Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

9888423383

ENVIRONMENTAL MANAGEMENT **0680/23**

Paper 2 Management in context **October/November 2019**

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.

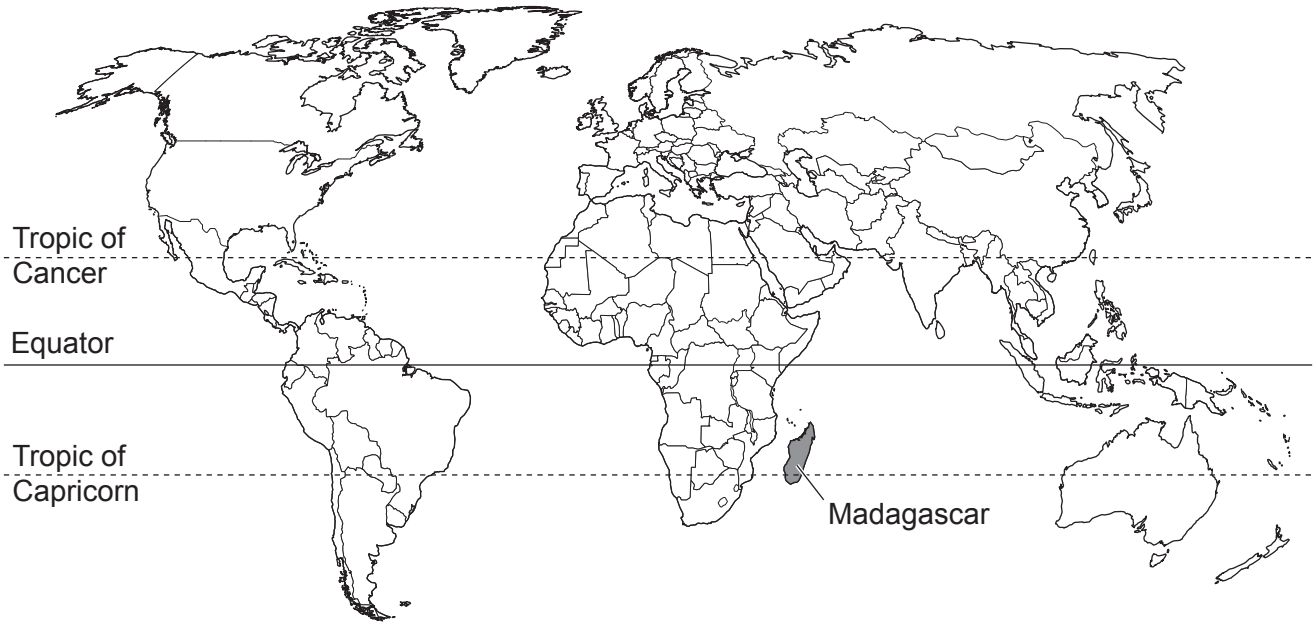
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **22** printed pages and **2** blank pages.

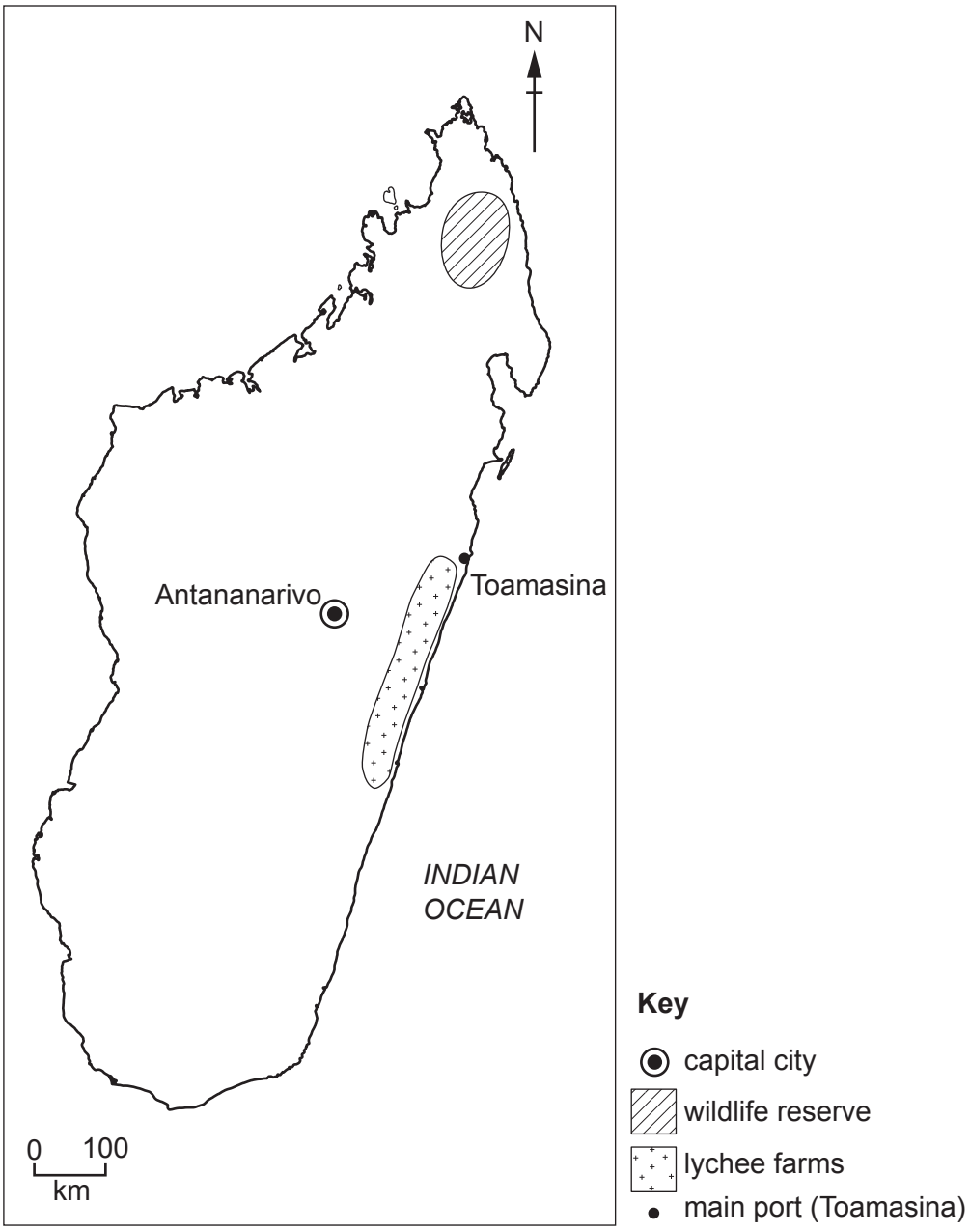
© UCLES 2019

Cambridge Assessment International Education

world map showing the location of Madagascar



map of Madagascar



Area of Madagascar: 587 041 km^2

Population: 25.6 million (in 2017)

Children per woman: 4.12

Life expectancy: 65.9 years

Currency: Malagasy ariary (2940 MGA = 1 USD)

Languages: French, Malagasy, English

Climate of Madagascar: tropical along the coast, temperate inland, very little rain (arid) in the south

Terrain of Madagascar: narrow coastal plains and mountains inland

Main exports of Madagascar: agricultural products (coffee, lychees, vanilla and sugar), chromite, petroleum products and textiles

© UCLES 2019

[Turn over

Madagascar is the fourth largest island in the world. In 2017, 60% of the population lived in rural areas. Agriculture is the main economic activity. Mining and oil exploration are a developing part of the economy. The island has a high biodiversity including many endemic species, which are species found nowhere else in the world. There is great potential for sustainable tourism. Madagascar has very few roads and many people have a low standard of living.

1 (a) (i) Calculate the number of people living in urban areas in Madagascar in 2017.

..... [1]

(ii) Describe **two** reasons why an increase in the rural population can cause deforestation.

1 .....

.....

2 .....

.....

[2]

(iii) Explain how trees protect the soil from erosion.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(iv) About 300 000 tourists visit Madagascar each year.

Suggest **two** reasons why the government wants to encourage tourists to visit Madagascar.

1 .....

.....

2 .....

.....

[2]

© UCLES 2019

(b) The photograph shows a chameleon found in Madagascar.



There are about 185 different species of chameleon found in the world.

Many tourists visit Madagascar to see the wildlife. Madagascar has 85 endemic species of chameleon.

(i) Calculate the percentage of all species of chameleon that are endemic to Madagascar. Give your answer to three significant figures.

..... % [2]

(ii) A survey of Madagascar reported that 66 species of chameleon are threatened with extinction. Of these species, 22 are critically endangered.

What is the ratio of critically endangered species to species threatened with extinction?

..... [1]

(iii) Each chameleon species is adapted to a particular niche.

Define the term *niche*.

.....

.....

.....

..... [2]

(iv) Chameleons catch and eat insects.

Explain why chameleons are classified as a secondary consumer.

.....

..... [1]

(c) An area of mountainous rainforest covering 32 000 hectares has been set up as a wildlife reserve to protect endemic species, including chameleons. Some tourists visit the wildlife reserve after a long journey over a rough track. There is a small visitor centre. If tourists stay overnight they have to sleep in a tent and bring their own food.

The following activities also take place in this reserve:

- plant and animal populations are surveyed by scientists
- trees are replanted by local people
- methods of sustainable farming are taught to local people
- fuel-efficient cooking stoves are promoted.

(i) Suggest how replanting trees can help conserve populations of chameleons.

.....

.....

.....

..... [2]

(ii) Explain how sustainable farming in this wildlife reserve can help maintain biodiversity.

.....

.....

.....

.....

.....

..... [3]

© UCLES 2019

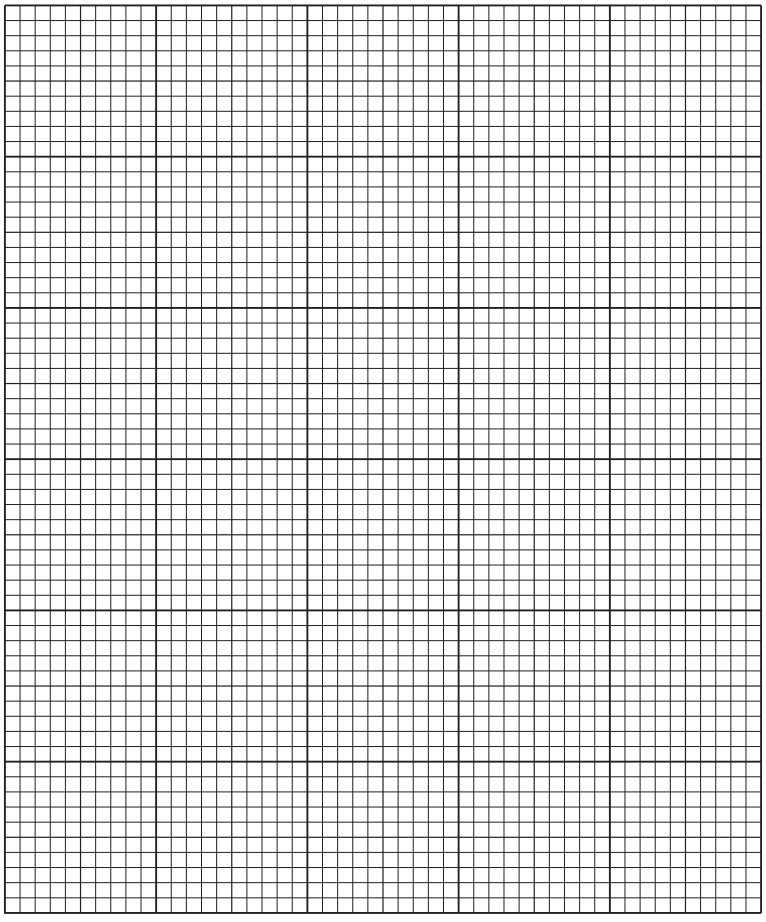
BLANK PAGE

(d) Rocket cooking stoves are fuel-efficient cooking stoves that use less wood than an open fire. This reduces the emissions of carbon dioxide.

The table shows the estimated sales of rocket cooking stoves over a 7-year period for one region of Madagascar.

year	estimated sales of rocket cooking stoves / thousands
1	0.5
2	1.2
3	2.1
4	3.4
5	4.9
6	6.7
7	8.6

(i) Plot a line graph of the data.



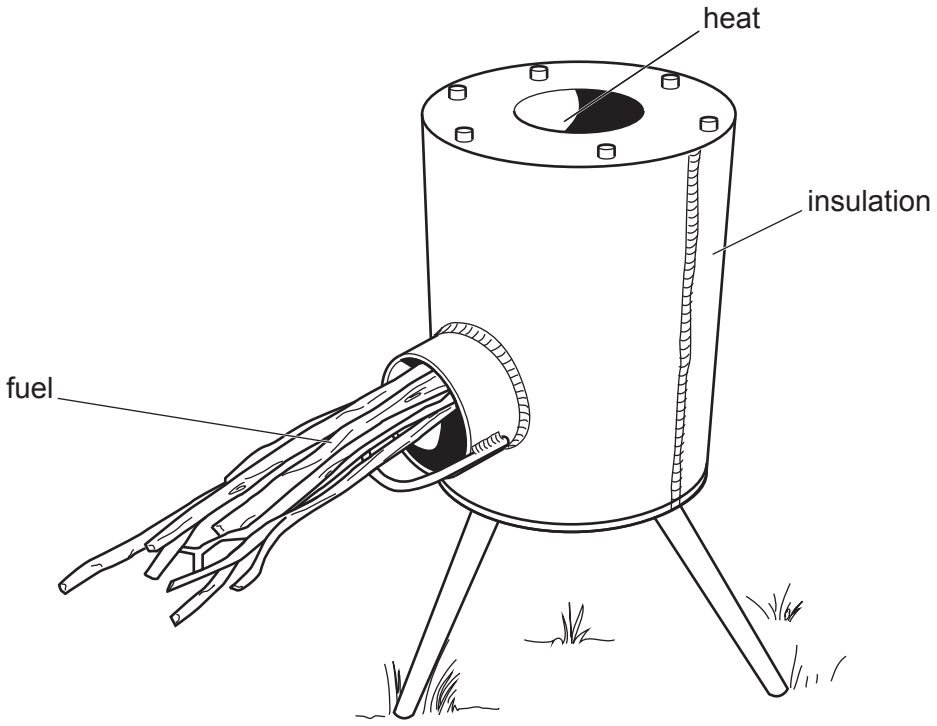
[4]

© UCLES 2019

(ii) Use your line graph to predict the estimated sales of rocket cooking stoves in year 8.

..... [1]

(iii) The diagram shows a rocket cooking stove.



Suggest **two** reasons why the use of rocket cooking stoves improves the health of rural people.

1 .....

.....

2 .....

.....

[2]

(e) There are about 800 different species of orchid plant found only in Madagascar. Many of these species are under threat from people collecting plants illegally.

The photograph shows the flower of one species of orchid.



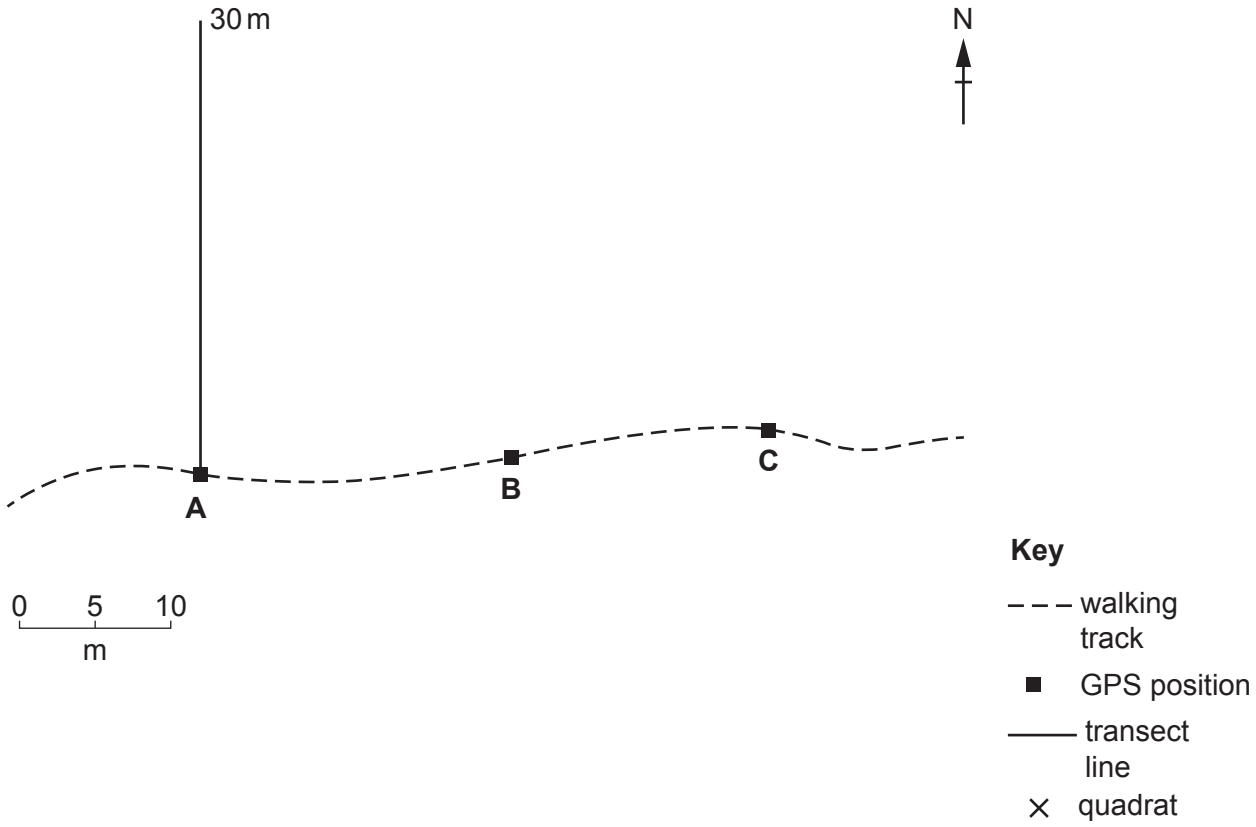
The population of this orchid species was surveyed in the wildlife reserve.

The following method was used:

- one walking track was used as the starting point for the survey
- a global positioning system (GPS) was used to find a starting point on the track
- a transect line was laid out using a 30 m tape due north from the first GPS position
- a 1×1 m quadrat was placed at 5 m intervals along the transect line
- the number of plants of this orchid species was counted in each quadrat
- the method was repeated at two more GPS positions along the track.

© UCLES 2019

The GPS positions and the first transect line are shown on the diagram.



(i) Complete the diagram to show the remaining transects and all the quadrats. [2]

(ii) The table shows the results of this survey.

	number of orchid plants per m^2			
distance from GPS position / m	**transect A**	**transect B**	**transect C**	**average**
5	19	22	17	19
10	34	31	34	33
15	36	31	35	34
20	37	33	36	35
25	45	40	37	41
30	37	38	37	.....

Complete the table by calculating the average for 30 m. [1]

(iii) Describe the distribution of orchid plants recorded by this survey.

.....

.....

.....

..... [2]

(iv) Other similar surveys have shown this orchid species has an average of 28 plants per m^2.

Do you think people have been collecting orchid plants illegally in the area sampled by transects **A**, **B** and **C**? Give a reason for your answer.

.....

..... [1]

(v) Suggest **two** reasons why this type of survey needs to be repeated in many areas within the wildlife reserve.

1 .....

.....

2 .....

.....

[2]

© UCLES 2019

(f) This species of orchid plant produces colourful flowers.

Explain the role of insects in pollination.

.....

.....

.....

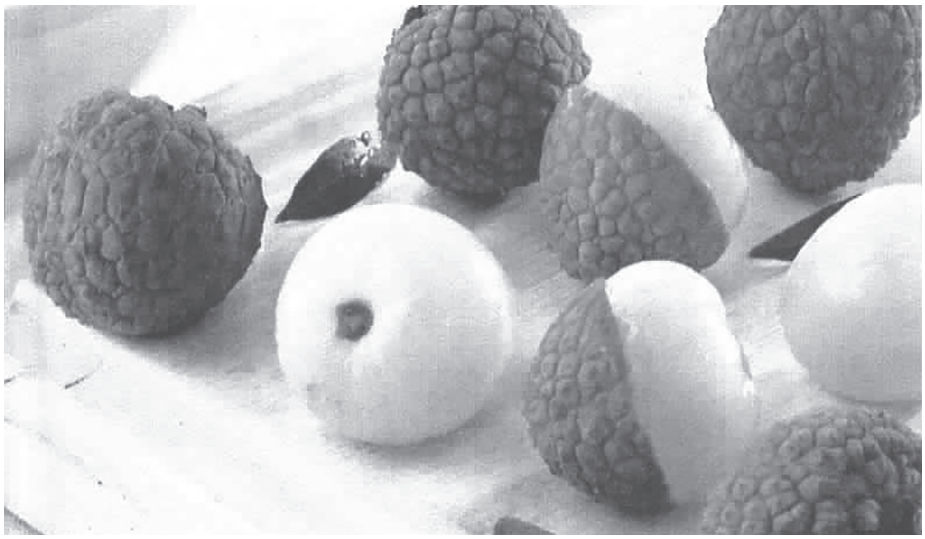
.....

.....

..... [3]

[Total: 38]

2 **(a)** The photographs show some lychee fruits and some lychee trees.





The fruits grow on trees and are picked by up to 30 000 families in October and November each year. About 3000 collectors transport the lychees to the main port of Toamasina.

Up to 20 000 tonnes of lychees are exported to Europe each year.

One lychee farmer said,

> I like growing and selling lychees at the end of each year. At the end of the year I have many things to pay for. This means I can support my family.

© UCLES 2019

(i) Suggest **three** things a lychee farmer could invest in to maintain their farm sustainably.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(ii) Everyone in a family is involved in picking lychees. The average family size is 4.7 people in rural areas.

Estimate the number of people who pick lychees in October and November.

..... [1]

(iii) The average family size is 4.5 people in urban areas.

Suggest reasons why the average family size is smaller in urban areas than in rural areas.

.....

.....

.....

.....

.....

..... [3]

(iv) The table shows climate data from a weather station near the main port of Toamasina.

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
average temperature / °C	26	26	25	25	24	22	21	21	22	24	24	25
average rainfall / mm	366	376	452	399	364	282	302	203	132	99	117	262

Suggest why the lychees must be transported quickly to be packed and then shipped from the main port.

.....

.....

.....

..... [2]

(v) Suggest **one** reason why lychees are **not** exported to Europe by air.

.....

..... [1]

© UCLES 2019

(b) A student wanted to investigate the packing of lychees for export.

The student selected ten lychee fruits at random and weighed each fruit.

The results are shown in the table.

lychee fruit sample	mass of lychee fruit / g
1	44
2	45
3	39
4	38
5	40
6	41
7	42
8	45
9	36
10	39
average	40.9
range	.....

(i) The range of a set of values is the difference between the maximum and minimum value.

Complete the table by calculating the range for the mass of lychee fruit. [1]

(ii) The lychee fruits are packed into boxes that contain 4.5 kg of lychees.

Calculate the average number of lychee fruits in **one** box.

Give your answer to the nearest whole number.

..... [2]

(c) The east coast of Madagascar is regularly hit by tropical cyclones.

(i) Describe the weather conditions during a tropical cyclone.

.....

.....

.....

..... [2]

(ii) Suggest why the risk of being infected with the malaria parasite increases after a tropical cyclone.

.....

..... [1]

(iii) Describe the life cycle of the malaria parasite.

.....

.....

.....

.....

.....

..... [3]

(iv) Suggest reasons why the risk of being infected with malaria cannot be eradicated in Madagascar.

.....

.....

.....

.....

.....

..... [3]

© UCLES 2019

(v) Describe ways the government could manage the impacts of a tropical cyclone.

.....

.....

.....

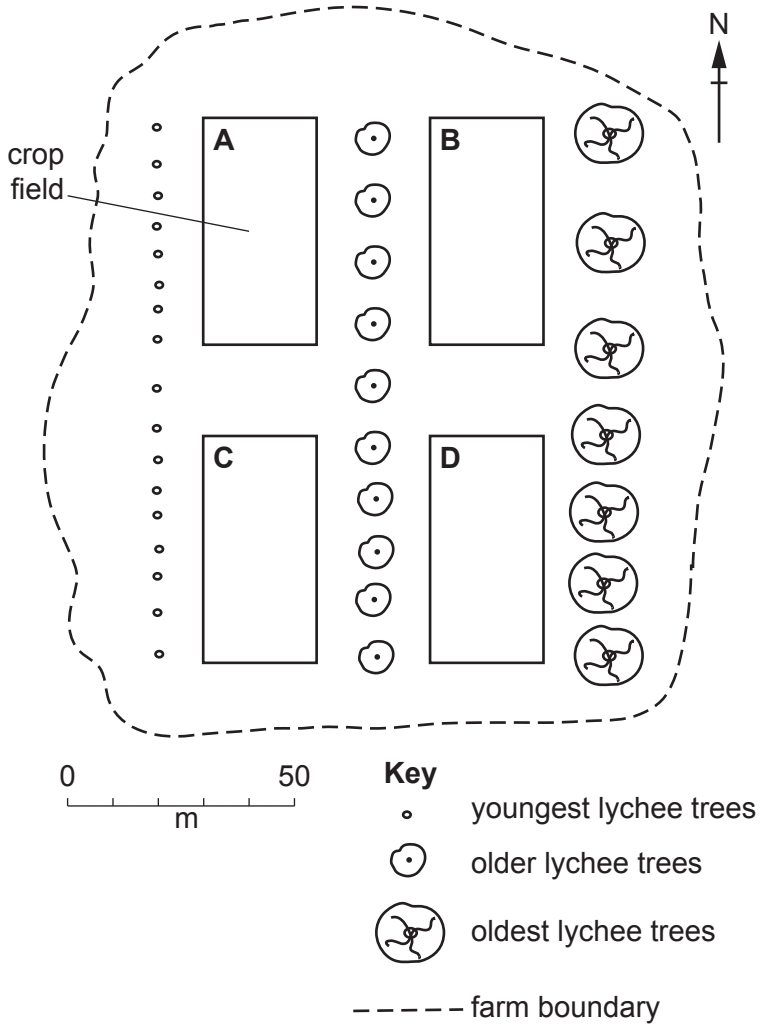
.....

.....

..... [3]

(d) Some farmers near the east coast of Madagascar try to reduce the impact of tropical cyclones.

The diagram shows a plan of a farm near the east coast.



(i) Calculate the area of field **A**.

Give the unit for your answer.

..... [2]

(ii) Suggest why the farmer has left the oldest lychee trees on the eastern side of the farm.

.....

.....

.....

..... [2]

(iii) The farmer grows a different crop in each of the four fields. The four crops are beans, cassava, peanuts and sweet potato.

The farmer rotates the crops each year.

The table shows the crop rotation plan.

year	field			
	A	**B**	**C**	**D**
2017	beans	cassava	peanuts	sweet potato
2018	sweet potato	beans	cassava	peanuts
2019	peanuts	sweet potato	.....	.....
2020	.....	.....	.....	.....

Complete the crop rotation plan in the table. [2]

(iv) The farm slopes down from east to west. This increases the risk of soil erosion.

Describe **three** farming activities that can reduce soil erosion other than crop rotation.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(e) One agricultural adviser said,

> Many lychee farms are small and the lychee trees are old. Farmers need to plant new lychee trees.

A student wanted to collect information to confirm this opinion.

The student produced a questionnaire and used it to record the answers given by farmers.

question	tally		
1. How many lychee trees do you have?	1–49	50–100	100+
2. How many kg of fruit do you pick each year?	1–99	100–200	200+
3. How old are your lychee trees in years?	1–5	6–10	10+
4.	.....	.....	.....
.....			
.....			

(i) Complete the questionnaire by writing **one** more question the student could have asked. Write your question in the same style as those in the questionnaire. [2]

(ii) Describe **one** method the student could use to randomly select the farmers to be questioned.

.....

.....

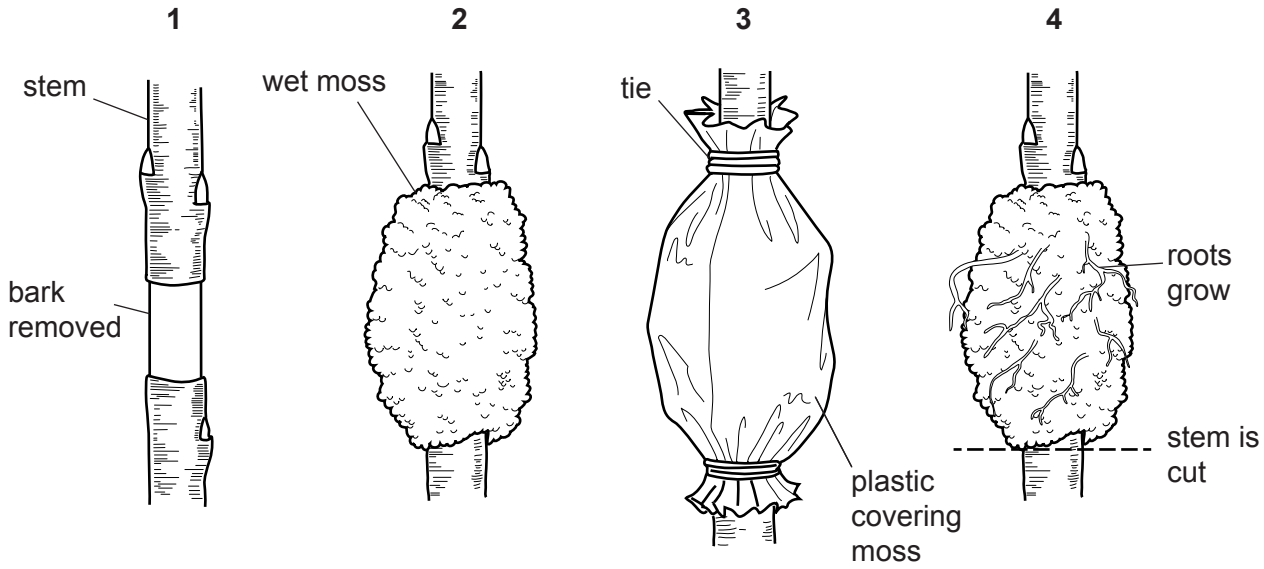
.....

..... [2]

© UCLES 2019

(iii) New lychee trees can be produced by a method called air layering.

The diagram shows the stages of air layering.



Suggest **two** reasons why some farmers do **not** produce their own new lychee trees by air layering.

1 .....

.....

2 .....

.....

[2]

(iv) Suggest **two** ways the government could encourage farmers to plant new lychee trees.

1 .....

.....

2 .....

.....

[2]

[Total: 42]

© UCLES 2019

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 Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

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

© UCLES 2019