

**ADVANCED SUBSIDIARY GCE
GEOLOGY**

Global Tectonics and Geological Structures

THURSDAY 24 MAY 2007

2831

Afternoon

Time: 1 hour

Candidates answer on the question paper.
Additional materials: Electronic calculator
Ruler (cm/mm)
Protractor



* G U E / T 1 6 9 3 7 *

Candidate
Name

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- **WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.**

INFORMATION FOR CANDIDATES

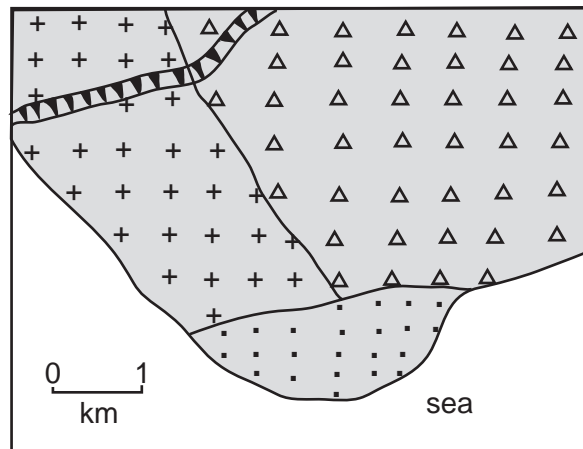
- The number of marks for each question is given in brackets [] at the end of each question or part question.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.





FOR EXAMINER'S USE		
Qu.	Max	Mark
1	17	
2	18	
3	15	
4	10	
TOTAL	60	

This document consists of **12** printed pages.

Answer **all** the questions

1 The simplified map below shows some features of a seismically active area.



-  unweathered granite with a thin soil
-  deeply weathered granite with a thick soil
-  reclaimed land (unconsolidated sand and gravel)
-  steep slope

(a) The local authority is planning to build a hospital in the area.

(i) Indicate with an **X** a suitable location for the hospital. [1]

(ii) Give **two** reasons for your decision.

1

.....

2

..... [2]

(iii) Indicate with a **Y** the most unsuitable land area to locate the hospital. [1]

(b) (i) Describe the social and economic effects of predicting a major earthquake in a city in an economically developed country.

.....

.....

.....

..... [2]

(ii) Name and describe **two** building techniques designed to reduce the impact of earthquakes on built structures.

1

.....

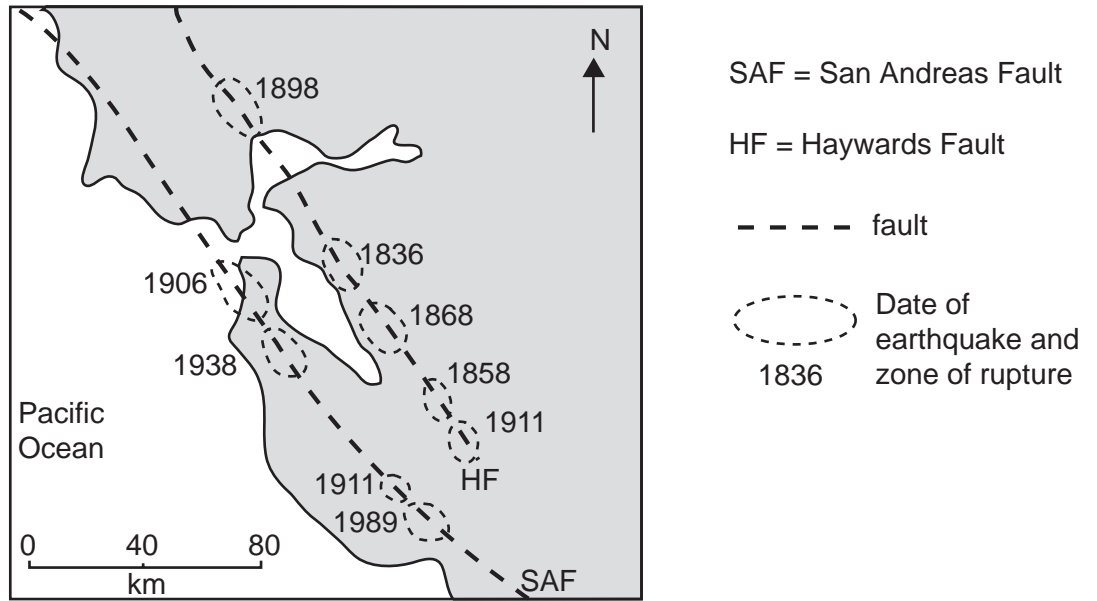
.....

2

.....

..... [4]

(c) The map below shows the San Francisco Bay area which has been the site of a number of major earthquakes.



(i) Name the type of plate margin that exists in this part of California.

..... [1]

The pattern of timing of earthquakes can be used by geologists to predict the likely location of the next major earthquake.

(ii) On the map, shade and label an area where the next earthquake is likely to occur:

- on the San Andreas Fault [1]
- on the Haywards Fault. [1]

(iii) Explain why you have chosen these areas.

.....

 [2]

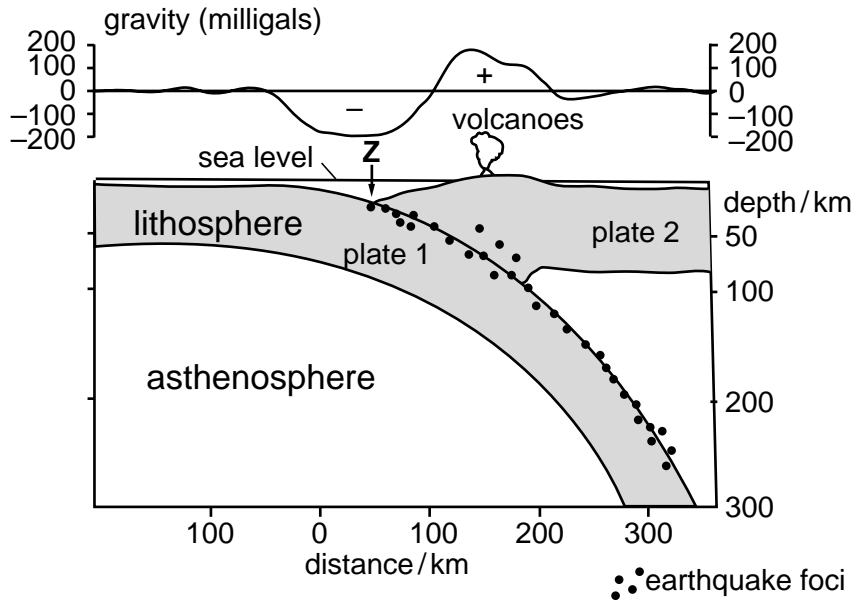
(iv) Describe **two** other earthquake prediction methods.

- 1

- 2
 [2]

[Total: 17]

2 The diagram below is a simplified section and a graph showing the variation in gravity across a plate margin.



(a) (i) On the diagram, label the directions of plate movement. [2]

(ii) Name the feature at Z.
 [1]

(iii) Name the type of plate margin shown above.
 [1]

(iv) Name a location of **such** a plate margin.
 [1]

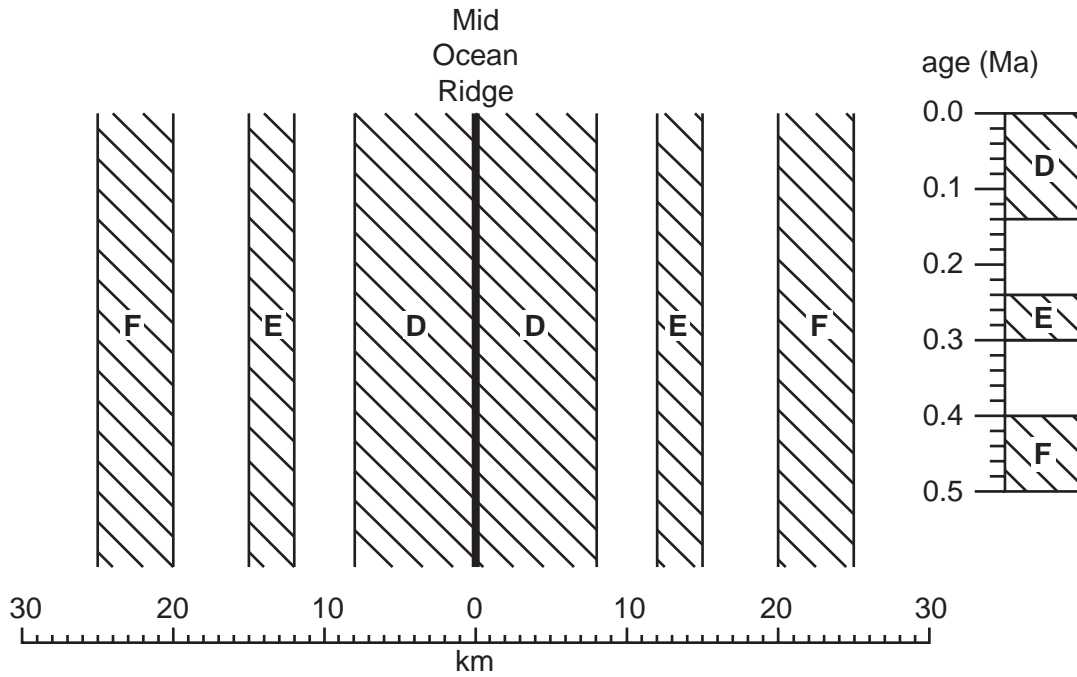
(b) (i) Describe and explain the distribution of the earthquake foci shown on the diagram.

 [2]

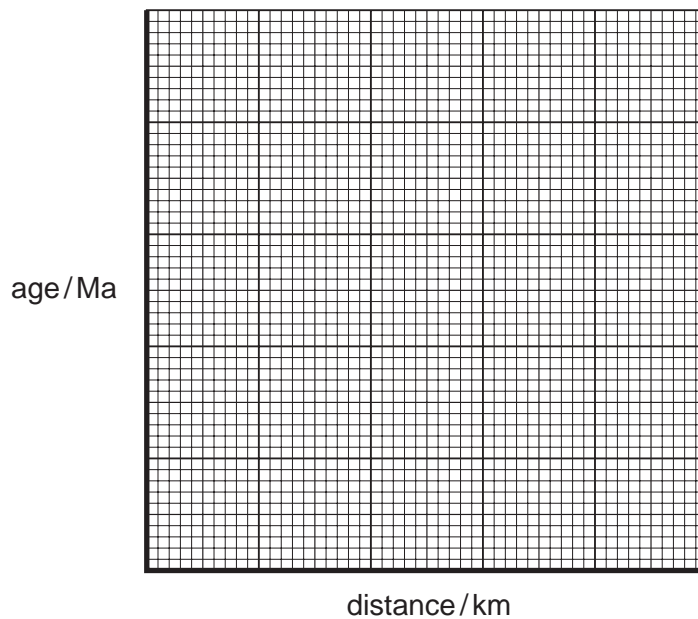
(ii) Describe and explain the variations in gravity shown on the graph.

 [2]

(c) The map shows a series of linear magnetic anomalies either side of a mid ocean ridge.



(i) Plot the boundaries of the positive magnetic anomalies **D**, **E** and **F** on the graph below with distance from the Mid Ocean Ridge against age of oceanic crust. Draw a line of “best fit” through the plotted points. [4]



(ii) From your graph, determine the average rate of sea floor spreading, in cm per year, for one side of the ocean ridge. Show your working.

..... cm/year [2]

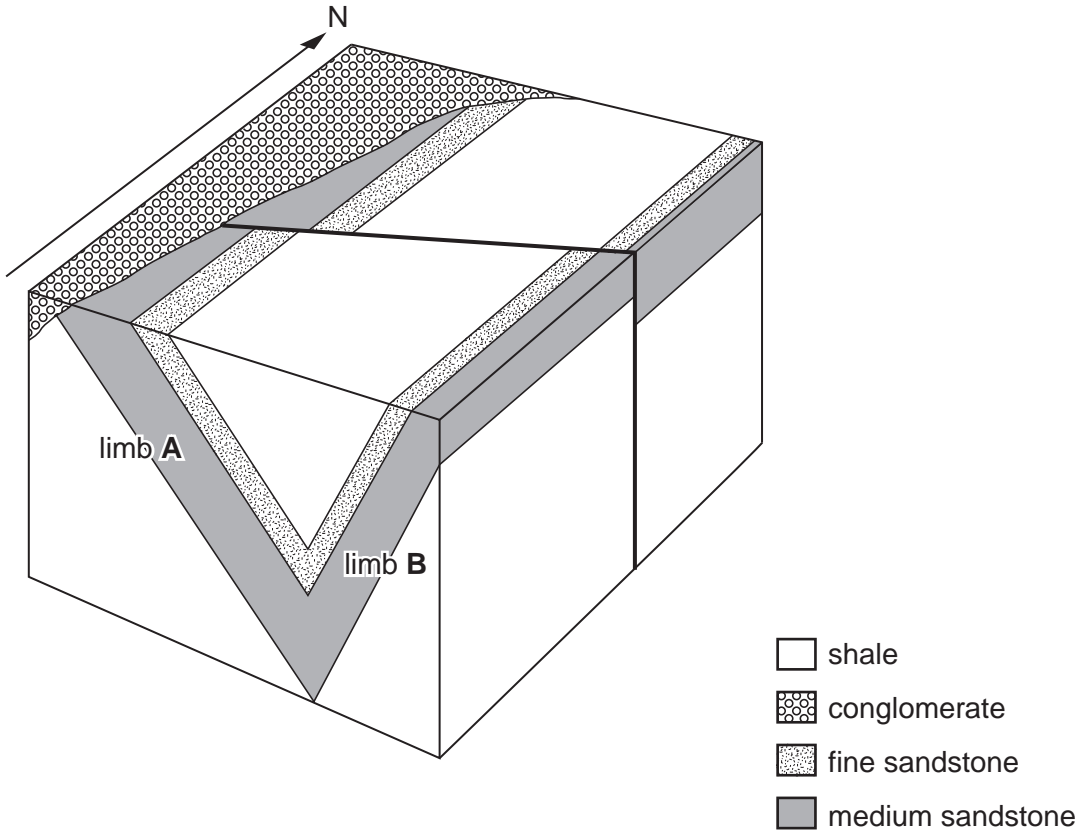
(iii) What is the rate, in cm per year, at which the ocean is widening in this region?

..... cm/year [1]

(iv) Explain why the pattern of magnetic anomalies is symmetrical either side of the ocean ridge.

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

[Total: 18]



(a) (i) Describe the fold structure shown on the block diagram above, using technical terms.

.....

 [2]

(ii) Draw and label the fold axis and axial plane trace on the block diagram above. [2]

(iii) Measure the angle and direction of dip of the two fold limbs, **A** and **B**.

limb **A**: angle of dip direction of dip

limb **B**: angle of dip direction of dip [2]

(iv) Label the unconformity on the block diagram above. [1]

(b) Using the block diagram above outline the age relationships between the fold, fault and unconformity.

.....

 [2]

(c) In the table below enter the correct technical term next to the appropriate description.

fault breccia

fault plane

mylonite

slickensides

technical term	description
	Fine-grained rock with fractured crystal fragments in a streaky, very fine-grained matrix.
	Parallel scratches and grooves produced by fault movement.
	Angular fragments of rock set in a finer-grained matrix produced by grinding of rock against rock.

[2]

(d) (i) In the space below, draw a simple cross-section to show an antiform, which is also an anticline.

[2]

(ii) In the space below, draw a simple cross-section to show a monocline.

[2]

[Total: 15]

Optional extension sheet. If you use this lined page to complete an answer to any question, the question number **must** be clearly shown.

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END OF QUESTION PAPER

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