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International Education

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CANDIDATE NAME

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ENVIRONMENTAL MANAGEMENT **8291/13**

Paper 1 Principles of Environmental Management **May/June 2026**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- 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. Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- 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 **24** pages.

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Section A

Answer **all** questions in this section.

1 Figure 1.1 shows part of the water cycle.

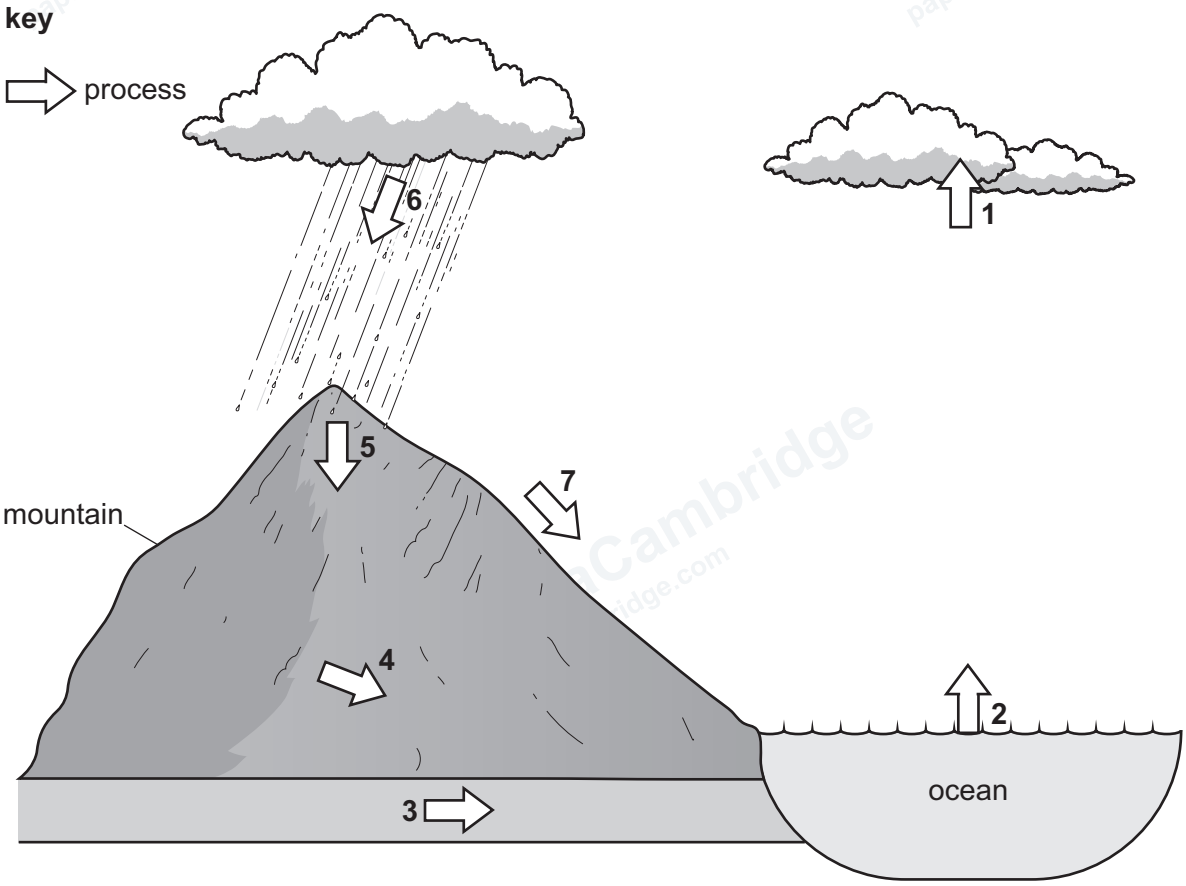

Figure 1.1

(a) **(i)** Identify the number of the process that represents condensation shown in Figure 1.1.

..... [1]

(ii) Name processes **3** and **4** shown in Figure 1.1.

3 .....

4 .....

[2]

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(b) A farmer grazes livestock on the side of the mountain.

Explain how this affects process **7** shown in Figure 1.1.

.....

.....

.....

..... [2]

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(c) Figure 1.2 shows a hydroponics system used to grow tomatoes.

Hydroponics is a strategy for managing food security.

Figure 1.2

(i) Use Figure 1.2 to describe benefits of hydroponics as a strategy for managing food security.

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..... [4]

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(ii) Plants require water for photosynthesis.

State the word equation for photosynthesis.

..... [1]

(iii) Plants respire aerobically in hydroponics systems.

Tick (✓) **all** the statements that correctly describe aerobic respiration in plants.

description	✓
it only occurs during the day	
1 glucose molecule respired forms 6 carbon dioxide molecules	
6 oxygen molecules are needed to respire 1 molecule of glucose	

[2]

[Total: 12]

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2 **(a)** Table 2.1 shows data about 4 countries in 2023.

Table 2.1

country	area of country / km^2	population of country	population density / .....
Argentina	2 736 690	46 621 847	17.0
Greece	130 647	10 497 595	80.4
Qatar	11 586	2 532 104	.....
Singapore	709	5 975 383	8427.9

(i) Complete Table 2.1:

- Add the unit for population density.
- Calculate the population density for Qatar to **one** decimal place.

[2]

(ii) A student uses Table 2.1 to conclude that:

'The population of Argentina will have a greater impact than the population of Greece on the environment.'

Suggest **one** piece of evidence that supports this conclusion and **one** piece of evidence that does **not** support this conclusion.

supports .....

.....

does **not** support .....

.....

[2]

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(b) Figure 2.1 shows the population structure for Qatar in 2023.

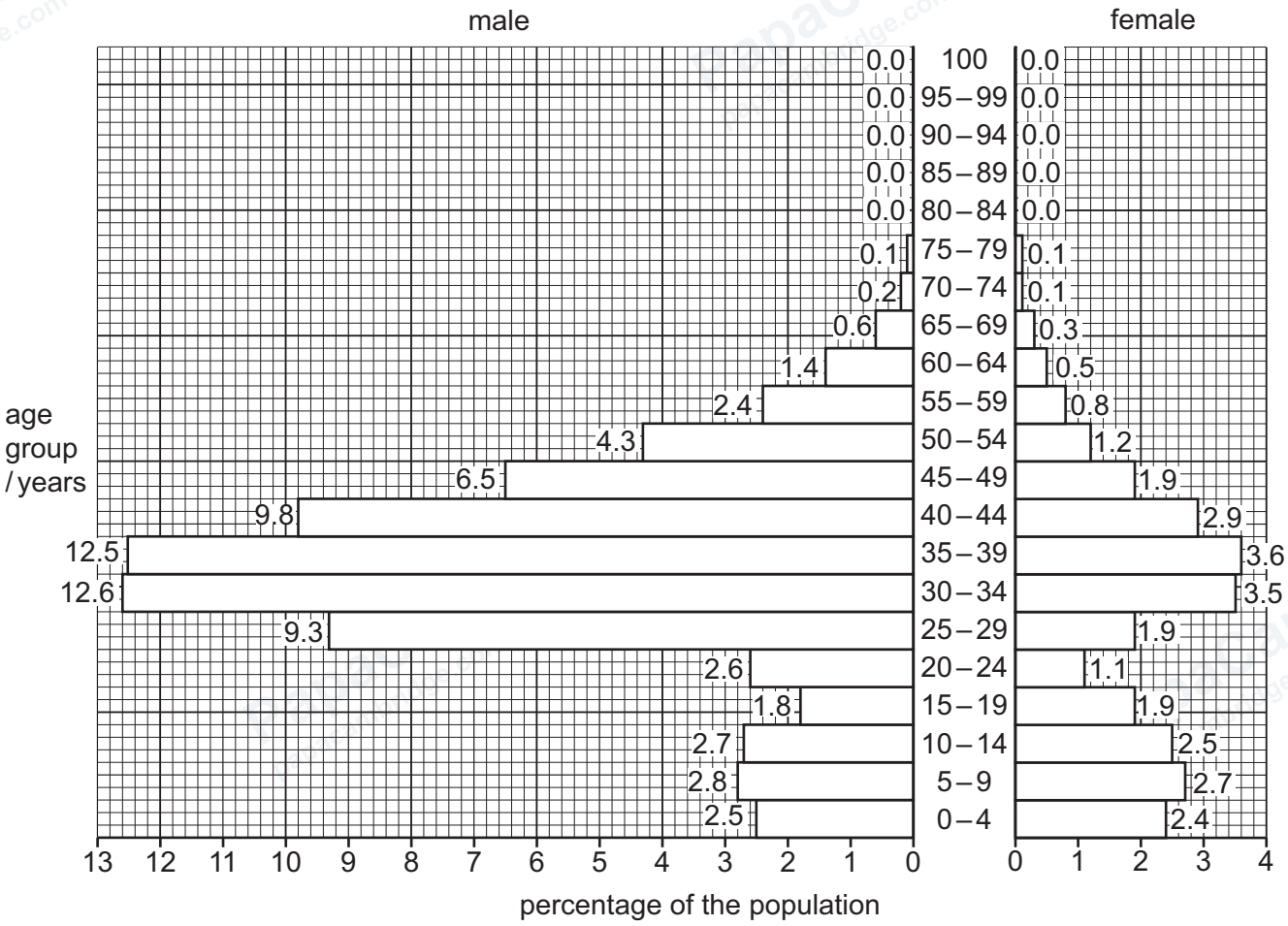

Figure 2.1

(i) Compare the population of males with the population of females in Qatar in 2023.

.....

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..... [3]

(ii) Suggest **one** reason for the shape of the population structure for males aged 25 to 45 shown in Figure 2.1.

.....

.....

..... [1]

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(c) Figure 2.2 shows the population structure for a country with a low income economy (LIC) and a country with a high income economy (HIC).

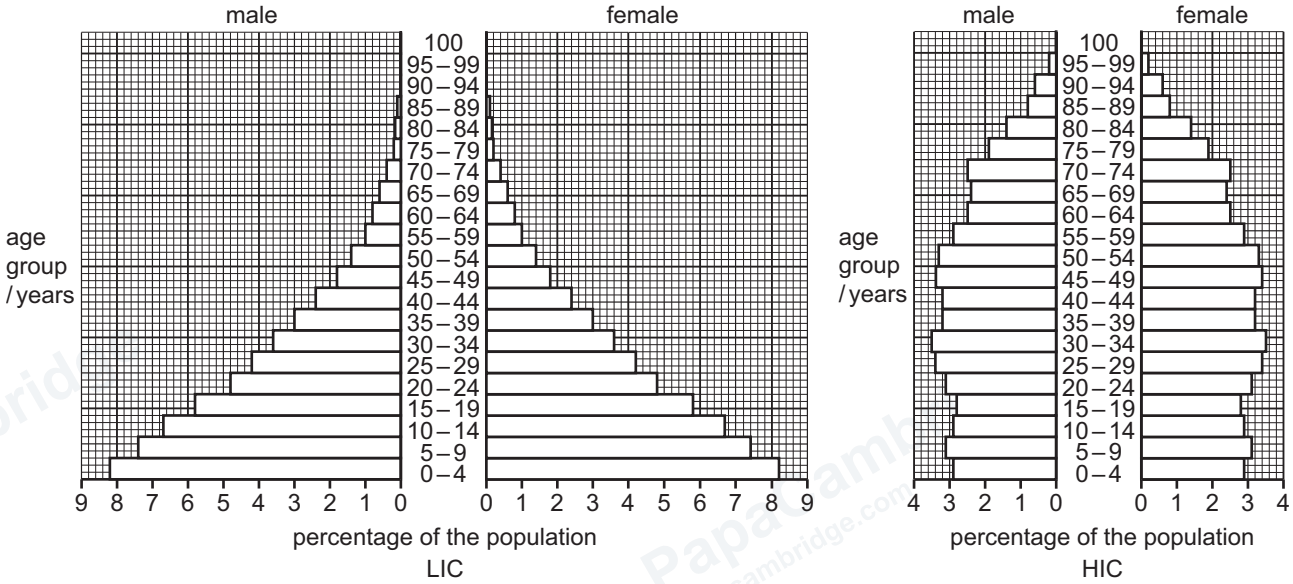

Figure 2.2

Explain reasons for the differences between the population pyramids of LICs and HICs shown in Figure 2.2.

LICs have a narrower top

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LICs have a wider base

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[5]

[Total: 13]

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3 **(a)** Figure 3.1 shows a gentoo penguin with two chicks in a nest in Antarctica.

Figure 3.1

Scientists investigate the effect of tourism on the population of gentoo penguins at one location in Antarctica.

A scientist suggests a hypothesis:

'Tourism will **not** affect the population of gentoo penguins.'

To test the hypothesis, the scientist:

- measures the number of gentoo penguin nests
- measures the number of tourists
- repeats these measurements each year for a 20-year period.

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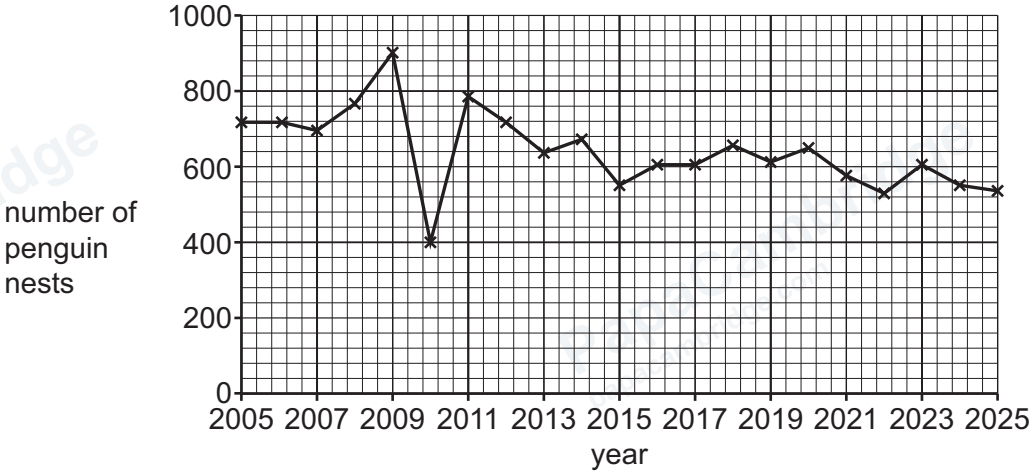
Figure 3.2 shows the results of the investigation.



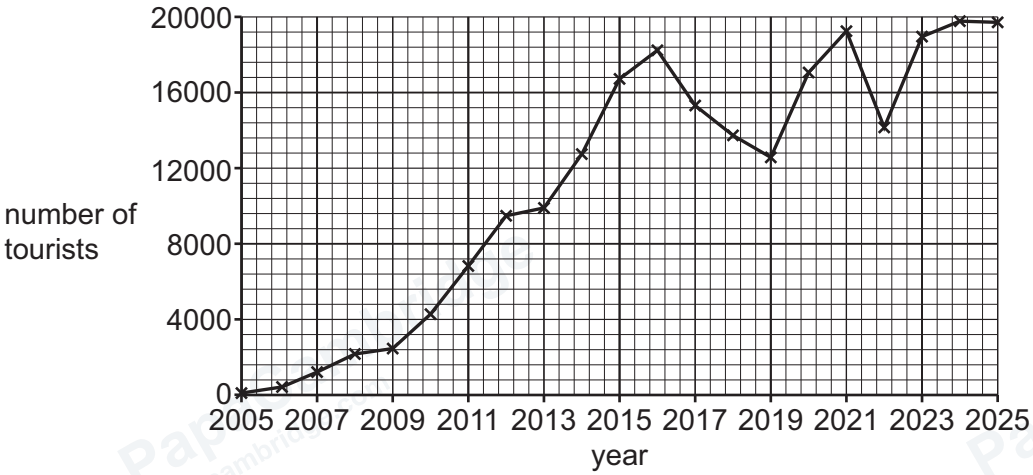


Figure 3.2

(i) State the independent variable in this investigation.

..... [1]

(ii) Use Figure 3.2 to explain if the data supports or does **not** support the hypothesis.

.....

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..... [2]

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(iii) Some tourists disturb gentoo penguins.

Suggest **two** other ways that tourism negatively impacts Antarctica.

1 .....

.....

2 .....

.....

[2]

(b) Ozone depletion impacts Antarctica.

(i) Describe how ozone depletion occurs.

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..... [4]

(ii) Explain why ozone depletion is greatest over Antarctica.

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..... [4]

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(c) Figure 3.3 shows part of an Antarctic food web that contains gentoo penguins.

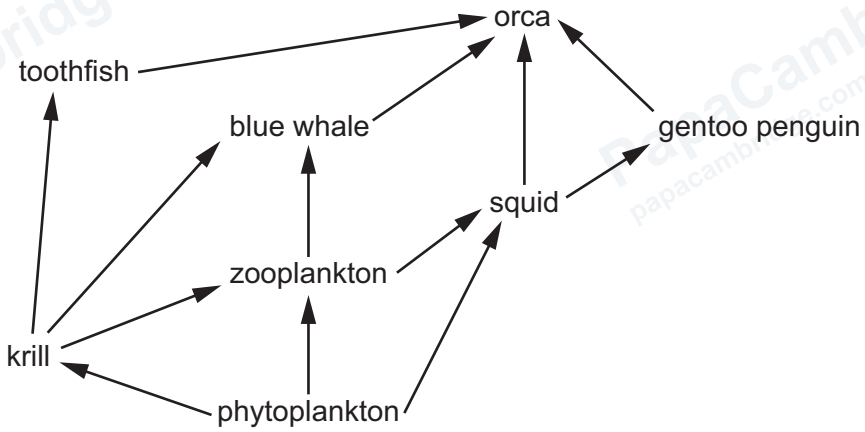

Figure 3.3

(i) Use Figure 3.3 to identify:

an organism that **only** feeds as a primary consumer .....

an organism that consumes at three different trophic levels .....

all of the tertiary consumers .....

.....
[3]

(ii) Figure 3.4 shows a pyramid of biomass for a food chain in Figure 3.3.

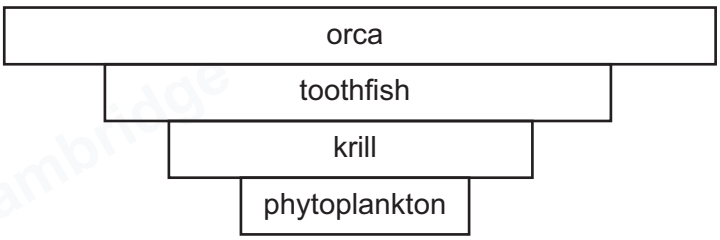

Figure 3.4

Describe how the shape of the pyramid of energy for this food chain is different to the pyramid of biomass shown in Figure 3.4.

.....

..... [1]

(iii) Explain why short food chains are more energy efficient than long food chains.

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..... [2]

[Total: 19]

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4 Figure 4.1 shows the percentage of plastic waste by disposal method for China and the mean values for the world in 2019.

Mismanaged plastic waste is waste that is illegally disposed of in the environment.

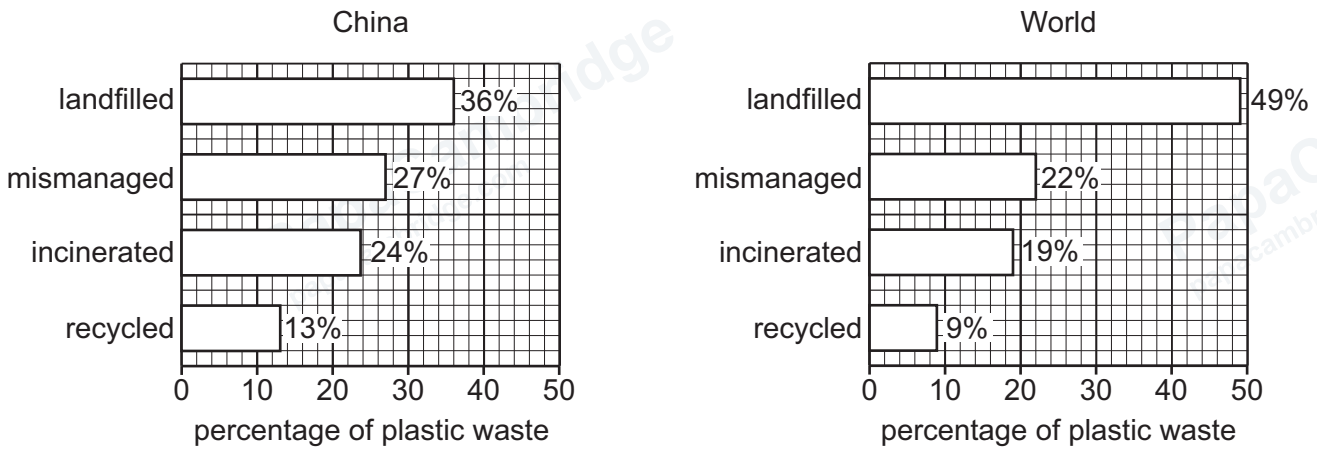

Figure 4.1

(a) Compare the data for China with the data for the world shown in Figure 4.1.

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..... [3]

(b) Only 4% of plastic waste in the USA is mismanaged.

Suggest **two** reasons for this low percentage.

1 .....

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2 .....

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[2]

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(c) Table 4.1 shows the percentage of plastic waste by disposal method for India in 2019.

Table 4.1

method of disposal	percentage of plastic waste
landfilled	36
mismanaged	46
incinerated	4
recycled	12

Plot the data for India shown in Table 4.1 on Figure 4.2.

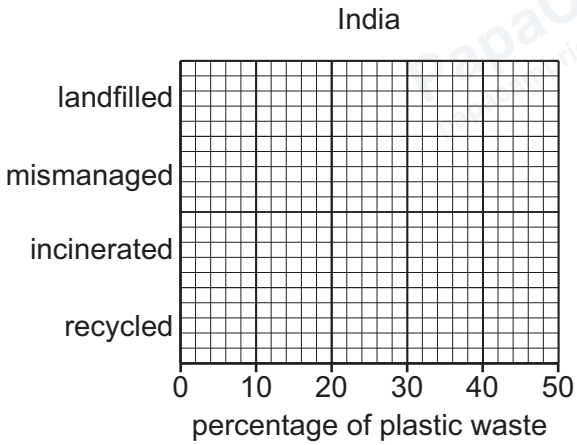

Figure 4.2

[2]

(d) Plastics contain a chemical called BPA.

BPA bioaccumulates in marine food chains.

(i) Describe the process of bioaccumulation.

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..... [3]

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(ii) State **two** other effects of plastics in the ocean.

1 .....

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2 .....

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[2]

(iii) One strategy to reduce plastics in the ocean is to use biodegradable plastics.

Suggest benefits and limitations of this strategy.

benefits .....

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limitations .....

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[4]

[Total: 16]

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Section B

Answer **one** question.

Either

5 'Invasive species are the biggest threat to biodiversity.'

To what extent do you agree with this statement?

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

Or

6 Evaluate the success of using renewable resources as a strategy for managing energy security.

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

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