



CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
NUMBER

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8291/12

October/November 2022

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 shows an ecological pyramid of numbers for a grassland biome.

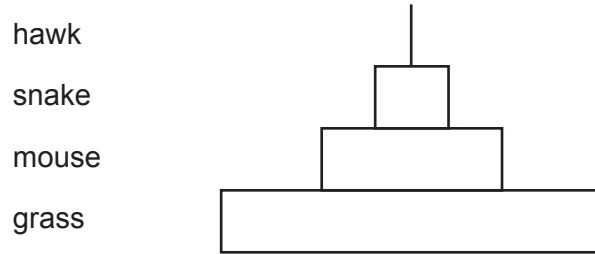


Fig. 1.1

- (i) State the trophic level of the snake in Fig. 1.1.

..... [1]

- (ii) Explain why the grass in Fig. 1.1 is called the producer.

.....

 [2]

- (iii) Explain the shape of the ecological pyramid in Fig. 1.1.

.....

 [3]

- (b) Fire ants are an invasive species of tropical grassland. They displace native ants and kill many species of insects.

(i) Define the term invasive species.

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..... [2]

(ii) Explain how an invasion of Fire ants can affect the food web of a tropical grassland.

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..... [3]

- (c) The grassland biome is also under threat from human activity.

(i) Suggest **two** human activities which can affect the biodiversity of a grassland biome.

1

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2

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[2]

(ii) Describe methods to conserve the biodiversity of a grassland biome.

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..... [4]

[Total: 17]

2 Fig. 2.1 shows a simplified water cycle.

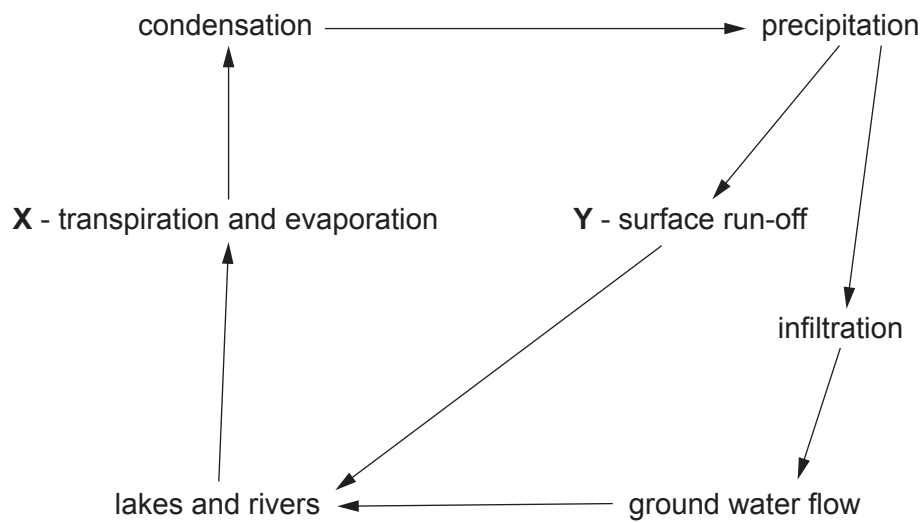


Fig. 2.1

(a) Explain the role of plants at **X** and **Y** in the water cycle in Fig. 2.1.

X

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.....

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Y

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[4]

(b) Suggest the effects of urbanisation on the water cycle in Fig. 2.1.

Give reasons for your answers.

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..... [4]

[Total: 8]

- 3 (a) Table 3.1 shows population information for Germany, a country in Europe, and Nigeria, a country in Africa.

Table 3.1

age group	population	
	Germany	Nigeria
0–14	10 323 982	86 366 541
15–64	52 141 917	110 453 234
65+	17 991 838	6 632 730

- (i) Use Table 3.1 to calculate the percentage of the population aged 65+ in Nigeria.

percentage = [2]

- (ii) The dependency ratio for Nigeria is 84.2.

The dependency ratio is calculated by the equation

$$\text{dependency ratio} = \frac{[\text{young population (0 to 14)} + \text{old population (65+)}] \times 100}{\text{population aged 15 to 64}}$$

Calculate the dependency ratio for Germany using the data from Table 3.1.

dependency ratio = [2]

- (iii) Suggest reasons for the difference between the dependency ratio for countries in different income groups.

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..... [4]

- (b) Explain **one** factor which affects human migration rate.

factor

explanation

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..... [2]

- (c) Describe **two** strategies to manage a changing population.

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..... [4]

[Total: 14]

- 4 (a) Fig. 4.1 is a graph showing the area of Antarctic sea ice recorded on 22 April each year.



Fig. 4.1

- (i) Describe the changes in Antarctic sea ice area in Fig. 4.1.

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..... [2]

- (ii) Suggest reasons for the changes in Antarctic sea ice area in Fig. 4.1.

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..... [4]

(b) The Antarctic Treaty has been in place since 1959.

(i) Explain why reaching international agreement to protect habitats is difficult to achieve.

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..... [3]

(ii) Describe strategies used to protect the Antarctic environment.

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..... [4]

[Total: 13]

- 5 (a) Complete Table 5.1 to identify non-renewable and renewable energy resources using the following terms.

oil wind solar nuclear geothermal

Table 5.1

non-renewable	renewable

[2]

- (b) Define the term energy security.

.....

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..... [2]

- (c) Explain **two** causes of energy insecurity.

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..... [4]

[Total: 8]

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