



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

CANDIDATE  
NAME

CENTRE  
NUMBER

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|--|--|--|--|--|

CANDIDATE  
NUMBER

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|



**ENVIRONMENTAL MANAGEMENT**

**0680/02**

Paper 2

**May/June 2009**

**1 hour 45 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 **both** questions.

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.

| For Examiner's Use |  |
|--------------------|--|
| 1                  |  |
| 2                  |  |
| <b>Total</b>       |  |

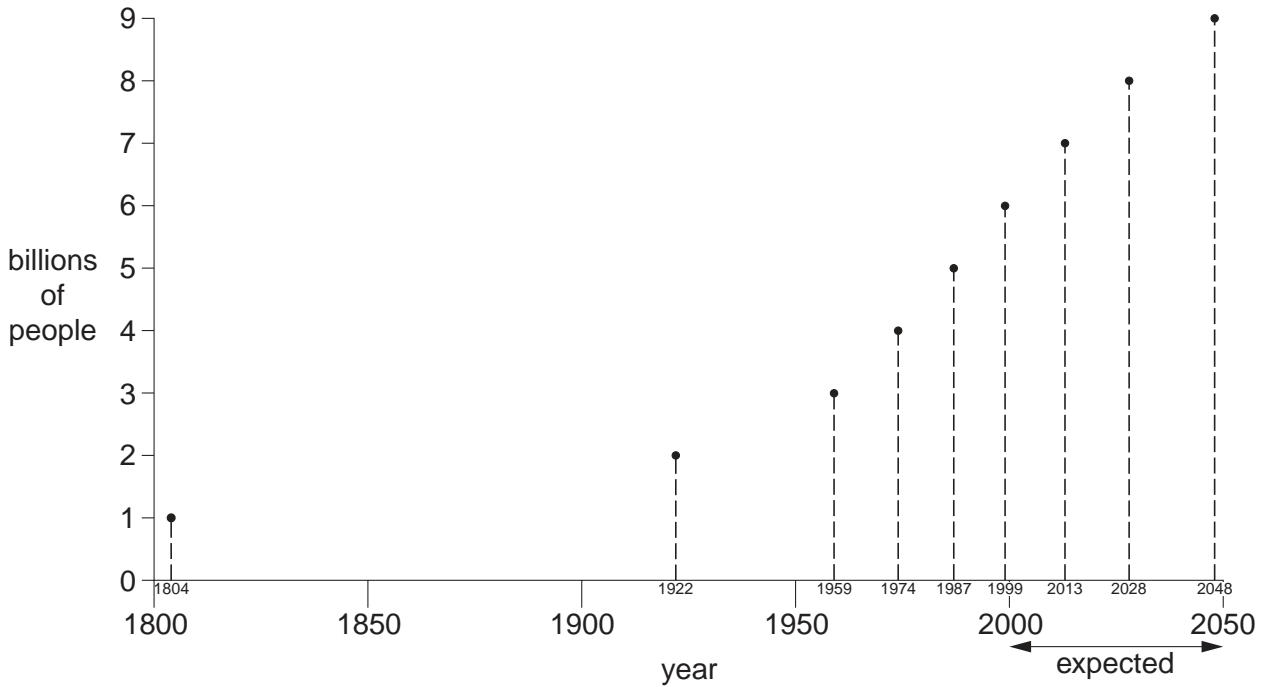
This document consists of **17** printed pages and **3** blank pages.



1 (a) World population keeps on growing.

For  
Examiner's  
Use

**World population growth**



(i) Draw in the line on the graph to show world population growth. [1]

(ii) How many years did it take for the world population to grow from one to two billion?

..... [1]

(iii) What was the least number of years it took for world population to increase by one billion?

..... [1]

(iv) Describe what the graph shows about expected future population growth compared with past growth.

.....

.....

.....

..... [2]

**(b)** Some countries have population policies to reduce rates of population growth.

**(i)** Name one country which has a population policy.

.....

**(ii)** Describe its main features.

.....

.....

.....

.....

.....

**(iii)** Comment on whether or not it has been successful.

.....

.....

.....

[5]

**(c)** State two reasons why governments in some developing countries have not introduced a population policy.

.....

.....

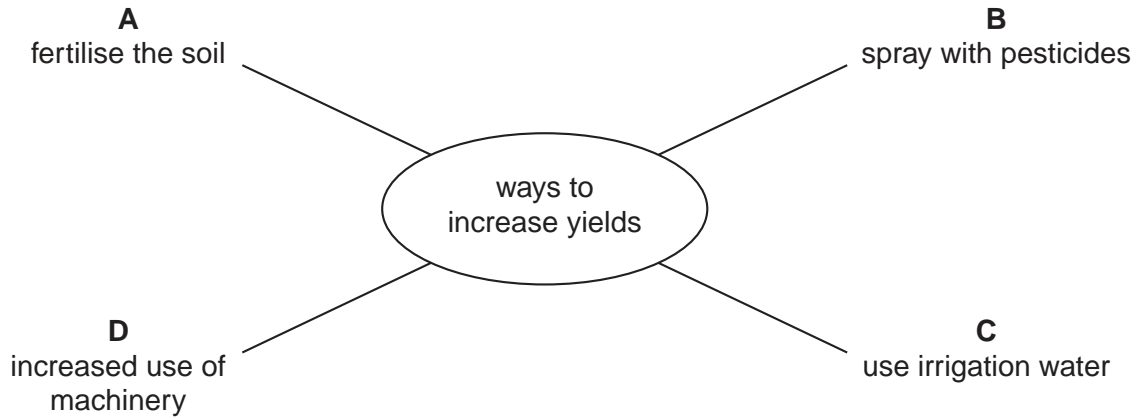
.....

.....

[2]

(d) More food needs to be produced to feed the world's growing population. Four agricultural techniques used by farmers to increase food output are given on the spider diagram below.

For  
Examiner's  
Use



Choose two of the techniques named. For each one,

- (i) briefly explain how it increases yields;
- (ii) state one disadvantage of its use.

Choice .....

Explanation .....  
.....  
.....

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

Choice .....

Explanation .....  
.....  
.....

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

(e) Another way of increasing farm yield is to use new seeds.

**Sowing the seeds of change**

In 1959 researchers in the Philippines cross-bred two rice plants: a semi-dwarf plant from China with a strong, tall Indonesian plant. The result was a sturdy short plant called IR8. How it compared with traditional varieties of rice plants is shown below.

|                                  |   |  |   |
|----------------------------------|---|--|---|
| <b>Old plant</b>                 |  |  | <b>New plant</b>                                  |
| grows rapidly                    |   |  | shorter, stronger plant                           |
| tall plant, can fall over easily |   |  | can be planted close together, needs little space |
| needs to be planted far apart    |   |  | needs fertiliser and pesticides                   |
| 5 months growing season          |   |  | 4 months growing season                           |
| average yield 1.5 tonnes per ha  |   |  | average yield 5.0 tonnes per ha                   |

(i) Why was this method given the name 'Green Revolution'?

..... [1]

(ii) From the information above, give two different reasons why use of the new seeds resulted in higher food output.

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

(iii) State one reason why the new plants were less at risk from bad weather during the growing season than the old plants.

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

- (iv) After new seeds were introduced, the wealth gap between rich large farms and poor small farms became wider. Explain why the introduction of new seeds favoured rich farms with large areas of land.

.....

.....

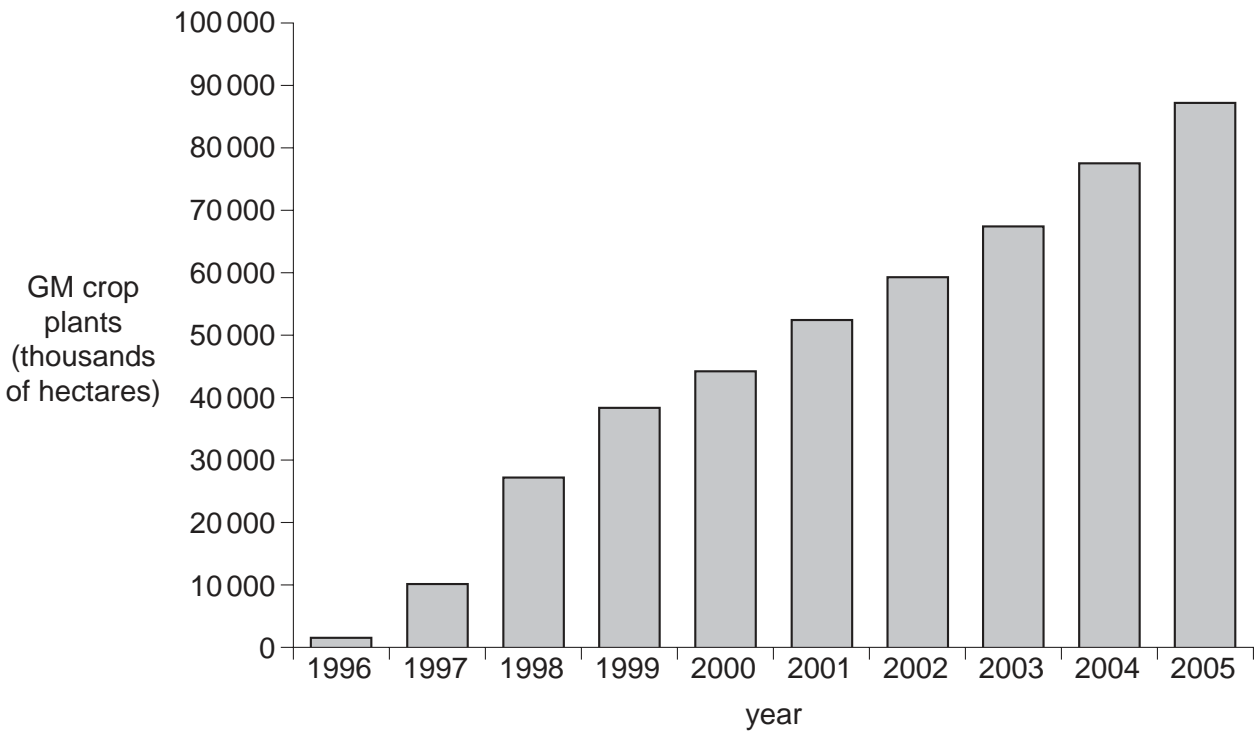
.....

.....

..... [3]

- (f) About 30 years ago, research scientists started to develop GM (genetically modified) crops. The bar graph shows world total area planted with GM crops for the 10 years from 1996 to 2005.

**Global GM plantings 1996-2005**  
(thousands of hectares)



- (i) Describe what the graph shows about the growth in area planted with GM crops before and after 1999.

.....

.....

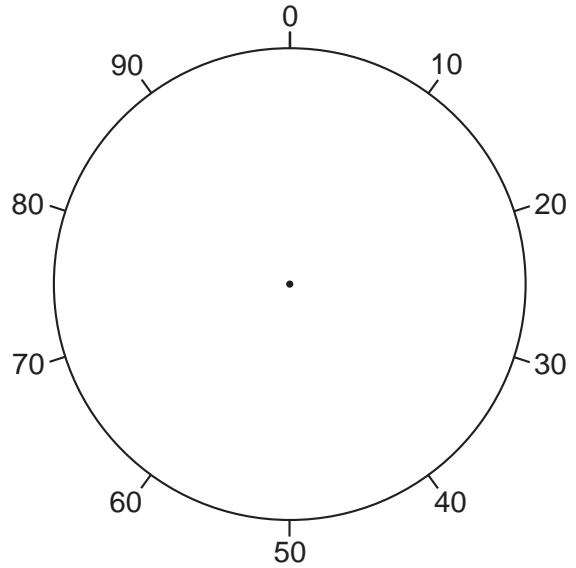
.....

..... [2]

(ii) **Global GM plantings by country in 2005**

For  
Examiner's  
Use

|                                  |    |
|----------------------------------|----|
| Percentages of global total area |    |
| USA                              | 55 |
| Argentina                        | 20 |
| Brazil                           | 10 |
| Canada                           | 7  |
| China                            | 4  |
| 16 other countries               | 4  |



Complete the pie graph. [3]

- (iii) The largest GM seed producing companies are American. They were full of hope that their GM seeds would be used world-wide, in the same way as new seeds were during the Green Revolution of the 1960s.

By 2005 the use of GM crops had not been as widespread and successful as the companies had hoped. What evidence from the bar and pie graphs supports this statement?

.....

.....

.....

.....

.....

[3]

(g)

**Comments about GM crops**

GM crops produce more food, more reliably. We have created corn with a natural pesticide; if an insect attacks the plant, the insect will die, not the plant. We have made a tomato that withstands frost.

**GM research scientist**

**Supermarket boss in Europe**

Public opinion in Europe is hostile to GM crops. It would be commercial suicide for our company to start selling foods made from GM crops. While there is no evidence that eating GM foods is harmful, many people are unwilling to take the risk.

We are worried about the introduction of 'unnatural' plants into the environment. The environment is a delicate system of checks and balances, easy to upset. Our fear is that GM crops will be harmful to surrounding plant and insect life.

**Environmental group**

**Politician in a poor African country**

As usual, the big GM companies are concentrating on rich countries. They are unwilling to sell seeds in poor countries, where their profits will be less. We have not seen any of the benefits so far and probably never will.

(i) State different reasons why fewer GM crops are grown in Europe and Africa than in the Americas (North and South).

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



(ii) Would you expect there to be a great increase in the global area of GM crop plantings in the next 10 years?

*For  
Examiner's  
Use*

.....  
.....  
.....

(iii) In your opinion, should there be a big increase in plantings of GM crops? State and explain your views about this.

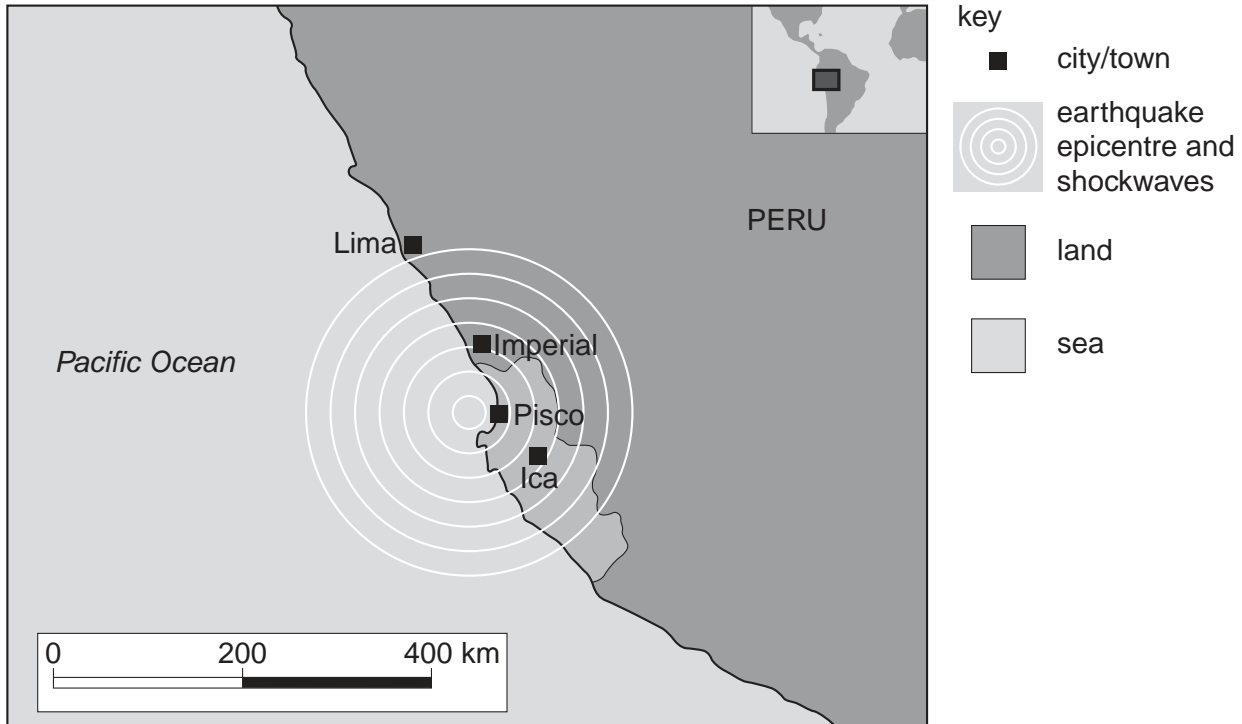
.....  
.....  
.....  
.....  
.....

[4]

[Total: 40]

## 2 Information about the earthquake in Peru (August 2007)

On Wednesday 16th August 2007 at 18.41 local time, an undersea earthquake registering 7.9 on the Richter scale struck Peru's coastal province of Ica. The epicentre was about 150 km south east of Lima, the capital city.



### Reports from coastal cities within the first 24 hours

**Pisco** – The first estimate was that 70% of the city was in ruins. Most houses had fallen – so also had churches and hotels. It was a city without lights, water and communications. Hundreds were trapped in buildings.

**Imperial** – The first estimate was that 80% of the adobe (mud) brick houses had fallen. Survivors lit fires in their ruined homes during the cold winter night.

**Ica** – People sifted through the rubble of the main church, which collapsed during a service when packed with worshippers.

**Lima** – People stood trembling in the streets as buildings shook around them.

The final death toll was estimated at between 450 and 500.

(a) State where the centre of the Peru earthquake was located in 2007.

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

(b) (i) How far away from the centre were the effects of the earthquake felt?

..... [1]

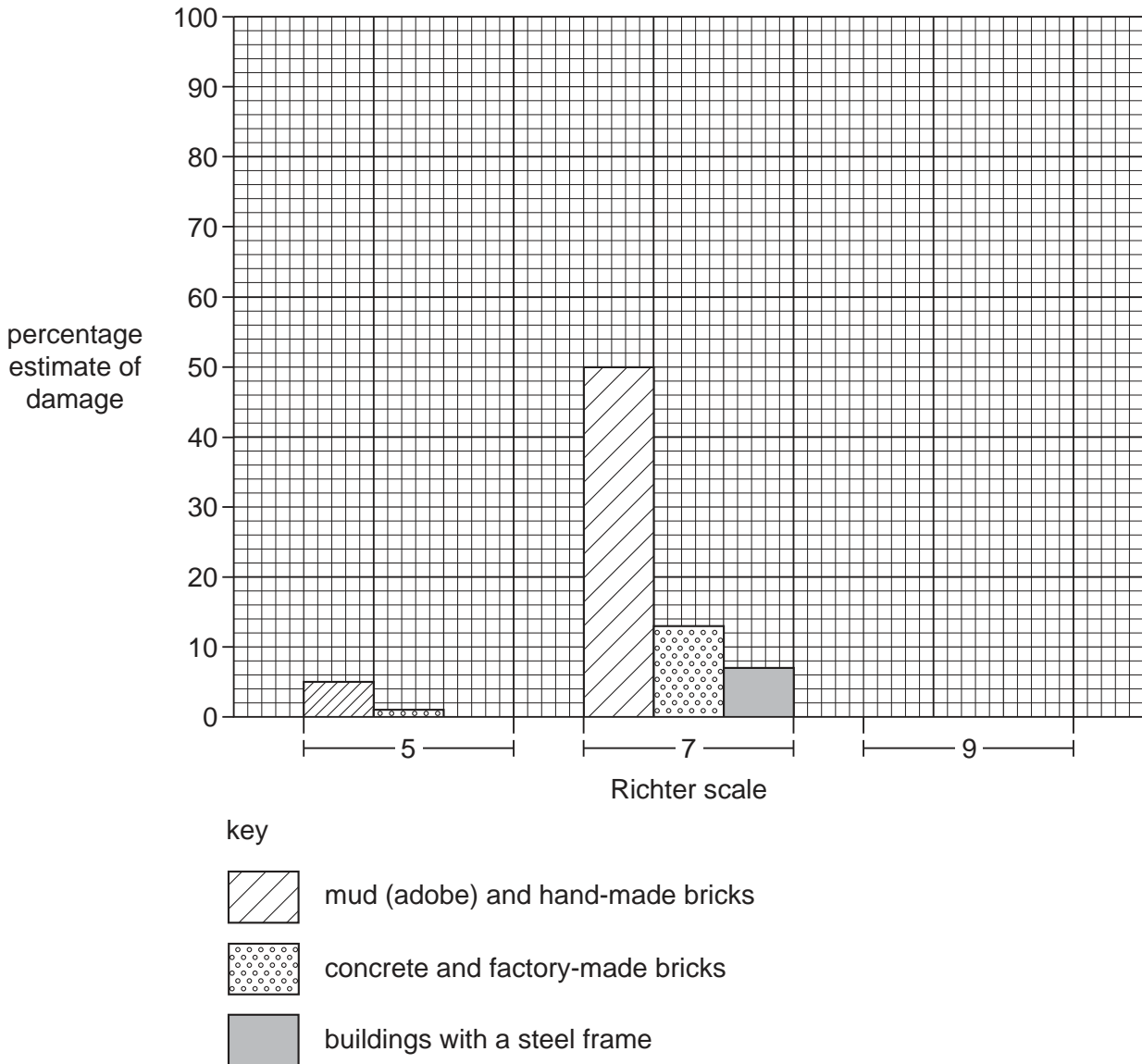
(ii) Describe how the impacts of the earthquake varied with distance from the centre.

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

- (c) The partly completed graph shows estimates for the percentage chance of damage to buildings, according to types of building materials and earthquake strength.

For  
Examiner's  
Use

**Percentage estimates for damage to buildings in earthquakes**



- (i) Percentage estimates for an earthquake Richter scale 9

|                                  |     |
|----------------------------------|-----|
| mud (adobe) and hand-made bricks | 100 |
| concrete and factory-made bricks | 33  |
| buildings with a steel frame     | 20  |

Complete the bar graph by showing percentages for a Richter scale 9 earthquake.

[2]

- (ii) Describe what the graph shows about the percentage chance of damage to buildings according to increasing earthquake strength and types of building materials used.

Increasing earthquake strength .....

.....

.....

Types of building materials .....

.....

..... [3]

- (iii) Was the damage to buildings in the Peru earthquake similar to that expected for an earthquake around 8.0 on the Richter scale? Explain as fully as you can from the information given.

.....

.....

.....

.....

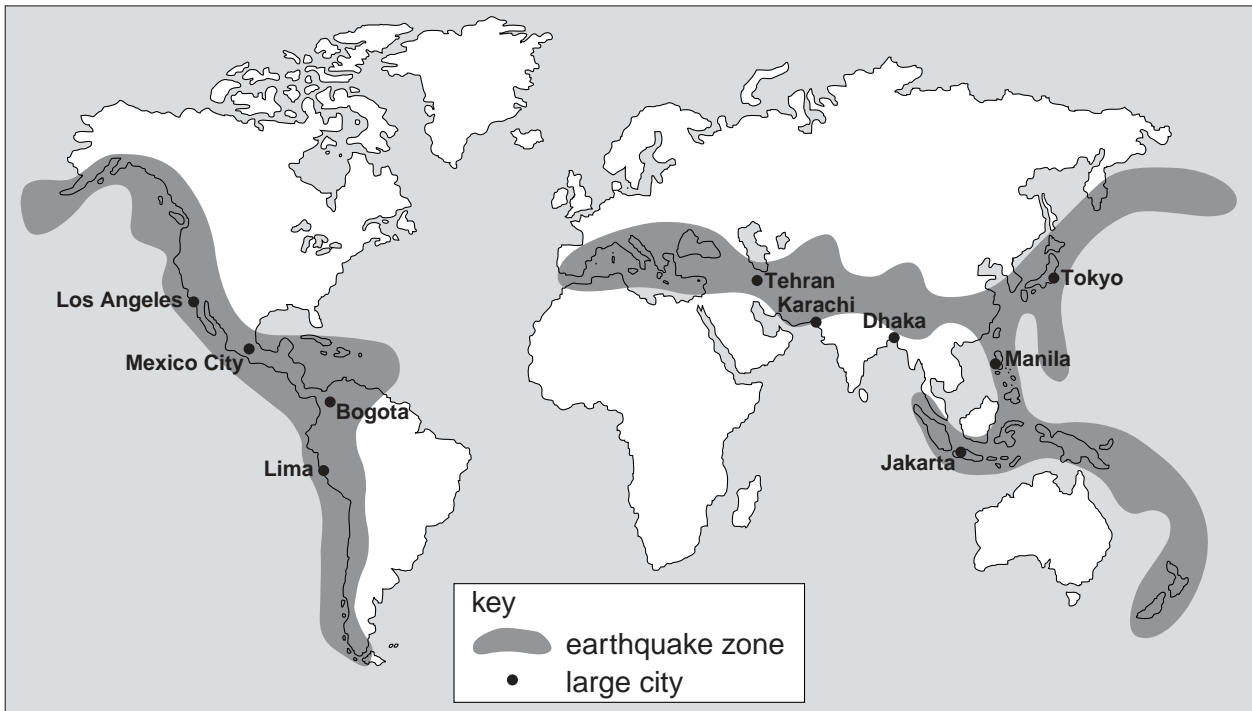
.....

..... [3]

(d) Look at the world map of major earthquake zones. All ten cities named have more than 7 million inhabitants.

For  
Examiner's  
Use

**Major earthquake zones**



(i) Describe the main features of the world distribution and pattern of major earthquake zones shown on the map.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(ii) Explain why earthquakes occur less frequently, or not at all, outside the major earthquake zones shown.

.....

.....

.....

..... [2]

- (iii) Choose one country in which the earthquake risk is high. Explain why strong earthquakes occur regularly in that country.

Name of country .....

Explanation .....

.....

.....

.....

.....

.....

.....

..... [4]

- (e) The large cities named on the map make a big contribution to national wealth, for example Tehran contributes 40% of Iran's national income each year. One big earthquake could wreck the economy of Iran.

Tehran lies in such an earthquake-prone area that some have suggested moving the whole city of 12 million people to a safer location.

- (i) Why is this unlikely to happen?

.....

.....

.....

.....

.....

.....

..... [3]

- (ii) Describe **three** strategies used in cities in developed countries, such as Tokyo and Los Angeles, to save lives when an earthquake strikes.

.....

.....

.....

.....

.....

.....

..... [4]

(f)

**Big cities and natural disasters**

For  
Examiner's  
Use

**UN Report 2007**

- \* The number of natural disasters affecting urban populations has increased by four times since 1975

**Causes identified**

- \* World population growth
- \* Growth of big cities and densely packed urban areas
- \* Slums springing up in disaster-prone areas, such as on steep slopes, next to swamps
- \* Coastal locations of many big cities, with increasing risks from flooding and tsunamis

**Main conclusion**

- \* That the death toll from natural disasters affecting big cities does not have to keep increasing

**(i)** Big city growth is a much greater problem in developing than in developed countries. Why?

.....

.....

.....

.....

..... [3]

**(ii)** Problems caused by natural disasters in coastal locations are similar in big cities in both developing and developed countries. Explain why.

.....

.....

.....

.....

..... [3]



(iii) How likely is it that the death toll from natural disasters affecting large cities will stop increasing, as the UN says it should? State and explain your views about this.

*For  
Examiner's  
Use*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 40]





---

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.

University of 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.

0680/02/M/J/09