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5350971118

ENVIRONMENTAL MANAGEMENT **0680/22**

Paper 2 Management in Context **February/March 2025**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- 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.

INFORMATION

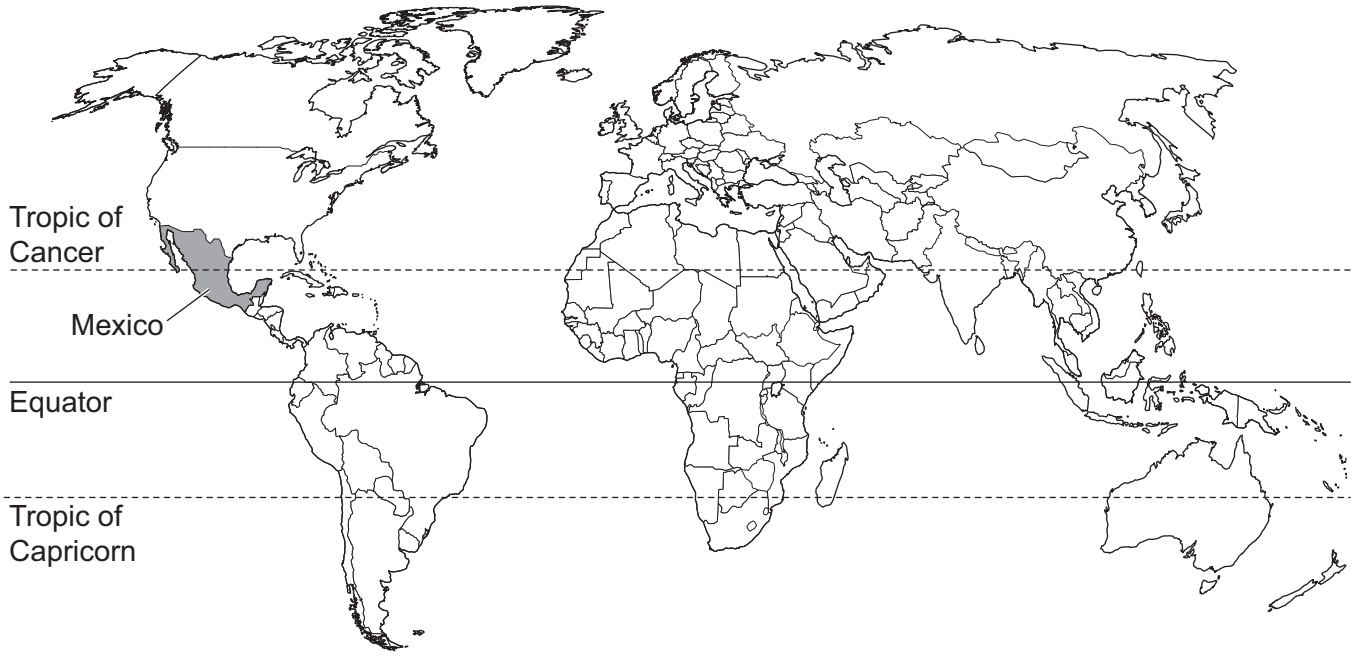
- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

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World map showing the location of Mexico

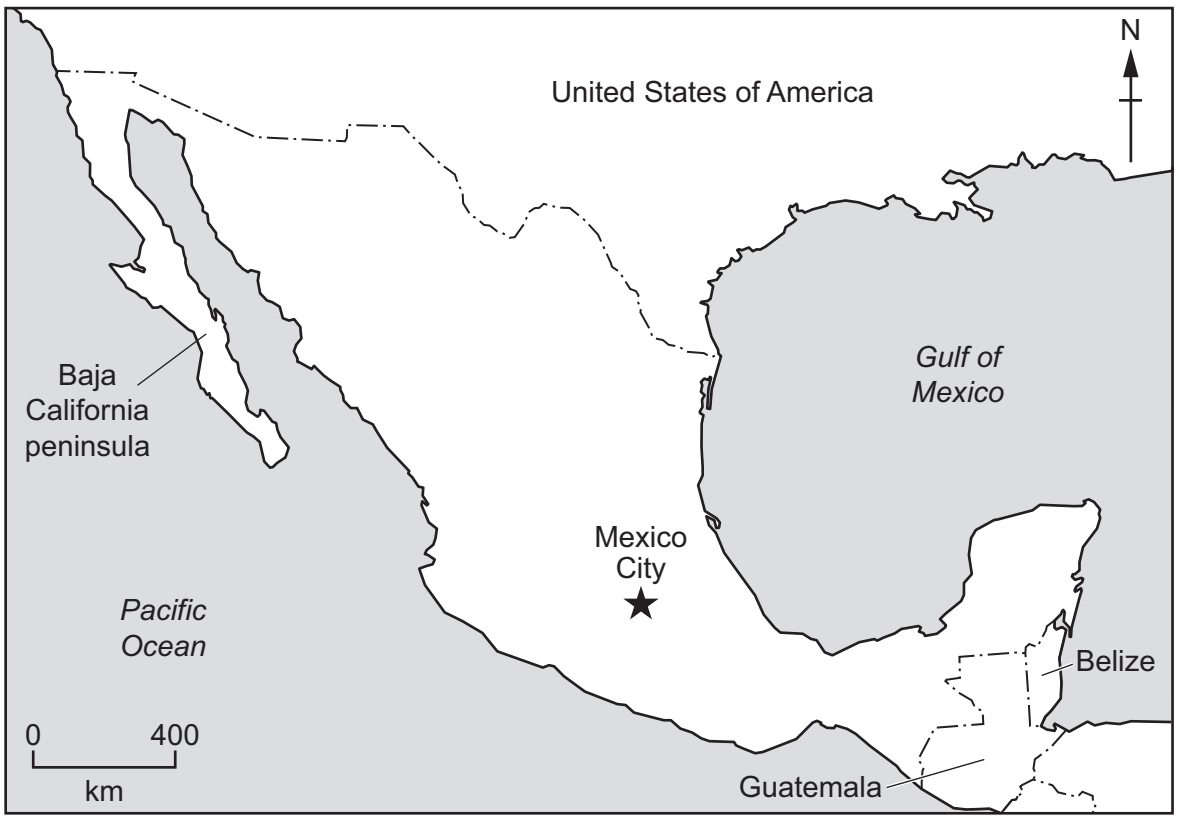


Map of Mexico

Key

★ capital city

international boundary



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Area of Mexico: 1 943 945 km^2

Population: 129 150 971 (in 2022)

Children per woman: 2.08

Life expectancy: 75.3 years

Currency: Mexican pesos (19.43 MXN = 1 USD)

Language: Spanish and regional languages

Climate of Mexico: varied, desert and tropical areas

Terrain of Mexico: varied, with mountains and large flatlands

Main exports of Mexico: oil, silver, gold, agricultural products and timber

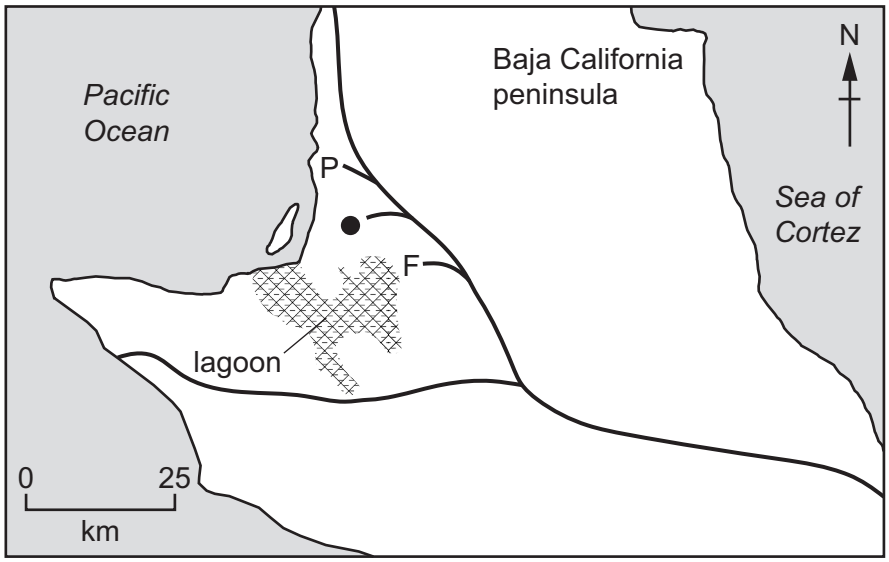
Mexico is a country in North America. Mexico has reserves of minerals and oil that are extracted and exported. Agriculture is a major industry. Some areas have poor soils that limit agricultural yields. Tourism is important for the economy.

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1 **(a)** The map shows the location of the Guerrero Negro sea salt factory on the Baja California peninsula, Mexico.

Key

- large road
- town
- P port
- F factory
- lagoon



The sea salt factory is the largest in the world and produces 7 million tonnes of sea salt every year. The sea salt is extracted from sea water.

(i) The factory is located on the edge of a shallow area of sea called a lagoon.

Use the map to estimate the area of the lagoon.

Circle the correct answer.

20 km^2 **100 km^2** **400 km^2** **1000 km^2**

[1]

(ii) Ocean tides bring sea water into the lagoon which give the factory a constant supply of sea water.

Suggest **two** other reasons for the location of the factory.

1 .....

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2 .....

.....

[2]

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(iii) The lagoon ecosystem contains biotic and abiotic components.

Suggest **one** biotic and **one** abiotic component of a lagoon ecosystem.

biotic .....

abiotic .....

[2]

(b) The photograph shows sea salt that has been extracted from sea water in the lagoon.



Suggest **two** environmental impacts of this sea salt extraction.

1 .....

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2 .....

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[2]

(c) The factory is located in the El Vizcaíno biosphere reserve.

Describe how biosphere reserves conserve biodiversity.

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(d) The photograph shows tourists whale watching in the lagoon.



(i) Whale watching can be managed as sustainable tourism.

Describe what is meant by sustainable tourism.

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..... [1]

(ii) Suggest **three** strategies for managing the impacts of whale watching.

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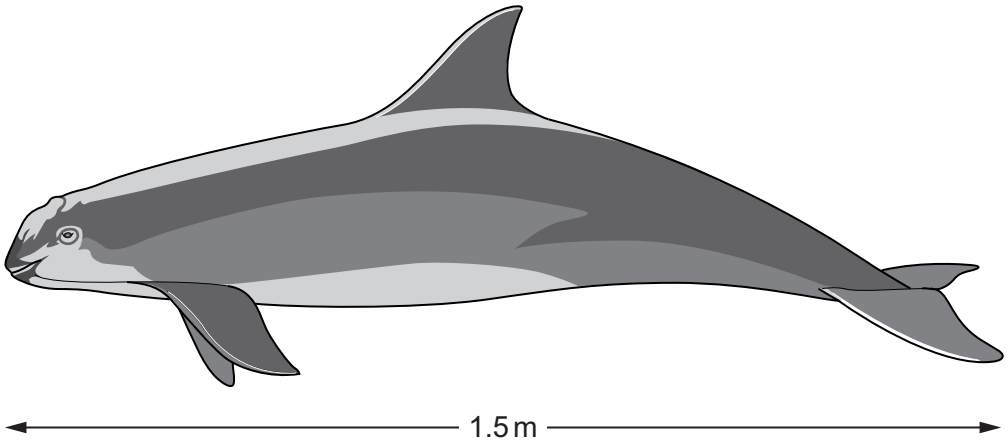
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(e) The drawing shows a marine mammal called the vaquita porpoise.



Marine mammals need to come to the surface of the water to breathe air.

The vaquita porpoise is only found in the Sea of Cortez.

In 2015, a survey estimated that there were 60 vaquita porpoises in the wild. In 2021, there were only 10 vaquita porpoises left in the wild.

(i) Calculate the mean decrease **per year** in the vaquita porpoise population in the six years between 2015 and 2021.

Give your answer as a whole number.

..... [2]

(ii) Suggest why it is difficult to estimate the population of vaquita porpoises.

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..... [1]

(iii) Suggest **two** reasons why commercial fishing is a threat to vaquita porpoises.

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[2]

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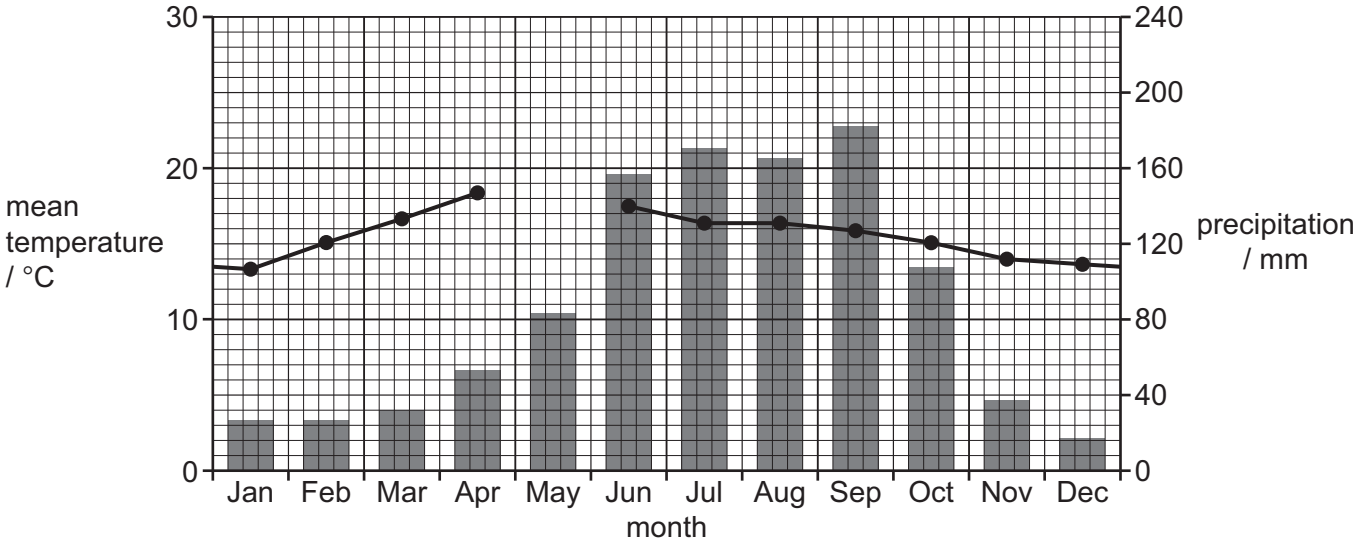
2 **(a)** The graphs show climate data for Mexico City and the Baja California peninsula.

Key

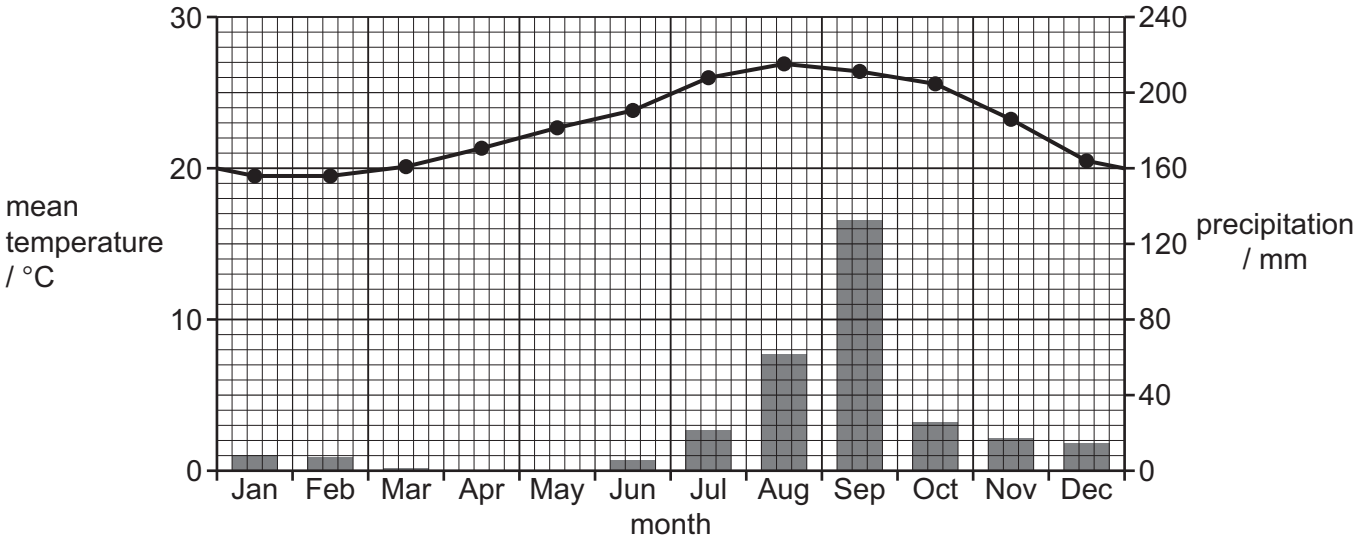
precipitation

temperature

Mexico City



Baja California peninsula



(i) Identify the month in Mexico City with the lowest precipitation.

..... [1]

(ii) Identify the 4-month period on the Baja California peninsula with the greatest mean temperatures.

..... [1]

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(iii) The mean temperature for May in Mexico City is 18 °C.

Plot the mean temperature for May on the graph for Mexico City.

Complete the line for temperature on the graph for Mexico City.

[1]

(iv) Compare the monthly mean precipitation of Mexico City with that of the Baja California peninsula.

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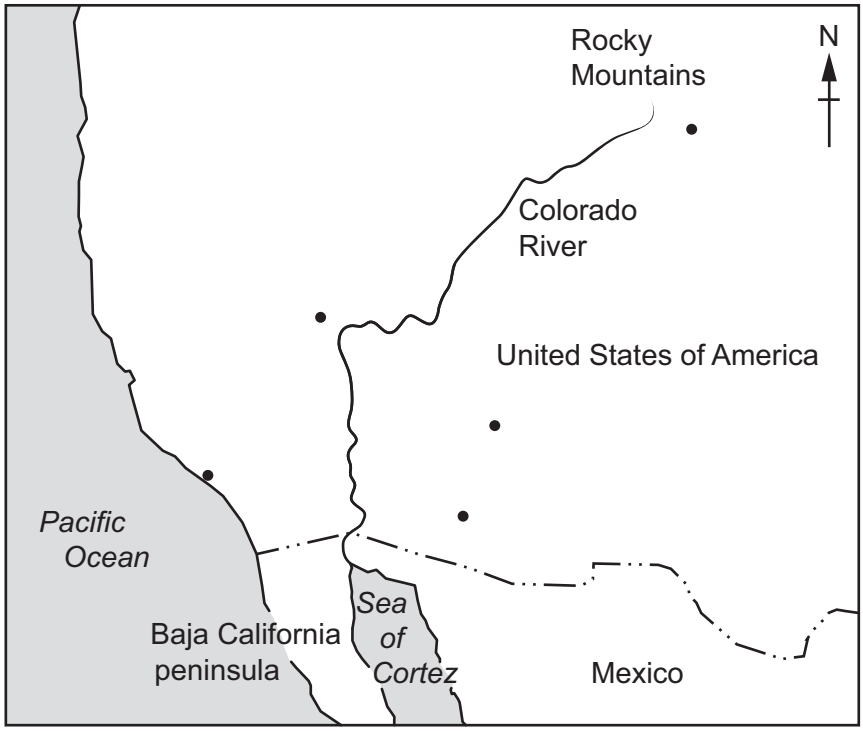
(b) The map shows the path of the Colorado River.

Key

— · · — international boundary

• large city

Colorado River



The Colorado River is the main source of fresh water for the Baja California peninsula. In recent years, the river does **not** supply enough water for the population of the Baja California peninsula.

(i) Suggest **three** reasons why the Colorado River does **not** supply enough water for the population of the Baja California peninsula.

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[3]

(ii) State **two** sources of fresh water other than a river.

1 .....

2 .....

[2]

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(c) The United States of America (USA) government recommends that potable water should contain a maximum of 10 mg / dm^3 of nitrate ions.

(i) State what is meant by the term potable.

.....

..... [1]

(ii) Circle the formula for nitrate ions.

NO_3 **NO^-** **NO_3^-** **NO^{3-}**

[1]

(iii) State **one** source of nitrate ions in a river.

..... [1]

(iv) Complete the sentences about the impacts of excess nitrate ions in a river.

absorbed **carbon dioxide** **chlorination**

decomposed **eutrophication** **evaporated** **gases**

nitrogen **oxygen** **sedimentation** **sunlight** **water**

Excess nitrate ions in a river cause algae to grow very quickly.

The algae block ..... from entering the river.

Plants and algae die and are ..... by microorganisms.

The dissolved ..... gas in the river decreases and animals die.

This process is called ..... .

[4]

(d) The local government of the Baja California peninsula have introduced water rationing to conserve water.

Water rationing is where the water supply to homes and industry is turned off for a few hours each day.

Suggest **two** effects of water rationing on the people of the Baja California peninsula.

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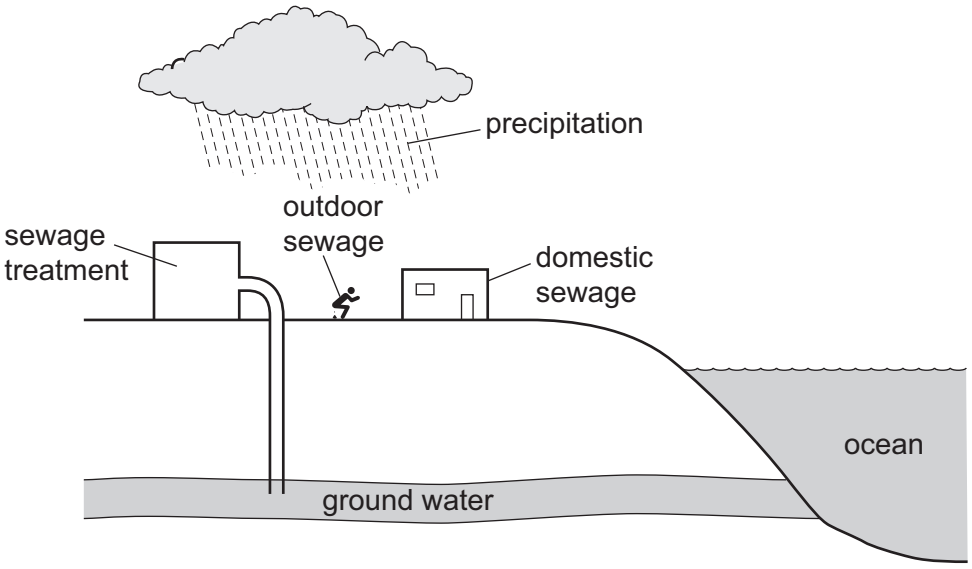
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(e) Human sewage contains faeces and water.

The diagram shows sources of human sewage in an ocean.



(i) Use the diagram to describe how human sewage enters oceans.

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..... [3]

(ii) Describe how human sewage can impact human health.

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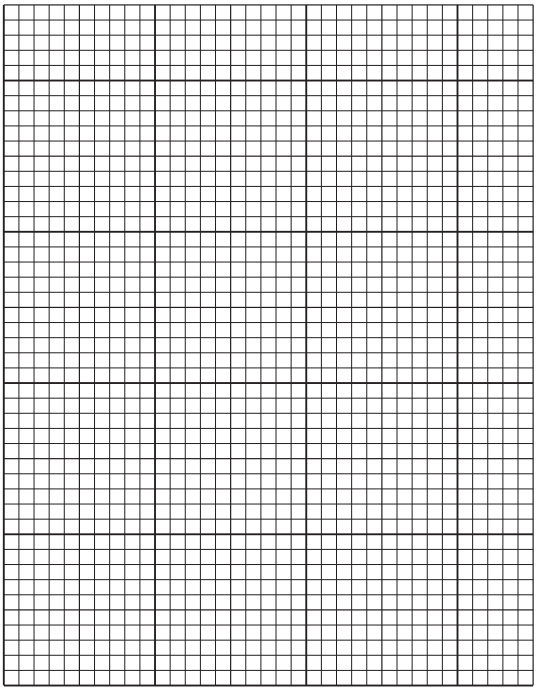
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3 (a) (i) The table shows the population density of 5 countries.

country	population density / people per km^2
Australia	3
China	150
Kenya	95
Mexico	66
USA	36

Plot a bar chart to show the population density for the 5 countries in the table.



[4]

(ii) Calculate how many times greater is the population density of Mexico compared to Australia.

..... [1]

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(b) In 2022, the population of Mexico City was 9.2 million and the area was 1485 km^2.

(i) Calculate the population density of Mexico City.

..... people per km^2 [2]

(ii) Suggest **three** reasons why many cities have a larger population than rural areas.

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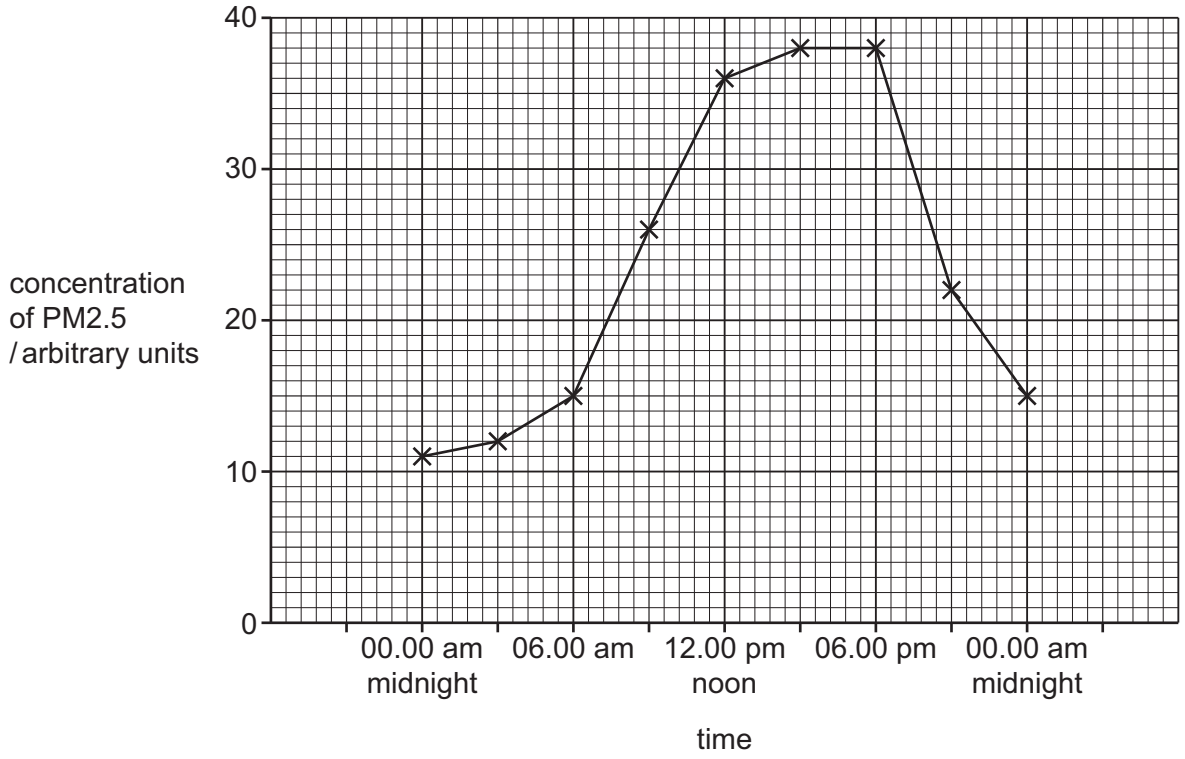
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(c) PM2.5 is an air pollutant produced from the combustion of fossil fuels.

The graph shows the concentration of PM2.5 over a 24-hour period in Mexico City.



The World Health Organization recommends that the 24-hour mean concentration of PM2.5 should be less than 15 arbitrary units.

(i) Use the graph to identify how many hours the concentration of PM2.5 is greater than the recommended concentration.

..... [1]

(ii) A student concludes that the 24-hour mean concentration of PM2.5 in Mexico City is below the 24-hour mean concentration recommended by the World Health Organization.

Use evidence from the graph to explain why this conclusion is **not** correct.

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..... [1]

(iii) Suggest **two** reasons for the changes in concentration of PM2.5 in the 24-hour period shown on the graph.

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(d) Smog regularly forms in Mexico City from vehicle emissions.

(i) Describe how smog forms from vehicle emissions.

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(ii) Describe **three** strategies to reduce the formation of smog.

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[3]

(iii) Smog can cause premature death.

State **two** other effects of smog on human health.

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[2]

[Total: 23]

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4 The drawing shows a white nun orchid.



The orchid grows on mature trees in the forests of southern Mexico. In 2022, the orchid was classified as endangered in the wild.

(a) Suggest **two** reasons why the orchid has become endangered.

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[2]

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(b) A scientist investigates the population of white nun orchids in a 1000 km^2 area of forest, using a systematic sampling technique.

(i) Describe how the scientist:

- uses systematic sampling
- collects the data using a transect
- records the data collected
- obtains an estimate for the population of orchids in the forest.

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(ii) Suggest **two** limitations of sampling white nun orchids in a 1000 km^2 forest using a transect.

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[2]

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(c) Seeds from the white nun orchid have been stored in seed banks.

(i) Explain why seeds are stored in seed banks.

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..... [2]

(ii) State **three** limitations of seed banks.

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[3]

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