OXFORD CAMBRIDGE AND RSA EXAMINATIONS
ADVANCED SUBSIDIARY GCE
F791
GEOLOGY
Global Tectonics

WEDNESDAY 20 MAY 2009: Afternoon
DURATION: 1 hour
SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the question paper.

OCR SUPPLIED MATERIALS:
None

OTHER MATERIALS REQUIRED:
Electronic calculator
Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF
INSTRUCTIONS TO CANDIDATES

• Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.

• Use black ink. Pencil may be used for graphs and diagrams only.

• Read each question carefully and make sure that you know what you have to do before starting your answer.

• Answer ALL the questions.

• Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

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

• The total number of marks for this paper is 60.

• Where you see this icon you will be awarded marks for the quality of written communication in your answer.

• You may use an electronic calculator.

• You are advised to show all the steps in any calculations.
1. The map below shows North and South America and the surrounding oceans.

(a) (i) On the map shade and label
- a trench
- a fold mountain chain [2]

(ii) On the map shade and label **ONE** area of high heat flow. Label this area as A. [1]
(iii) Explain why this area of high heat flow exists.

__________________________________________________________________________

__________________________________________________________________________ [1]

(iv) On the map shade and label ONE area of low heat flow. Label this area as B. [1]

(v) Explain why this area of low heat flow exists.

__________________________________________________________________________

__________________________________________________________________________ [1]
(b) (i) In the space below draw a cross-section of a convergent plate margin involving oceanic plates. Add the following labels:

- earthquakes
- volcanoes
- partially melting crust
- convection currents
- island arc

If you can not draw the diagram you may provide a clear description which should include details of labels named above.
(ii) Explain why earthquakes occur at convergent plate margins.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

________________________________________________________________________[2]

(c) Earthquakes are capable of causing huge amounts of damage to the built environment.

Name and describe a method used by engineers to reduce the impact of earthquakes on a built structure.

method ______________________________________________________________________

description ___________________________________________________________________

_____________________________________________________________________________[2]

[Total: 15]
2 (a) (i) The diagram below is a cross-section through a divergent plate margin.

Add the following labelled features to the diagram:

- convection currents
- rising magma
- volcanic activity
- axial rift

(ii) Describe and explain the possible causes of plate movements at mid-ocean ridges (MORs).

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________[2]
(b) The graph below can be used to calculate the rate of spreading at the North Atlantic Ridge.

Key
- - - - North Atlantic

East Pacific Rise

(i) Draw the graph to show spreading at the East Pacific Rise. Use data in the table below. [3]

<table>
<thead>
<tr>
<th>distance from MOR/km</th>
<th>0</th>
<th>50</th>
<th>100</th>
<th>150</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>millions of years</td>
<td>0</td>
<td>0.8</td>
<td>1.7</td>
<td>2.5</td>
<td>3.4</td>
</tr>
</tbody>
</table>
(ii) Calculate the rate of spreading of the East Pacific Rise. Show your working.

_______ cm/year [2]

(iii) How does the graph show you that the East Pacific Rise is spreading at a faster rate?

______________________________________________________________________________

______________________________________________________________________________ [1]

(c) What is the composition of the igneous rocks that comprise the oceanic crust?

In your answer, you should use appropriate technical terms, spelled correctly.

______________________________________________________________________________ [1]

[Total: 13]
QUESTION 3 STARTS ON PAGE 13
3 (a) Define the terms *stress* and *strain* in relation to rocks:

**stress**

____________________________________

________________________________________ [1]

**strain**

____________________________________

________________________________________ [1]

(b) When rocks are deformed they behave in a *competent* or *incompetent* manner. Define each term and give an example of a rock that deforms in each way.

(i) *competent* ______________________________________

_____________________________________________________

example ___________________________________________ [2]

(ii) *incompetent* ______________________________________

_____________________________________________________

example ___________________________________________ [2]
(c) The diagrams below show three types of fault.
(i) Name the fault types C, D and E.

C ____________________________________________

D ____________________________________________

E ____________________________________________ [3]

(ii) Label the footwall on fault D opposite. [1]

(iii) Complete the table below using C, D and E to show the type of stress for each fault type.

<table>
<thead>
<tr>
<th>stress type</th>
<th>fault (C, D or E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>compression</td>
<td></td>
</tr>
<tr>
<td>shear</td>
<td></td>
</tr>
<tr>
<td>tension</td>
<td></td>
</tr>
</tbody>
</table>

[2]
(d) Slickensides and fault breccias are two features that can be found along fault planes.

(i) In the space below draw a labelled diagram to show slickensides. Explain how they form.

If you can not draw the diagram you may provide a clear description which should include details of labels that you would include on a diagram.
(ii) In the space below draw a labelled diagram to show a fault breccia. Explain how it forms.

If you can not draw the diagram you may provide a clear description which should include details of labels that you would include on a diagram.

[Total: 18]
4 (a) (i) The Sun is made of two main elements. State the names of these two elements.

In your answer, you should use appropriate technical terms, spelled correctly.

element 1 _______________________________

element 2 _______________________________ [2]

(ii) The Solar System has terrestrial planets (Earth-like), gas giants and smaller bodies. Name TWO terrestrial planets other than the Earth.

terrestrial planet 1 __________________________

terrestrial planet 2 __________________________ [2]

(iii) What properties make these planets Earth-like?

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________ [2]

[Total: 6]
In this question, you may use diagrams to illustrate your answer.

Describe the detailed layered structure of the Earth’s mantle and core. For each layer describe its:

• depth
• physical state
• composition.
Optional extension sheet. If you use this lined page to complete an answer to any question, the question number **MUST** be clearly shown.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

END OF QUESTION PAPER
Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1PB.

OCR 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.