



Oxford Cambridge and RSA

Monday 14 May 2018 – 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 **16** pages. Any blank pages are indicated.

Answer **all** the questions.

- 1 (a) The photograph below is of a fold at Apes Tor in the Peak District National Park.



- (i) On the photograph label the following:

- a bedding plane
- a joint
- a bed

[3]

- (ii) Draw and label the axial plane on the photograph.

[1]

- (iii) Name and fully describe the fold shown in the photograph.



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

name

description

..... [2]

- (iv) State the type of force that caused the fold.

..... [1]

- (b) Describe how the deformation of fossils **and** ooliths can be used to measure strain. You may draw diagrams to illustrate your answer.

.....

.....

.....

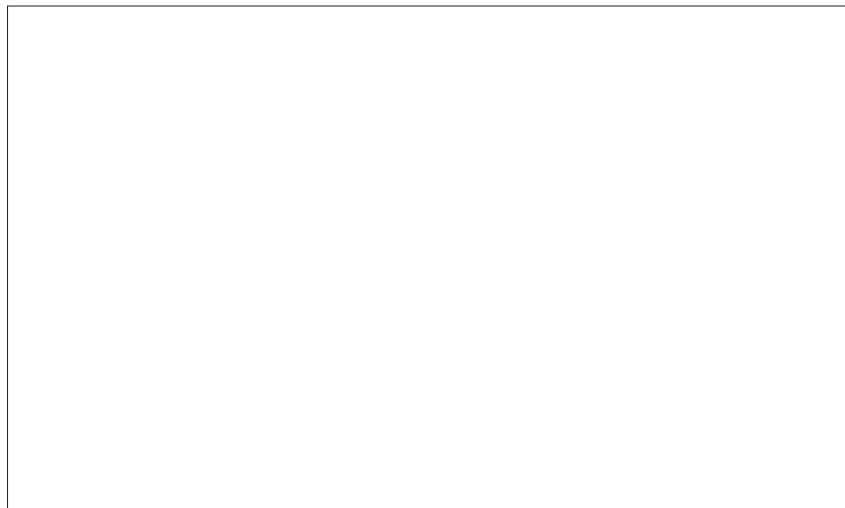
.....

[2]

- (c) In the space provided below draw a diagram to show a horst and graben in cross-section.

On your diagram include the following labels:

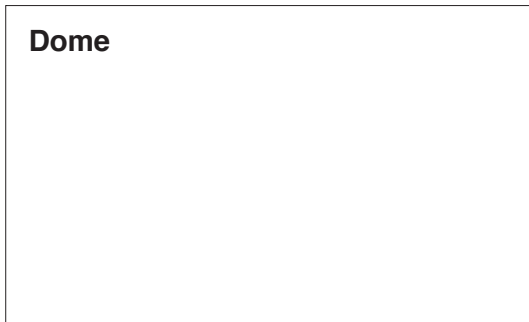
- **horst**
- **graben**
- **normal fault**
- **downthrown side**



[2]

- (d) With the aid of fully labelled, plan view diagrams, describe the main features of domes and basins **and** explain their formation.

Dome



Basin



.....

.....

.....

..... [3]

[Total: 14]

- 2 (a) (i) Describe how volcanic activity has been identified on Io, a moon of Jupiter.

.....
 [1]

- (b) Some of the oldest rocks found on Earth date to about 3800 Ma.

- (i) Name the method used to date these rocks.

..... [1]

- (ii) The generally accepted age of the Earth and the rest of the Solar System is about 4550 million years. Explain why this age cannot be measured directly from material preserved in the Earth's crust.

.....

 [2]

- (c) Complete the table by matching the descriptions with the planets from the list below.

Mars Mercury Saturn Uranus Venus

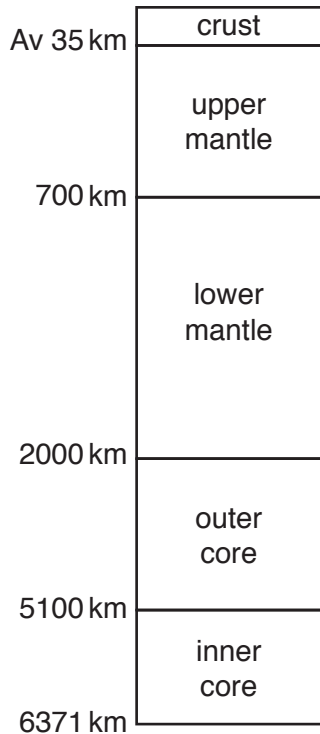
Description	Planet
Heavily cratered surface 0.4AU from the sun Almost no atmosphere	
Large shield volcanoes 2 moons Thin atmosphere composed mainly of carbon dioxide	
Rings composed of icy debris Mean temperature -180°C Hydrogen atmosphere 9.5AU from the sun	
Desert surface has craters and shield volcanoes No moons Dense atmosphere composed of carbon dioxide and clouds of sulphuric acid	
Icy rings and a rocky core 19.2AU from the sun Atmosphere composed mainly of hydrogen with helium and methane	

AU = Astronomical units

[2]

(d) (i) On the diagram below clearly label the following discontinuities:

- Lehmann
- Gutenberg
- Moho



[2]

(ii) Why is the Lehmann boundary not a distinct boundary?

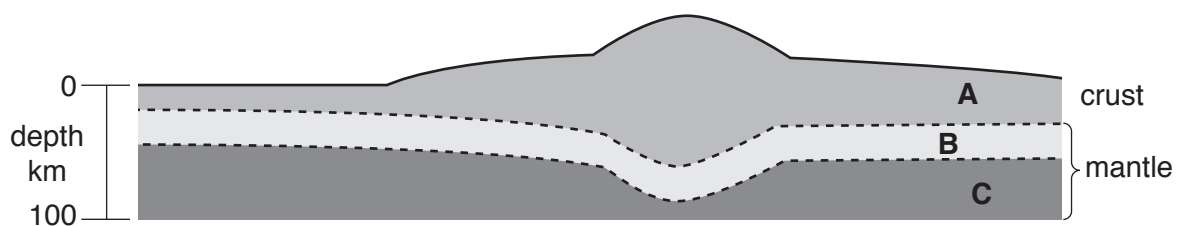
.....

 [1]

(e) Define the term partial melting.

..... [1]

(f) The diagram below shows a simplified cross-section through the crust and part of the mantle.



(i) Name the part of the Earth that comprises layers **A** and **B**.

..... [1]

- (ii) State the physical composition of layers **A** and **B**.

..... [1]

- (iii) Describe the physical state of layer **C**.

..... [1]

- (g) The following data records how temperature changes with depth (geothermal gradient).

Location	
Depth/km	Temperature °C
0	0
100	750
200	1150
300	1250
400	1400

- (i) Calculate the geothermal gradient between 0 and 100 km.

..... °C/ km [1]

- (ii) Calculate the geothermal gradient between 100 and 400 km.

..... °C/ km [1]

- (iii) Describe how heat is transferred in the mantle.

.....

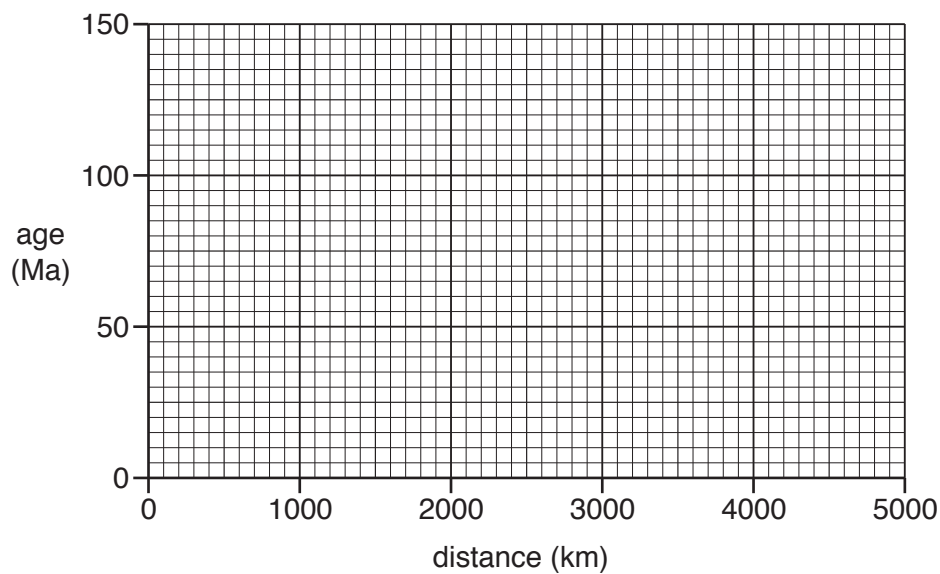
 [2]

[Total: 17]

- 3 (a) The following data comes from a survey in the South Atlantic Ocean. It represents a transect from the coast of Brazil across to the coast of West Africa.

Location	Distance from coast (km)	Age of crust (Ma)
A	1000	70
B	2000	20
C	2500	0
D	3500	50
E	4500	100

- (i) Plot these data on the graph below.



[2]

- (ii) Mark on the graph the position of the Mid Ocean Ridge.

[1]

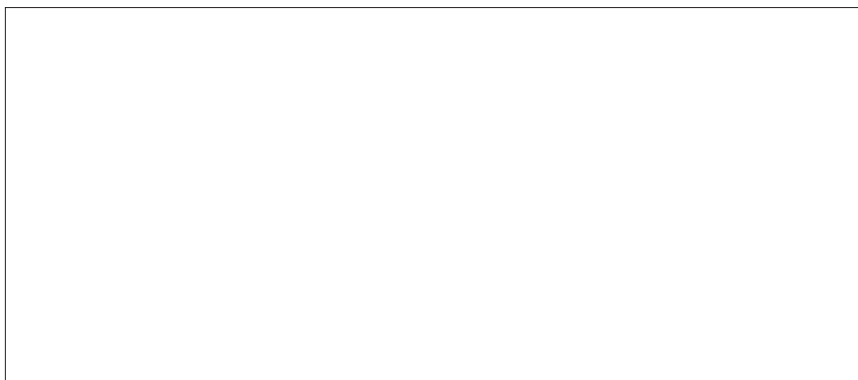
- (iii) Calculate the time it took for the sea floor to move between points A and B.
Show your working out.

answer: Ma [1]

- (b) The oldest sediment on the edge of the North Atlantic is 190 Ma. If the distance across the ocean is 3800 km, what is the average rate of sea floor spreading?
Show your working out.

answer: cm/yr [1]

- (c) In the space below draw a labelled cross-section of a converging oceanic/continental plate margin.



[3]

- (d) Describe the main characteristics of 'black smokers'.

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

- (e) Explain why the Pacific Ocean crust is not older than 200 Ma.

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

- (f) Explain why there are no volcanoes at continental-continental margins.



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

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

[Total: 13]

- 4 (a) Complete the table by matching the descriptions with the features of continents and oceans from the list below.

mid ocean ridge continental shelf major rift valley
 deep sea trench fold mountains seamount

Description	Feature
An area of sea floor that slopes gently to a depth of 120–200 m. An aseismic region.	
A linear strip of crust that has slipped down along normal faults. Shallow focus earthquakes are common along the fault lines.	
Elongated submarine valley systems occurring alongside fold mountains and island arcs.	
Submarine basalt volcano which may occur singly or in groups.	

[3]

- (b) Explain why the continental shelf may be dry land or below sea level.

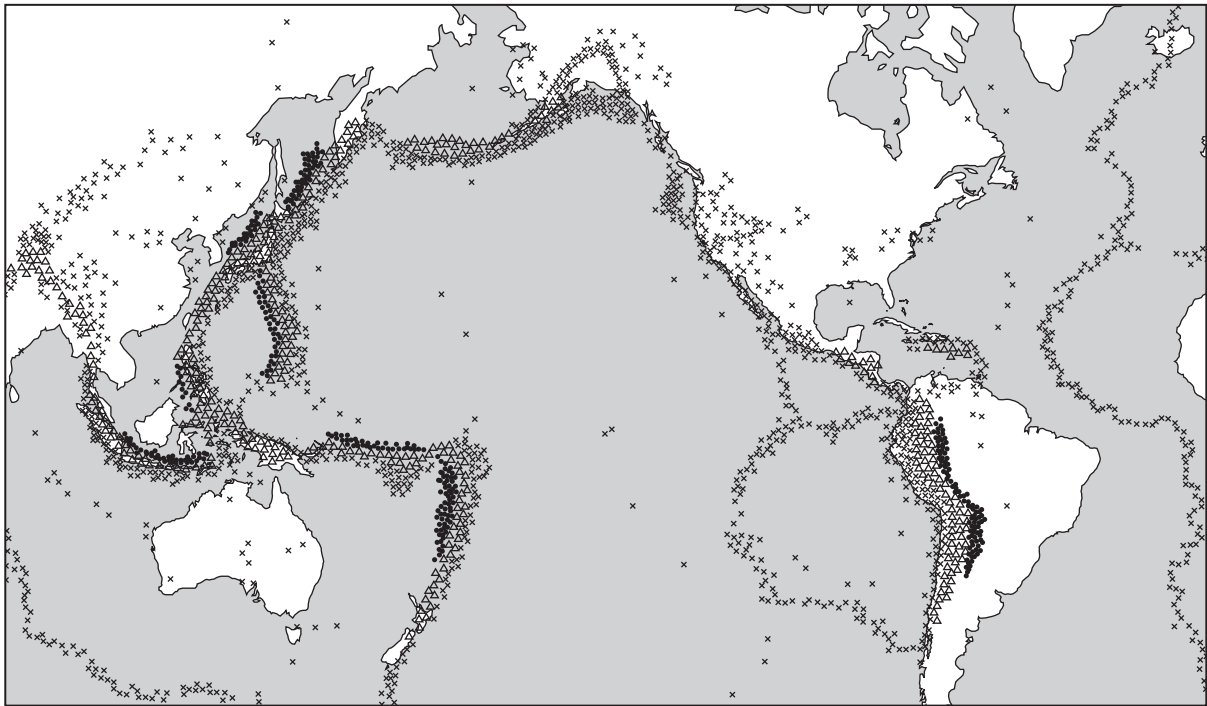
.....

.....

.....

..... [2]

- (c) The map below shows the location of shallow, intermediate and deep earthquakes. Earthquake zones are good indicators of plate boundaries.



Key

- deep earthquakes
- △ intermediate earthquakes
- × shallow earthquakes

Other than earthquake zones, identify **three** other pieces of evidence that help to identify plate margins:

1.
2.
3.

[3]

[Total: 8]

[8]

END OF QUESTION PAPER

[illegible]

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