UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

8627220604

ENVIRONMENTAL MANAGEMENT **0680/43**

Alternative to Coursework **October/November 2011**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Ruler

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 a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
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.

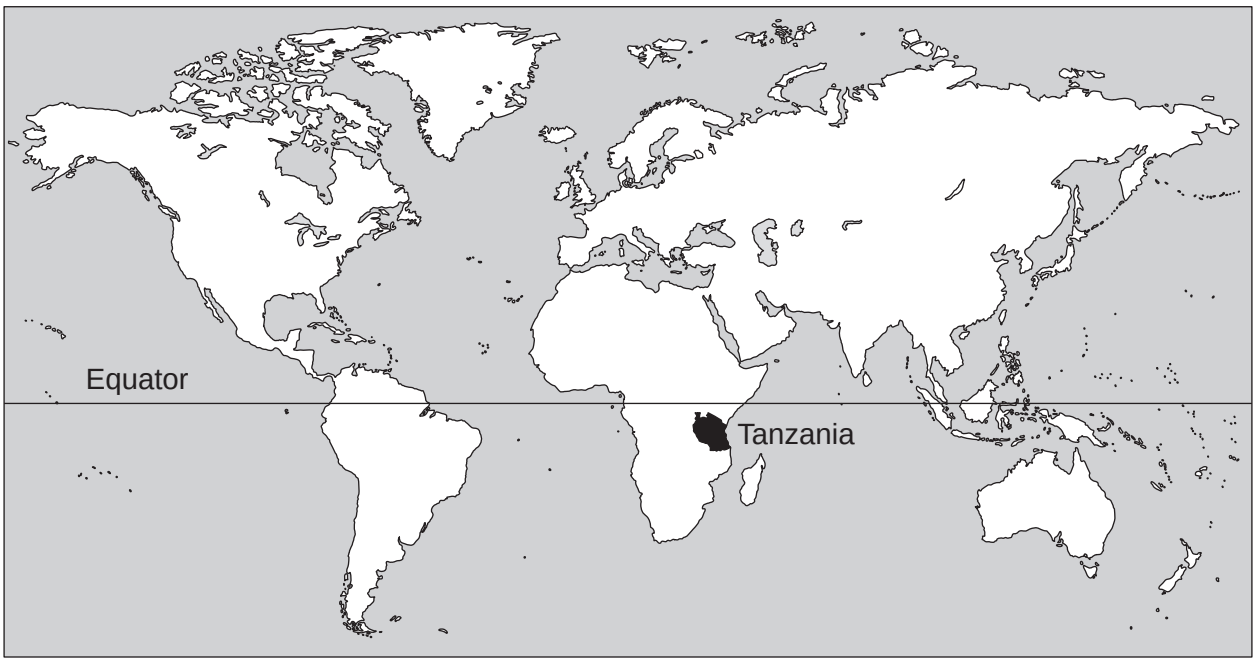
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

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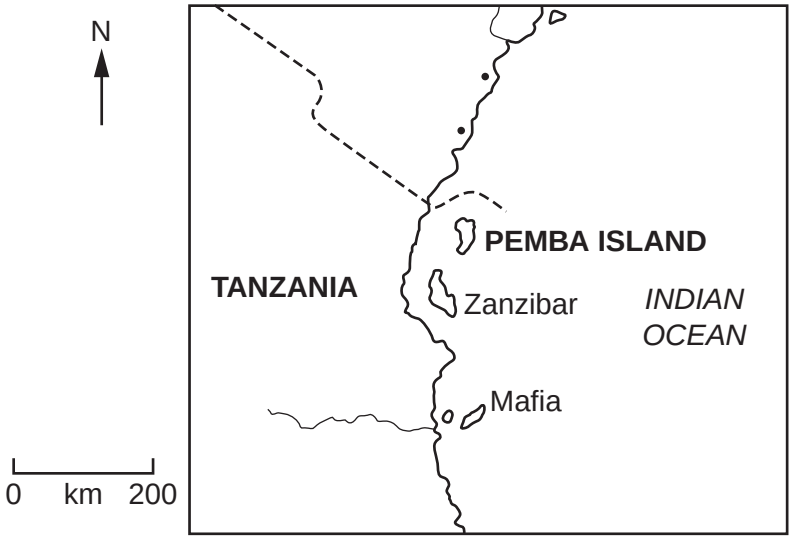
This document consists of **16** printed pages.

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World map showing the location of Tanzania



Map of coastal Tanzania



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Area of Tanzania: 947 300 sq km
Population: 42 000 000
Children per woman: 4.46
Life expectancy at birth: 52 years
Currency: Tanzanian shilling (1200 TZS = 1 US dollar)
Languages: Swahili, Kiunguja, English, Arabic, local languages
Climate: tropical along the coast but cooler in the highlands
Terrain: plains along the coast, a central plateau, highlands in the north and south
Main exports: gold, coffee, cashew nuts, manufactured goods, cotton

Tanzania depends heavily on agriculture which provides 85% of its exports and employs 80% of the work force. Only 4% of the total land area can be cultivated, however, the three islands of Mafia, Zanzibar and Pemba are heavily cultivated due to favourable climatic conditions. Industry consists of processing agricultural products and light consumer goods.

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[Turn over

1 Clove trees are grown on the islands and farmers harvest the clove fruits after the flowers have been pollinated. They are dried and sold on the mainland for export worldwide. Scientists have shown that the harvest of cloves is related to rainfall. The average rainfall for this region is 975 mm. Data from one farm on Pemba Island is shown in the table.

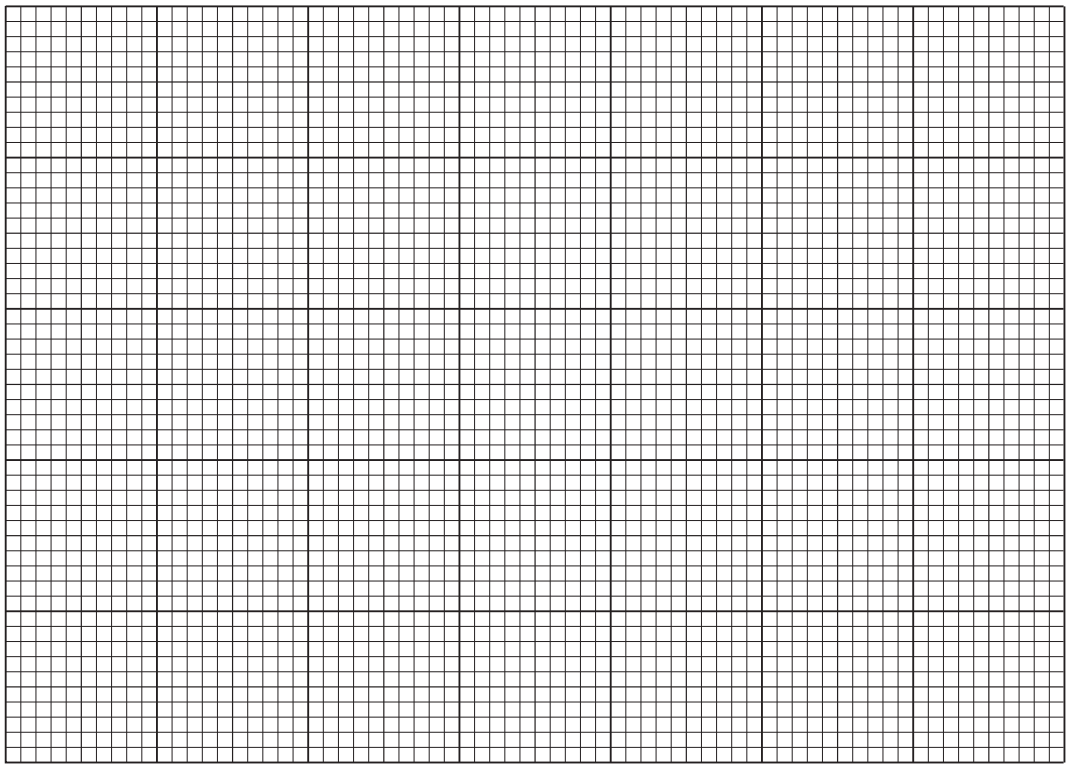
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year	2004	2005	2006	2007	2008	2009	2010
rainfall (mm)	1100	1000	800	900	1100	1050	890
clove harvest (tonnes)	1.0	0.9	1.2	1.2	0.9	0.9	1.1

(a) (i) How was the rainfall measured?

..... [1]

(ii) Plot the data from the table on a graph.



[4]

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(iii) Describe the relationship shown by the graph.

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..... [2]

(iv) The price paid to the farmer in 2010 was US $ 2.4 per kilogram.

The world market price in 2010 was US $ 4.2 per kilogram.

Calculate the percentage increase in price for cloves reaching the world market over the price paid to the farmer.

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..... [2]

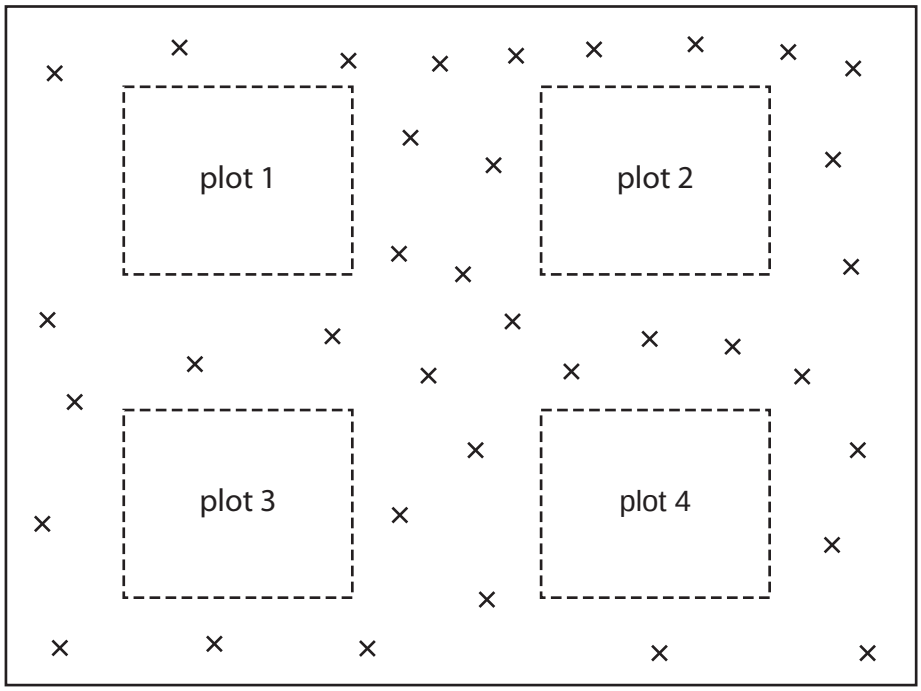
(v) A student carried out an economic comparison of two small farms on Pemba Island. Some of the data is shown in the table below.

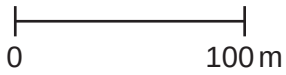
	farm A	**farm B**
harvest (kg)	600	880
production costs (US $)	900	1042
total sales (US $)	1440	1922
profit (US $)	540	.....
profit per kg (US $)	0.90	.....

Complete the table by calculating the profits for farm B. [2]

(b) Another farmer owns a small piece of land as shown in the diagram.

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× clove tree

The farmer knows that:

- mango fruits can be sold at market
- cassava is known to be a good energy food but is lacking in vitamins
- red beans are known to be a good source of protein and vitamins
- eggs and meat are known to be a good source of protein and can be sold at market

He has a choice of three plans for the future.

Plan A Keep harvesting cloves and grow mango fruits in all four plots.

Plan B Keep harvesting cloves, grow mango fruits in two plots and cassava in two plots. Cut the oldest clove trees for firewood.

Plan C Keep harvesting cloves, grow mango fruits in two plots, red beans in one plot, cassava in one plot. Keep chickens in small enclosures.

(i) Why might Plan A cause problems for the farmer in a few years time?

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..... [2]

(ii) Give **one** reason why Plan B is better than Plan A.

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..... [1]

(iii) Explain why Plan C is the plan that is most likely to be an example of sustainable farming.

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..... [3]

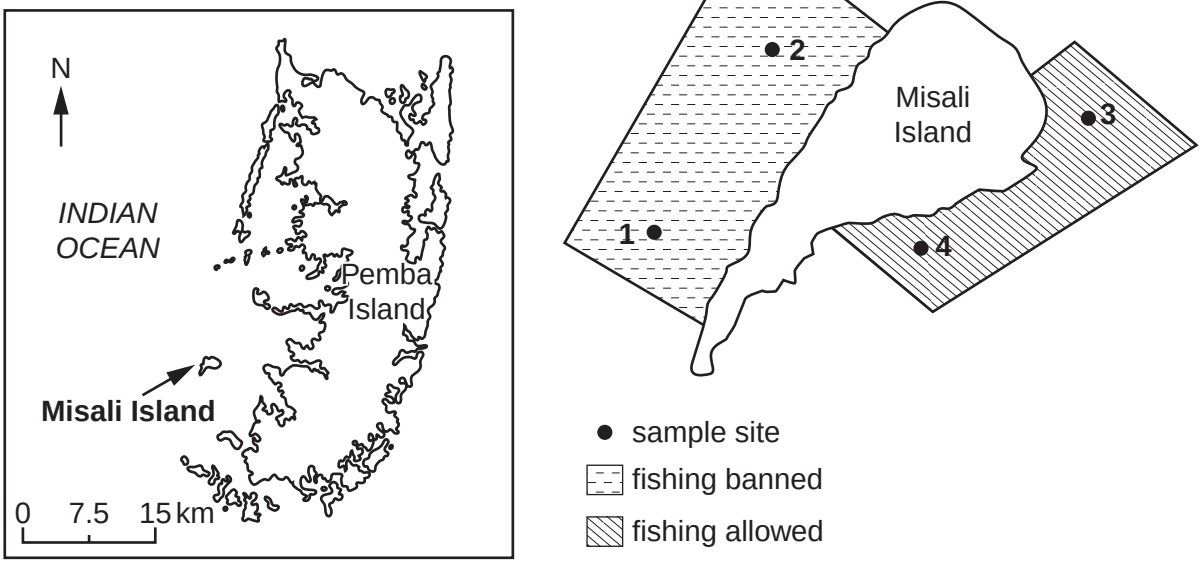
(iv) Suggest an advantage to the farmer of planting a small number of new clove trees each year.

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..... [1]

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2 **(a)** Fishing the coastal waters of Tanzania is an important activity. A scientist wanted to find out if fishing around Misali Island was having any effect on fish populations. The scientist established areas where fishing was banned and where fishing was allowed. Two sample sites in each area were selected. The sites are shown in the map.



The scientist caught three species of fish in all the sample sites and then measured the lengths of 20 of each species.

	sites 1 and 2	**sites 3 and 4**
species	**average length of fish (cm)**	**average length of fish (cm)**
snapper	25	21
jack	30	30
wrasse	17	16

(i) Name a method the scientist could have used to select the 20 fish to be measured.

.....

..... [1]

(ii) Which species does the data suggest is most affected by fishing activity? Give a reason for your answer.

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..... [2]

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(iii) Suggest why a fish species might have been measured as having a longer than average length in an area being fished compared to an area not being fished.

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..... [1]

(iv) Describe how the scientist would have made sure that the samples from all the sites were comparable.

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..... [2]

(v) How could the scientist extend the research?

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..... [3]

(b) (i) Some fishermen from Pemba Island want to copy the scientist's survey to find out if they are damaging their fishing grounds, as the fish they are catching seem to be smaller than in the past.

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The instructions for carrying out the survey are listed below, but not in the correct order.

1 Select two sample sites for a fishing area and two for an area where fishing is banned.

2 Fish in the same way in each site.

3 Take a fishing net to each site.

4 Mark the centre of each sample site with a floating coloured buoy.

5 Measure 20 fish of each species.

6 Separate fish into species.

7 Record results in a table.

Write the numbers in the correct order. Two answers have been completed for you.

1						7

[2]

(ii) Draw a suitable table to record all the measurements of this fishing survey.

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[3]

(iii) Describe and explain the changes that happen to fish populations when they are overfished.

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..... [3]

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3 Pemba Island has several endemic plant and animal species, found nowhere else in the world. Until recently, a large species of bat called the flying fox has been caught and eaten by people living on the island. The flying fox was in danger of extinction, and local people stopped catching them. It is now a protected species. Ecotourists now come to the island to see the flying fox and other rare species.

(a) (i) Why is it in the islanders' interest to stop catching and eating flying foxes?

.....

..... [1]

(ii) The island also has an endemic tree species, the Mpapindi palm. Only about 2000 of these remain in small areas of old forest in the north of the island. To save this species, three tree nurseries have been started to produce 20 000 Mpapindi seedlings. The nurseries are run by local people.

Describe how you would set up a nursery for the Mpapindi palm.

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..... [4]

(iii) When the seedlings are large enough, some will be planted on the edge of old forest and others on the edge of clove plantations. Describe how local people will be able to decide which site is most successful.

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..... [2]

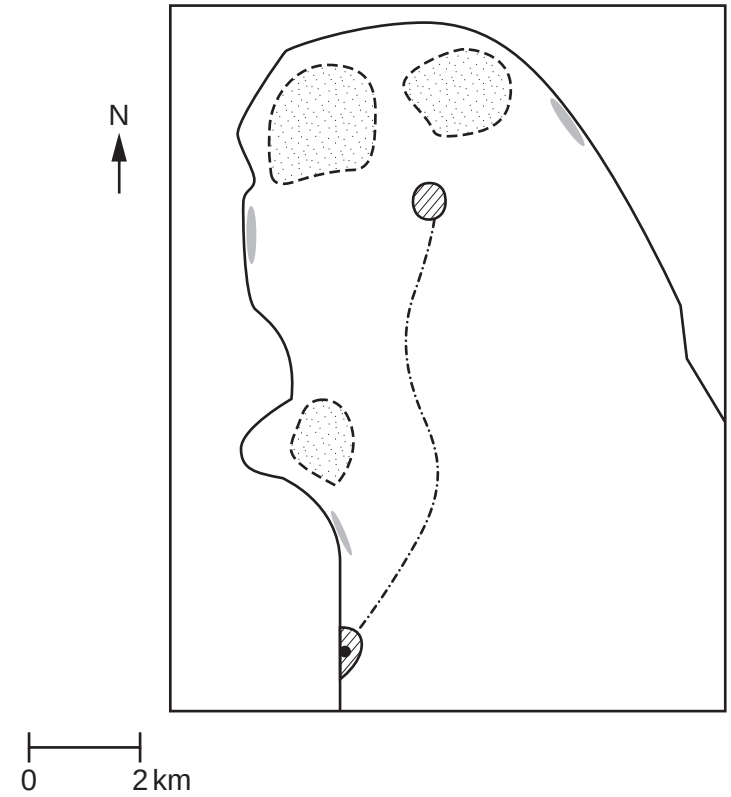
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(b) Some other facts about Pemba Island are:

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- rare species of turtle visit the beaches to lay eggs
- coral reefs form lagoons with high biodiversity
- four endemic species of bird live in areas of old forest
- the Pemba day gecko is an endemic reptile
- in 2010 an electricity power supply cable from the mainland was constructed
- it is 60 km between the mainland and the nearest harbour on the island

The map below shows the northern part of Pemba Island.



(i) The ecotourists arrive and stay in the fishing village. Draw and label on the map above, one road and three nature trails that could be built to develop ecotourism. [2]

(ii) Suggest three new developments that would help to make the island more suitable for ecotourists. Explain how each development would help.

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first development .....

how it will help .....

.....

second development .....

how it will help .....

.....

third development .....

how it will help .....

.....

[6]

(c) The villagers held a meeting to discuss the ecotourism project. One suggestion from the meeting was to ask tourists to complete a questionnaire before they left the island to find out what they thought about their visit. The answers would then help the villagers to decide which improvements to make.

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(i) Complete the questionnaire with three more questions.

1 For how long are you visiting the island?

☐ 1 day ☐ 2–3 days ☐ 4–7 days ☐ more than 7 days

2 What did you come to see?

☐ flying foxes ☐ day geckos ☐ turtles ☐ birds

3 .....

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4 .....

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5 .....

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[4]

(ii) Describe how the villagers could process the results of the questionnaires.

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..... [2]

(d) In most villages on Pemba Island mats are woven using palm fronds. The fronds are dyed with up to ten different colours. The most colourful mats fetch the highest prices.

Turmeric is a small spice plant that can be used as a yellow-orange dye as well as in cooking. For the last thirty years, it has been grown on the island, only in very small quantities. It can be bought on the mainland.

(i) Explain why the demand for turmeric is likely to increase in the next few years.

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(ii) Describe how increased turmeric production could help the people living on the island.

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..... [2]

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