



Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER



ENVIRONMENTAL MANAGEMENT

5014/02

Paper 2 Management in context

For Examination from 2019

SPECIMEN PAPER

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of this page.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.

You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.

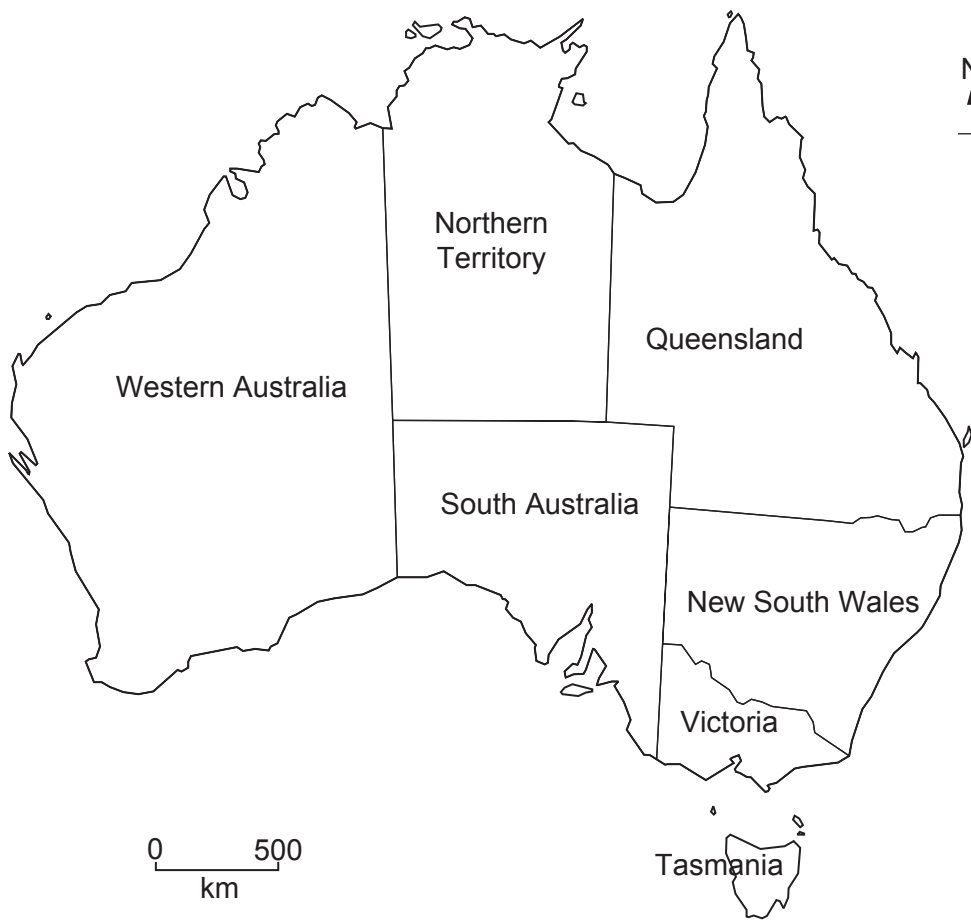
The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **18** printed pages.

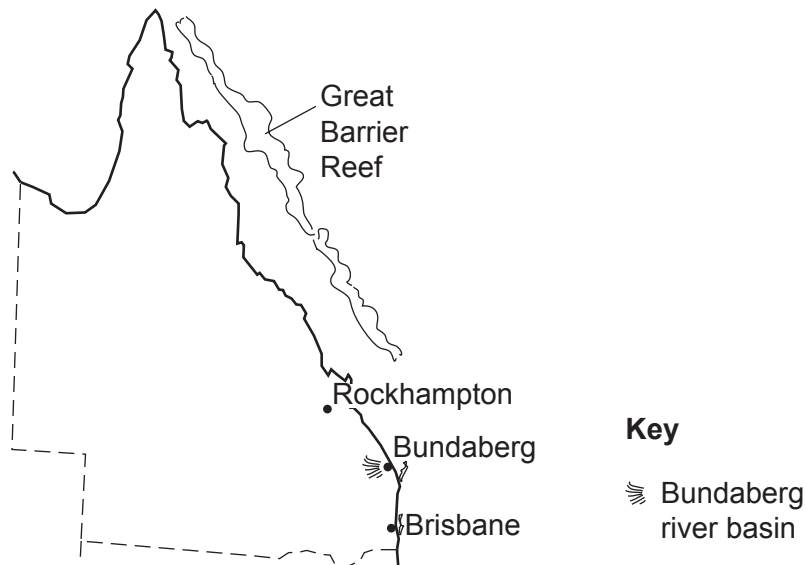
world map showing the location of Australia



map of Australia with states



map of Queensland



Area of Australia: over 7 741 000 km²

Population: 23.8 million

Children per woman: 1.78

Life expectancy: 81.8 years

Currency: Australian Dollar (1.43 AUD = 1 USD)

Language: English and indigenous languages

Climate of Queensland: wet tropical along the northern and eastern coasts, semi-desert and desert further into the interior

Terrain of Queensland: fertile coastal lowlands, low desert plateau in the interior

Main exports of Australia: coal, iron ore, gold, meat, wool, wheat and machinery

Australia is an island with a large desert interior. Australia has extensive natural resources. Most of the population live close to the east and south coasts. Queensland is a state in Australia. It has an area of nearly 2 million square kilometres and a population of 4.7 million. Queensland has extensive irrigated agricultural areas as well as large coalfields. The coal is mined for domestic power generation and for export, particularly to China.

- 1 (a) (i) Calculate the percentage of the total Australian population that live in Queensland.

.....% [1]

- (ii) Suggest the benefits to Queensland and Australia of having large coalfields.

Queensland

.....

Australia

.....

[2]

- (b) The table shows the 30-year average data for a weather station in northern Queensland.

month	average daily temperature / °C	average monthly rainfall / mm	average number of wet days per month
January	28	277	15
February	28	285	12
March	27	183	10
April	25	84	6
May	23	33	5
June	21	36	4
July	20	15	3
August	21	15	3
September	23	18	2
October	25	33	4
November	27	48	5
December	28	137	12

- (i) Name the coolest month of the year.

..... [1]

- (ii) Name the driest **two** months of the year.

..... [1]

- (iii) The northern and eastern parts of Queensland are often hit by tropical cyclones between December and March.

In December 2010 much of Queensland suffered its worst floods for 100 years.

The table shows data for the weather station in northern Queensland for four different months in 2010.

month	average daily temperature / °C	monthly rainfall / mm	number of wet days
A	28	117	11
B	20	15	3
C	27	209	22
D	25	140	13

State which month, **A**, **B**, **C** or **D**, shows the data for December 2010.

..... [1]

- (iv) Suggest how the worst flooding in 100 years could have affected the extraction and exporting of coal.

.....

 [3]

- (v) Many people remained in the flooded area.

Explain why this could have caused an outbreak of cholera.

.....

 [3]

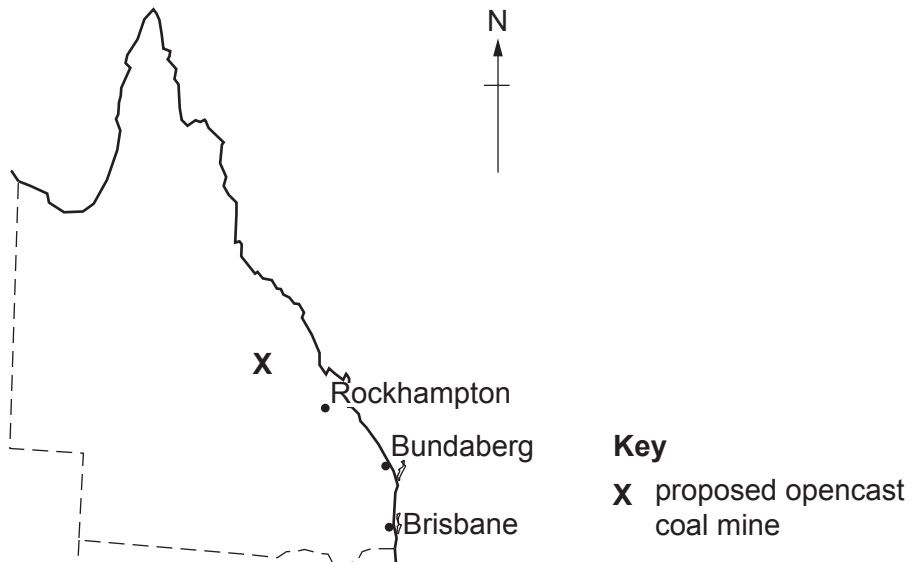
(vi) Suggest why some people remained in the flooded area.

.....
..... [1]

(c) The 2010 extreme weather was followed by a very strong El Niño event in the Pacific Ocean.
Describe how the fisheries near the west coast of South America could be affected by an El Niño event.

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..... [4]

(d) The authorities in Queensland want to develop a new opencast coal mine. One proposed location is shown.



Local people were asked to fill in a questionnaire to find out their views about the proposed development of the new opencast mining project.

The table shows the results.

	percentage responses to questionnaire		
	yes	no	do not know
1. Do you expect more local people to be employed by the mining project?	42	46	12
2. Do you think the mining project will improve the transport links in the area?	60	25	15
3. Have you any worries about the environmental impact of the mining project?	35	55	10

(i) Suggest how people could have been selected for this questionnaire.

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..... [2]

(ii) Describe how the data from this questionnaire was processed.

.....

..... [1]

(iii) Suggest why the majority of local people had no worries about the environmental impact of the opencast mining project.

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..... [2]

(e) (i) Coal is a non-renewable energy resource.

Name **one** renewable energy resource.

..... [1]

(ii) Explain why opencast mining may have a larger environmental impact than deep mining.

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..... [3]

(iii) Much of the coal extracted from Queensland is exported. This coal is burnt in power stations to generate electricity. Carbon dioxide is released by burning coal in power stations.

Describe the environmental problems caused by the release of carbon dioxide.

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..... [3]

(iv) Describe how the landscape can be restored after the opencast mining project has finished.

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..... [3]

- (f) Crops have been grown using irrigation for many years in the Bundaberg river basin. As a result, salinisation is now a big problem in parts of the river basin.

A student described the process of salinisation with this list of statements.

- A Irrigation water soaks into the soil to a great depth.
- B Water and salts are drawn up to the surface.
- C Water evaporates from the field.
- D Salts dissolve in the water at a great depth.
- E Salt remains at the surface and kills plant roots.

The student has written the correct statements but they have been presented in the wrong order.

- (i) Complete the boxes to show the correct order for salinisation.

One has been done for you.

1st	2nd	3rd	4th	5th E
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[2]

- (ii) Other than killing plant roots, state **one** other negative effect of salinisation.

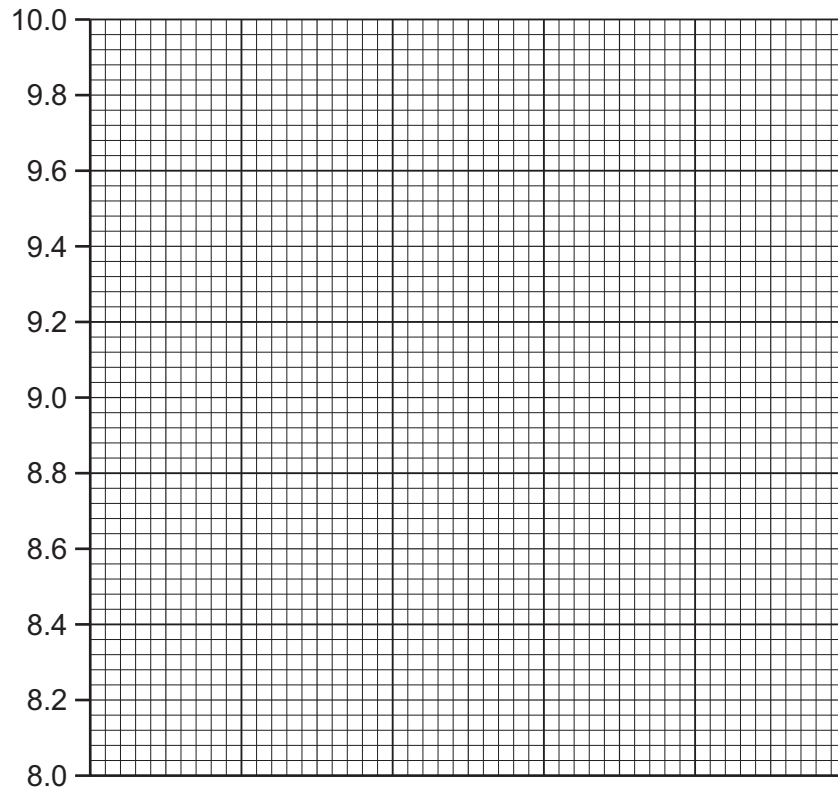
.....
 [1]

- (g) A farmer in the Bundaberg river basin kept a record of the total yield of maize from some irrigated fields over six years.

The table shows the data.

year	yield/tonnes per hectare
2010	9.8
2011	9.8
2012	9.5
2013	9.3
2014	9.1
2015	8.9

- (i) Plot the data as a bar graph on the grid.



[4]

- (ii) Predict a likely yield for 2016.

..... [1]

(iii) Farmers add fertilisers to increase crop yield.

They carefully calculate the amount of fertiliser to be added so that most of the fertiliser is absorbed by the crop.

Suggest **two** economic advantages of carefully calculating the amount.

.....
.....
.....
..... [2]

(iv) Even though the farmers have added fertilisers carefully, some parts of the Bundaberg river basin have an increased concentration of nitrates and phosphates.

Describe how these increased concentrations can change the plant and animal populations in the river.

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..... [4]

2 (a) The Great Barrier Reef is the largest coral reef system in the world. It provides a habitat for many species. Its biodiversity is high and it is a protected world heritage site.

(i) State the meaning of the term *biodiversity*.

.....
..... [1]

(ii) For many years the reef has been commercially valuable for fishing and tourism.

Recent surveys of the reef have found:

- the Queensland sawfish is now an endangered species
- three fish species are close to being endangered
- fewer fish are being caught
- the fish being caught are smaller.

In 2004, the government banned fishing on one third of the reef.

Write a brief plan for a new survey to find out if fish populations are recovering in the area where fishing is banned.

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..... [4]

(iii) Explain **two** benefits of banning fishing on one third of the reef.

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..... [2]

- (iv) The remaining two thirds of the reef can still be fished commercially, but only with restrictions to prevent overfishing.

State **two** restrictions and explain how they help prevent overfishing.

restriction

explanation

.....

restriction

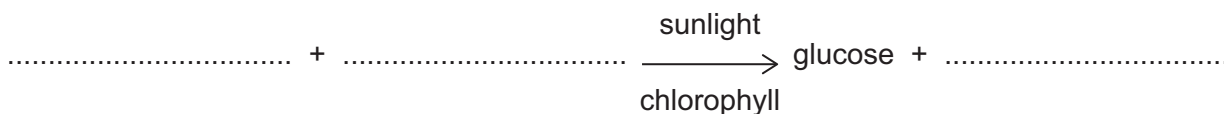
explanation

.....

[4]

- (b) Coral reefs are made of living animals called polyps. The polyps make calcium skeletons. The colonies of polyps form hard coral structures. The polyps provide a home for photosynthetic algae which produce a range of colours.

- (i) Complete the word equation for photosynthesis.



[2]

- (ii) Explain the role of chlorophyll in photosynthesis.

.....

..... [1]

- (iii) If sea water surrounding coral reefs becomes too hot the algae die, so that the coral loses its colour and looks white. This process is called coral bleaching.

Coral bleaching events can be recorded from satellites in orbit around the Earth.

Suggest **one** benefit of using satellites for recording bleaching events.

.....

..... [1]

- (iv) The photosynthetic algae usually start to re-colonise the coral polyps when the sea water cools again. However, if the sea water remains too hot for too long then the algae cannot return so the coral polyps die.

Suggest the relationship that exists between the coral polyp and the algae.

.....

..... [1]

(c) A typical coral reef food chain is shown. Phytoplankton consists of photosynthetic algae that float in the water.

phytoplankton → zooplankton → reef worms → small fish → reef shark

(i) The phytoplankton die because the sea water becomes too hot.

Explain what happens to reef worms.

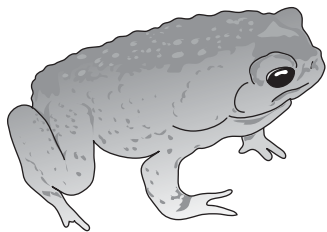
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..... [2]

(ii) In an area where fishing is allowed, large numbers of small fish are caught.

Suggest what might happen to the populations of reef worms and reef sharks.

reef worms
.....
reef sharks
..... [2]

- 3 In 1935, cane toads were introduced into the sugar cane fields of Queensland to control cane beetles.



0 15 cm

Fact sheet about cane toads

- eat many species of invertebrates
- cannot climb like native frogs
- produce a powerful poison



0 1 cm

Fact sheet about cane beetles

- adults mate in the soil
- larvae only live in soil for 10 weeks
- adults live and feed on sugar cane leaves

(a) The cane toad failed to control the cane beetle.

Suggest an explanation for this.

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..... [3]

(b) The cane toad population increased dramatically.

A student wanted to know more about the population of cane toads in a sugar cane field.

The student:

- selected ten sample points in a sugar cane field using a map
- spent five minutes at each sample point counting toads and recording the numbers in a tally chart
- repeated the count on five days
- recorded the results in a table.

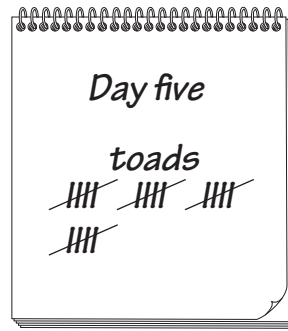
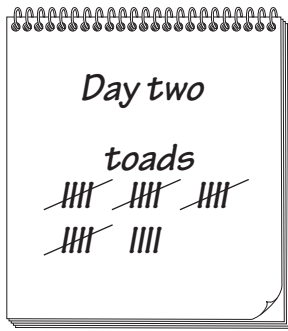
day	number of cane toads counted	number of cane toads counted from 10 sample points
1	2, 3, 3, 0, 2, 3, 4, 3, 2, 1	23
2	1, 0, 1, 2, 1, 3, 2, 3, 1, 1	15
3	2, 1, 2, 3, 1, 3, 2, 2, 1, 1	18
4	0, 0, 1, 2, 1, 2, 1, 2, 2, 1	12
5	3, 2, 3, 4, 2, 2, 2, 1, 2, 1
total	

(i) Complete the table. [1]

(ii) Calculate the average number of toads counted per day.

..... [1]

(c) The student decided to carry out the same survey in two other sugar cane fields. The student recorded the following in a notebook.



(i) Present the student's findings in a suitable table.

[3]

