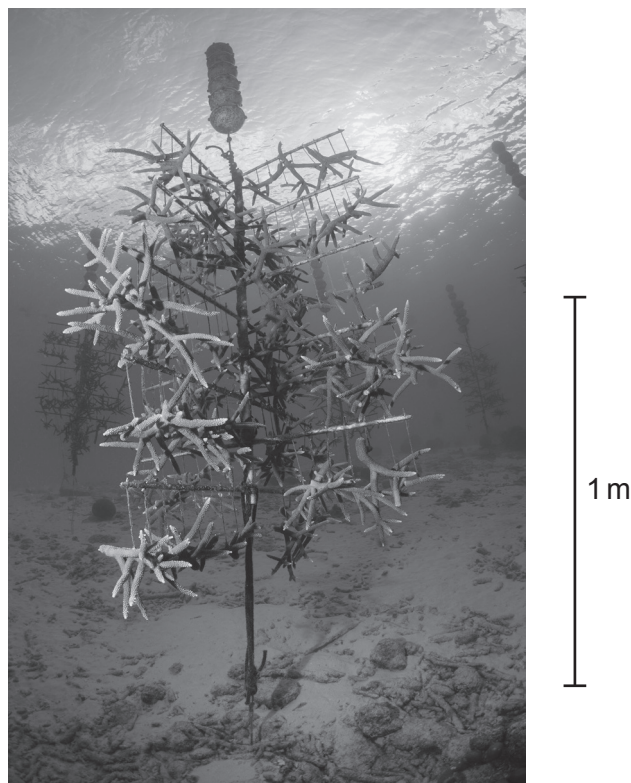


Fig. 2.2

- (i) Evaluate the use of a coral nursery line as a strategy for conserving staghorn corals.

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..... [4]

- (ii) Suggest **three** other strategies that governments could introduce to conserve staghorn corals.

1

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2

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3

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[3]

[Total: 14]

- 3 Fig. 3.1 shows data about birth and death rates and the population of a country.

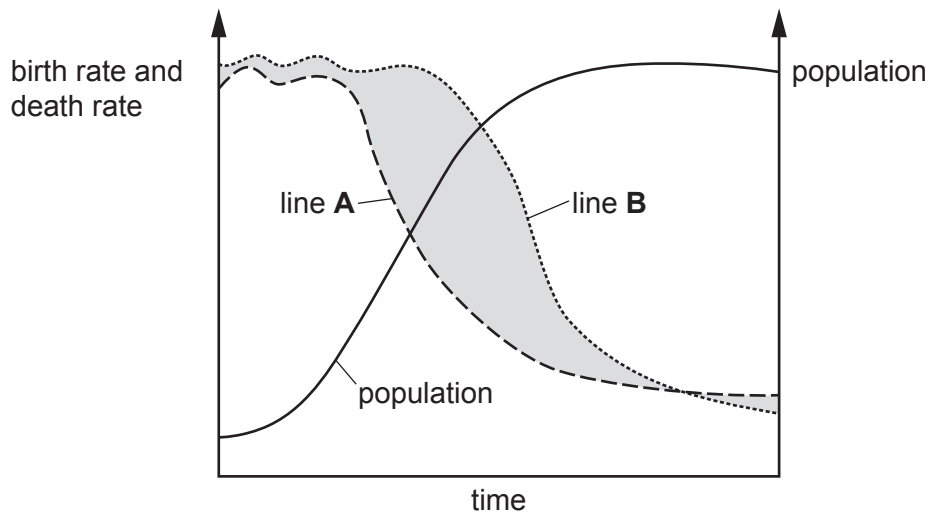


Fig. 3.1

- (a) (i) Line **A** and line **B** represent the birth and death rates of the country.

Identify the line that represents the death rate. Use Fig. 3.1 to give reasons for your answer.

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..... [2]

- (ii) Birth and death rates cause population change.

Explain **one** other cause of population change.

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..... [2]

- (b) Table 3.1 shows the dependency ratio for the country in 1990 and 2020.

Table 3.1

dependency ratio in 1990	dependency ratio in 2020
93	55

Describe **three** changes that could cause the change in dependency ratios shown in Table 3.1.

- 1
-
- 2
-
- 3
-
- [3]

- (c) Strategies are required to limit population increase. One strategy is to improve the availability of contraception.

Describe the benefits and limitations of this strategy for managing population change.

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-
-
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-
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-
-
-
-
- [4]

[Total: 11]

- 4 (a) The United Nations estimated that, in 2019, approximately 750 million people experienced severe levels of food insecurity.

(i) Define food insecurity.

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..... [2]

(ii) Describe causes of food insecurity.

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..... [4]

- (b)** Fig. 4.1 shows aeroponics, an agricultural technique for growing crop plants. Aeroponics is a strategy for improving food security.

The crop plants are grown without soil and have their roots in air. Water is sprayed onto the roots as a fine mist.

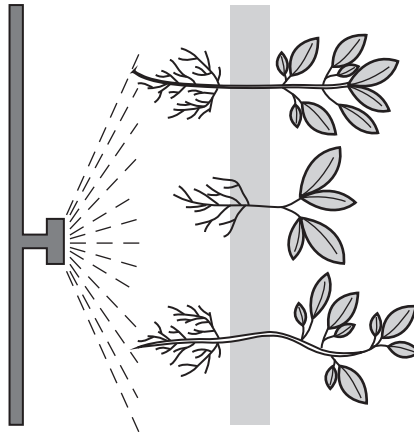


Fig. 4.1

Suggest benefits and limitations of aeroponics as a strategy for reducing food insecurity.

[6]

- (c) One other strategy for improving food security is the use of pesticides such as herbicides and fungicides.

Describe how pesticides improve food security.

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..... [4]

- (d) Many crop plants are annual plants. An annual plant produces a crop in one year and then dies. Perennial plants live for more than two years and produce a crop each year. Plant breeders try to breed perennial crop plants from annual crop plants.

Suggest **two** advantages of perennial crops compared to annual crops.

1

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2

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[2]

[Total: 18]

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