



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE
NAME

CENTRE
NUMBER

--	--	--	--	--

CANDIDATE
NUMBER

--	--	--	--



ENVIRONMENTAL MANAGEMENT

0680/43

Paper 4

May/June 2018

1 hour 30 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

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

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.

Study the appropriate source materials before you start to write your answers.

Credit will be given for appropriate selection and use of data in your answers and for relevant interpretation of these data. Suggestions for data sources are given in some questions.

You may use the source data to draw diagrams and graphs or to do calculations to illustrate your answers.

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

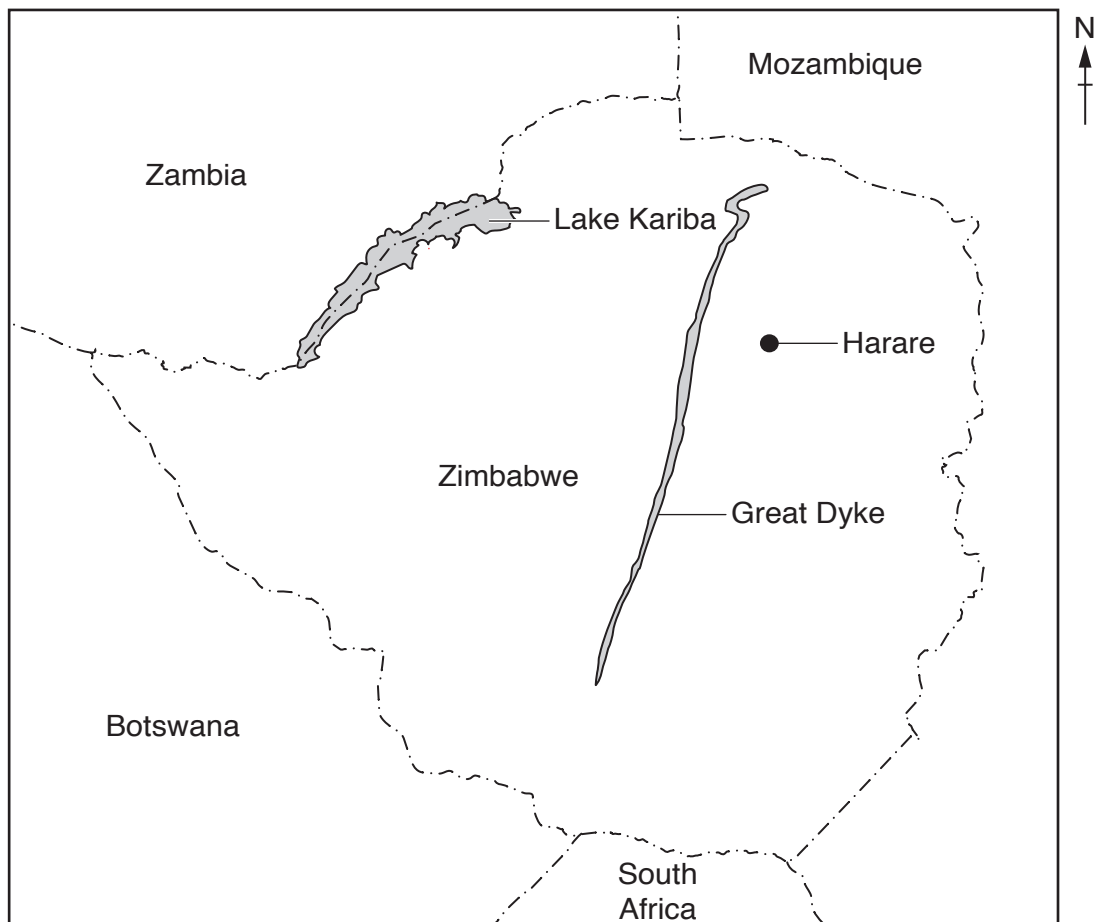
The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **13** printed pages and **3** blank pages.

map of the world



map of Zimbabwe



0 100
km

Key

- capital city
- - - international boundary

area: 390 760 km²

population: 15.6 million (in 2015)

children per woman: 3.53

life expectancy: 57 years

currency: US Dollar (USD) in use in 2015

languages: Shona, English, Ndebele

climate: tropical with wet and dry seasons

terrain: central plateau, mountains in the east

main exports: clothing, cotton, gold, metal alloys, platinum, textiles, tobacco

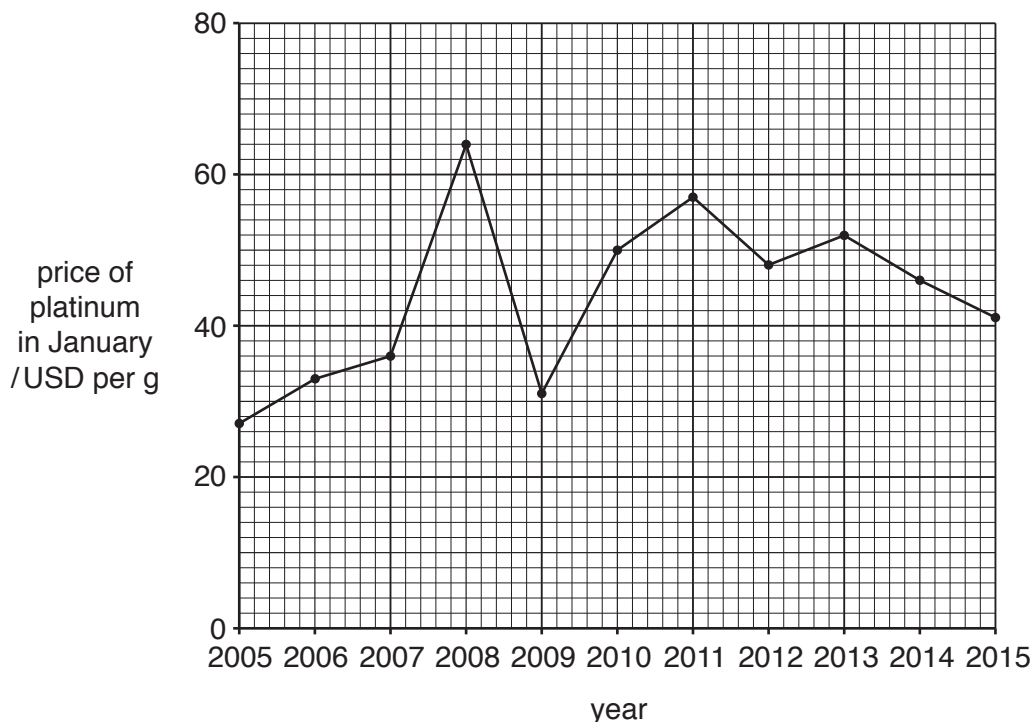
1 The economy of Zimbabwe depends on mining and agriculture. Most people live in rural settlements and have a low standard of living because of unemployment. In Harare, the capital city, there are frequent shortages of electricity that affect about 1.5 million people. The largest industry is mining, which employs up to 350 000 people.

(a) (i) Calculate the percentage of the population in Zimbabwe that is employed in mining.

Show your working.

.....% [2]

The graph shows the price per gram of platinum between January 2005 and January 2015.



(ii) State how many years the platinum price in January was less than 40 USD per gram.

.....[1]

(iii) Complete the sentence.

The lowest price of platinum was USD in January 20.....

and the highest price of platinum was USD in January 20.....

[2]

(iv) Suggest why companies invest in platinum mining.

.....

 [2]

(b) The Great Dyke, shown on the map on page 2, was formed from magma 2.5 billion years ago. It is 550 km long and between 3 and 12 km wide. The dyke is rich in minerals.

(i) Suggest the type of rock that formed the Great Dyke.

.....[1]

(ii) Suggest how the Great Dyke intrusion formed 2.5 billion years ago.

.....

.....

.....

.....[2]

(c) As a result of mining activity in Zimbabwe water pollution is a problem.

A scientist took water samples from a river flowing through a mining area. The table shows the chemical analysis of the water samples at different distances into the mining area.

distance into the mining area/m	pH	sulfate/ppm	nickel/ppm	cobalt/ppm	copper/ppm
0	7.1	55	0.30	0.10	0.10
200	6.4	100	1.00	0.10	0.30
400	6.3	100	1.50	0.10	0.52
600	6.1	160	2.20	0.10	0.78
800	4.3	250	2.89	0.10	0.88
1000	3.4	310	3.15	0.10	0.98

ppm = parts per million

(i) Describe the pattern of results in the mining area, between 0 and 1000m, for pH and cobalt.

pH

.....

cobalt

.....

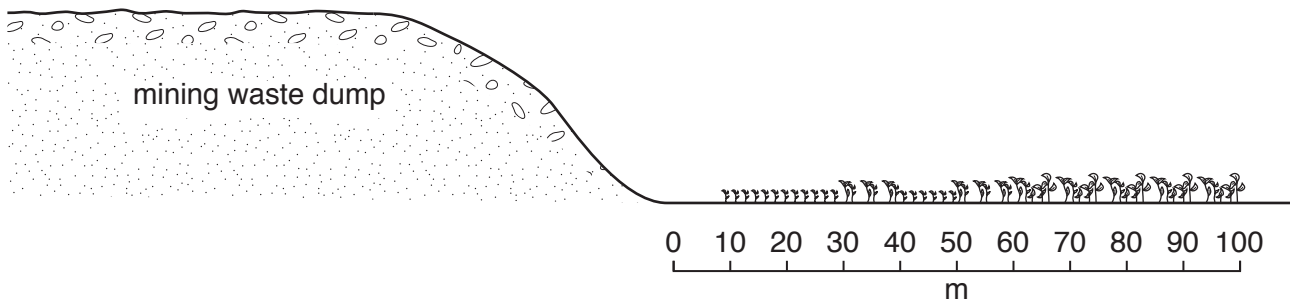
[2]

(ii) Calculate the range of copper concentration between 0 and 1000m.

..... ppm [1]

BLANK PAGE

- (d) The scientist noticed that there were only a few plants growing near the mining waste dumps. The scientist carried out a survey of plants along a transect line near a mining waste dump.



The table shows the results.

distance from mining waste dump /m	0	10	20	30	40	50	60	70	80	90	100
total number of plants	0	1	2	3	4	6	8	10	13	13	13
number of plant species	0	1	1	2	1	2	2	4	4	4	4

- (i) Describe the patterns of results for the total number of plants and the number of plant species between 0–60 m and 70–100 m.

total number of plants

0–60 m

.....

70–100 m

.....

number of plant species

0–60 m

.....

70–100 m

.....

[4]

- 2 (a) Many people buy a licence from the government of Zimbabwe and start small mines. They dig pits up to 30m deep and extract rocks containing gold. The rocks are transported to crushing mills up to 50km away. All the extracted gold is bought by the government of Zimbabwe. Many women have formed small mining companies.

Two women were talking about mining.

At first we found the work very hard but now we are used to it. We can earn 2500 USD a month before costs and often make more money than the men.

I now earn enough money to feed and buy clothes for my children. I can also afford to pay their school fees. I will carry on mining.

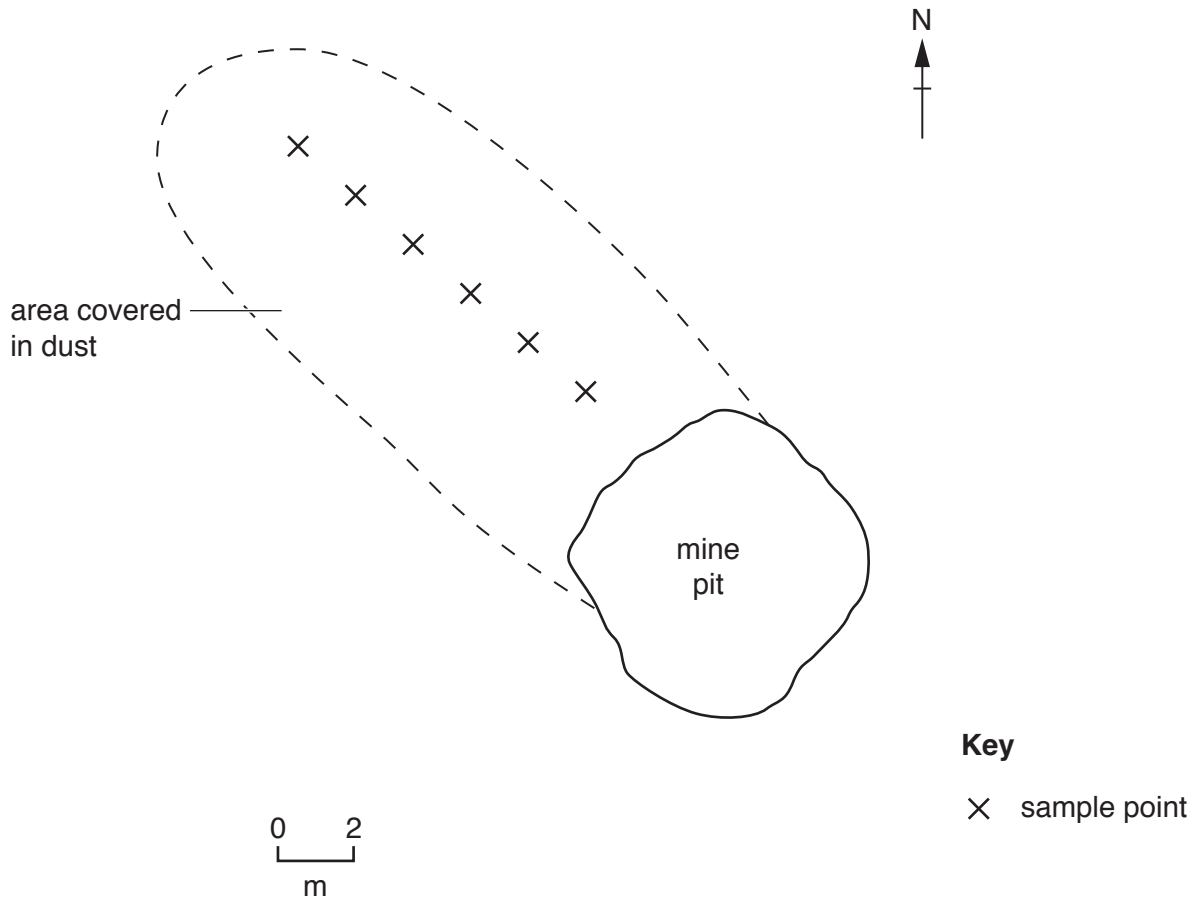
- (i) Suggest **two** expenses of operating a small mine.

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

- (ii) Describe **one** risk to human health of this type of mining.

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

(b) A student visited some small mines and noticed that all the plants growing to the north west of the mines were covered in dust.



Key

× sample point

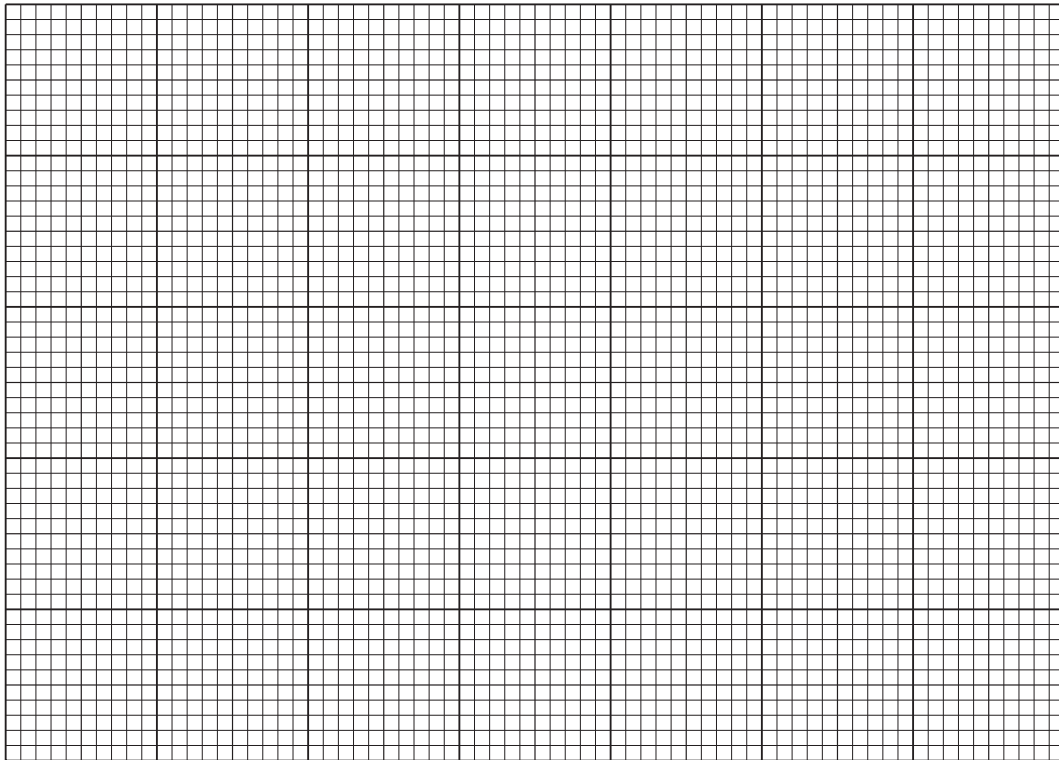
(i) Name the wind direction responsible for the mining dust shown in the diagram.

.....[1]

The student decided to measure the length of 10 leaves of one species of plant at 2 metre intervals from one of the small mines. The results are shown in the table.

distance from mine /m	2	4	6	8	10	12
average length of 10 leaves/mm	42	46	50	55	64	74

(ii) Plot a graph of the results on the grid.



[4]

(iii) Describe the trend shown by the graph.

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

(iv) Suggest **two** ways the student could have improved this survey.

1
.....
2
.....
[2]

(v) Suggest reasons why the dust causes differences in the average length of leaves.

.....
.....
.....
.....
.....
.....
.....[3]

(c) Anyone can apply to the government of Zimbabwe for a licence to start a small mine. These licences allow mining to begin immediately. Licences for larger mines take up to a year to be given.

(i) Suggest why farmers might not want small mines to be allowed on their land.

.....
.....
.....
.....
.....
.....
.....[3]

(ii) Suggest reasons why giving a licence for a larger mine takes up to a year.

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

(iii) Explain why mining is **not** a sustainable activity.

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

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.