

OCR

Oxford Cambridge and RSA

Monday 15 May 2017 – Morning

AS GCE GEOLOGY

F791/01 Global Tectonics

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

- Ruler (cm/mm)
- Protractor
- Electronic calculator

Duration: 1 hour



Candidate
forename

Candidate
surname


Centre number

Candidate number

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the barcodes.

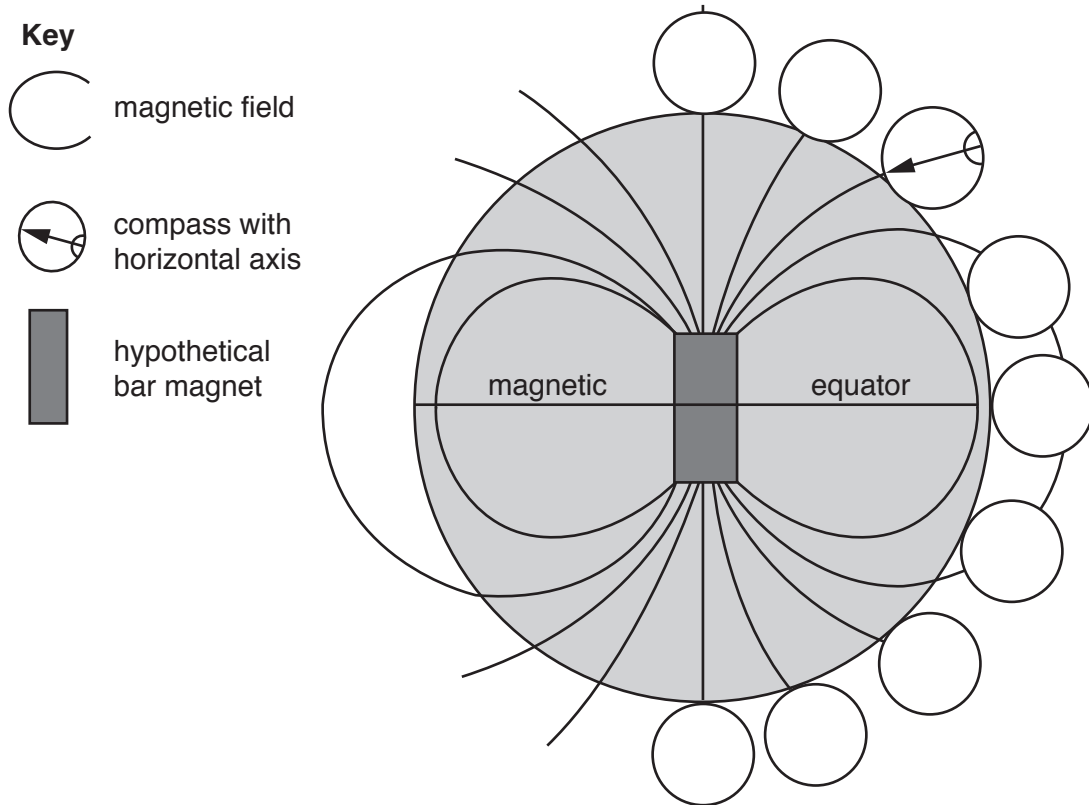
INFORMATION FOR CANDIDATES

- 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 a mark 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.
- This document consists of **12** pages. Any blank pages are indicated.

Answer **all** the questions.

- 1 The Earth has a magnetic field that is similar to the one produced by a bar magnet.

- (a) The diagram below shows the lines of the Earth's magnetic field. The circles show a magnetic compass held vertically at the Earth's surface.



not to scale

- (i) On the diagram, draw an arrow in each of the circles to show the correct direction of the compass needle. One of the circles has been completed for you. [4]

- (ii) Explain what is meant by *magnetic inclination*.

.....

..... [1]

- (b) (i) Complete the following sentences by writing the correct terms in the spaces from the list below. Terms may be used once, more than once or not at all.

permanent
 electricity
 magnetism
 self-exciting
 nickel
 iron
 currents
 dipole
 rotational
 fluid

The Earth's core is a good conductor of , because it contains

The Earth's energy and convection in the hot outer core induce , which generates more

This effect is called the dynamo.

[4]

- (ii) Describe how magnetism is preserved in rocks.

.....

 [2]

- (c) Describe how volcanic activity has been identified on Venus.

.....

 [2]

[Total: 13]

- 2 The table below shows the results of a student's research into the world's top ten most costly earthquakes. All costs are shown at present day prices.

Rank	Cost \$ $\times 10^9$	Earthquake	Date	Location	Magnitude	Deaths
1	312	Kobe	1995	Japan	6.9	6434
2	249	Tohoku	2011	Japan	9.0	15 893
3	95	Sichuan	2008	China	8.0	69 197
4	67	Northridge	1994	USA	6.7	67
5	43	Irpinia	1980	Italy	6.9	43
6	42	Tangshan	1976	China	7.8	242 000
7	42	Christchurch	2011	New Zealand	6.3	185
8	35	Chuetsu	2004	Japan	6.8	39
9	29	Izmit	1999	Turkey	7.6	17 000
10	21	Loma Prieta	1989	USA	7.0	57
Totals	935					353 776

(a) Using the table calculate:

- the percentage of total costs experienced by **Japan**. Show your working.

answer %

- the ratio of costs between the Kobe earthquake and the Loma Prieta earthquake. Show your working.

ratio :1
[3]

(b) (i) Suggest why earthquakes are costly.

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

- (ii) Name and describe **one** method of monitoring that is used to predict earthquakes.

method

description

.....

.....

.....

[3]

- (c) (i) Describe **one** characteristic of *L waves*.

.....

..... [1]

- (ii) Explain why *L waves* cause damage.

.....

..... [1]

- (d) Explain how earthquakes occur in brittle rocks.

.....

.....

.....

.....

.....

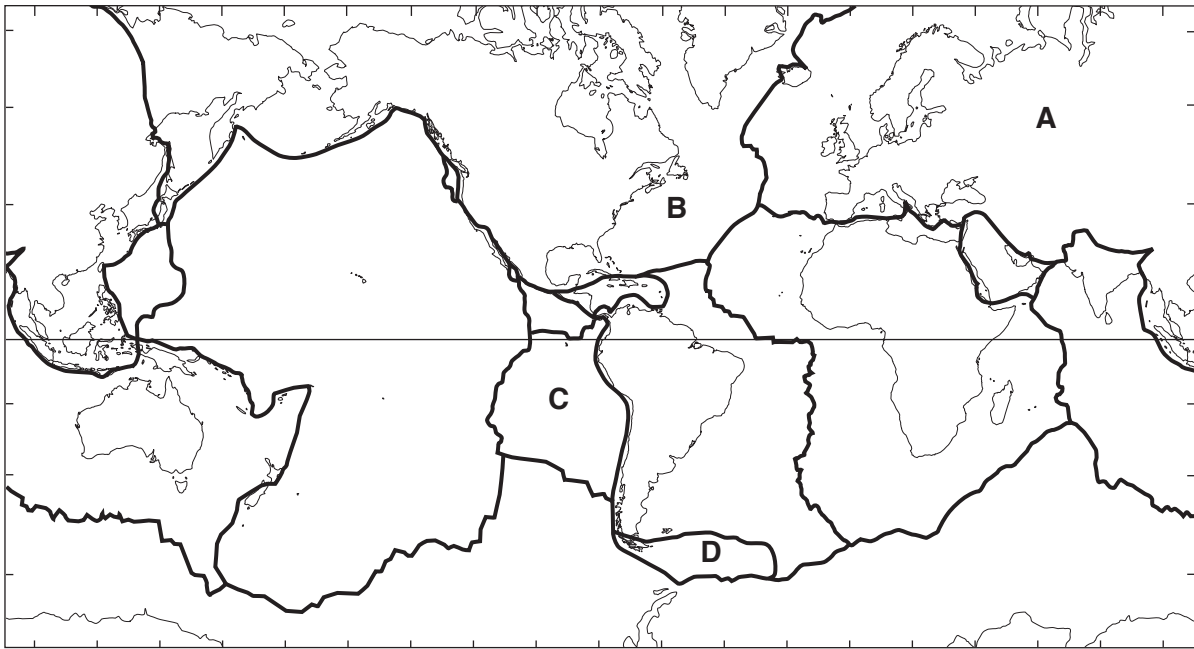
.....

.....

..... [4]

[Total: 13]

3 The map below shows tectonic plates.



(a) (i) Name each of the tectonic plates **A** to **D**.



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

A

B

C

D

[2]

(ii) Shade and label on the map

one area that has shallow earthquakes **only**

one area that has intermediate **and** deep earthquakes.

[2]

(b) (i) Explain the term *ridge push*.

.....

 [2]

(ii) Explain the term *slab pull*.

.....

.....

.....

..... [2]

(iii) Explain why the positions of tectonic plates change over time.

.....

..... [1]

(c) The table below contains descriptions of thickness, density and composition of tectonic plates.

E approximate composition of crust 50% SiO ₂ ; 15% Al ₂ O ₃ ; 10% Fe ₂ O ₃ ; 8% MgO	F density 2.9 g/cm ³	G most are a combination of oceanic and continental crust
H deformed and contains a mixture of igneous, sedimentary and metamorphic rocks	J peridotite of the upper mantle at the base	K approximate composition of crust 70% SiO ₂ ; 15% Al ₂ O ₃ ; 3% Fe ₂ O ₃ ; 1% MgO
L density 2.7 g/cm ³	M thickness range 5 km–400 km	N contain layered gabbro

Select **three** letters describing continental plates **only** and **three** letters describing oceanic plates **only**. Each letter may be used once or not at all.

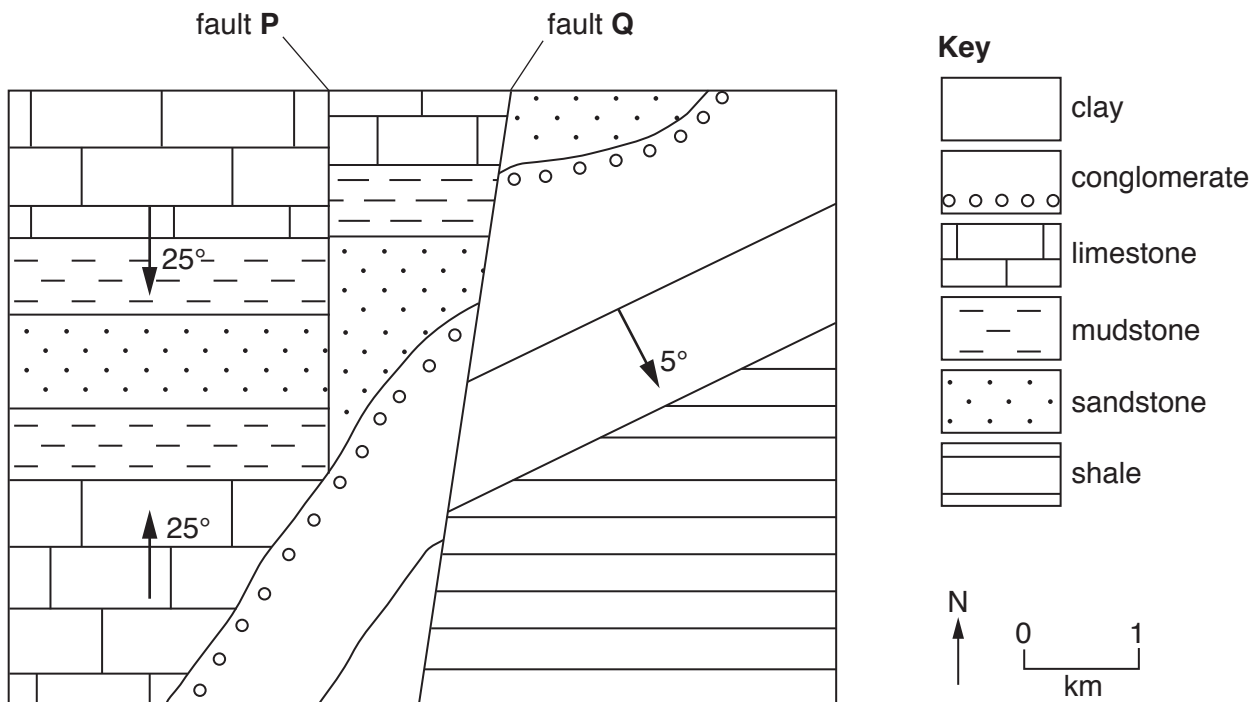
continental plates

oceanic plates

[4]

[Total: 13]

4 The geological map below shows an area where the land is flat.



(a) (i) On the map

- clearly label an unconformity across the area of the map
- draw and label the axial plane trace of a fold.

[2]

(ii) Measure the strike direction of the clay shown on the map.

direction in degrees

[1]

(iii) The rocks shown on the map contain surfaces that separate one layer from another. State the technical term that describes these surfaces.

..... [1]

(b) (i) List the geological structures shown on the map in order of age.

youngest

.....

.....

oldest

[2]

- (ii) Explain how you can tell that one fault is younger than the other.

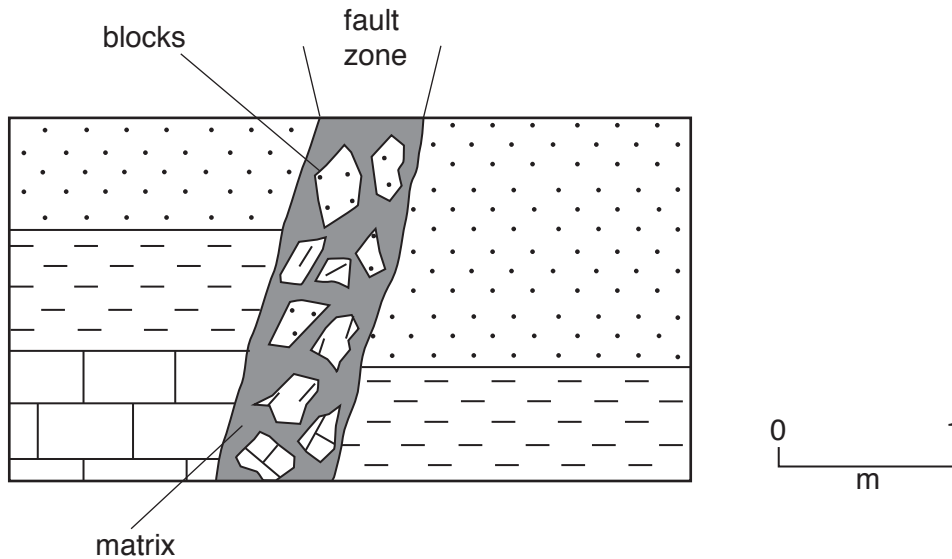
.....

.....

.....

..... [2]

- (c) The cross section diagram below shows one of the faults on the map.



- (i) Measure the angle of dip of the fault.

..... [1]

- (ii) Name the material shown within the fault zone.

..... [1]

- (iii) Explain how the angular blocks form.

.....

..... [1]

- (iv) State the technical term for the polished surfaces and striations that are found on fault planes. Describe how they form.



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

.....

.....

.....

..... [2]

[Total: 13]

Turn over

- 5 Describe *hotspots* and *mantle plumes* and the evidence for their existence. Explain how they have created island chains. You may use diagrams to illustrate your answer.

[8]

[Total: 8]

END OF QUESTION PAPER

This image shows a blank sheet of white paper designed for handwriting practice. It features a solid vertical line on the left side, creating a narrow margin. The rest of the page is filled with evenly spaced horizontal dashed lines, providing guides for letter height and placement. There are no other markings, text, or illustrations on the page.

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