

**Tuesday 15 January 2013 – Afternoon**

**AS GCE GEOLOGY**

**F791/01** Global Tectonics

Candidates answer on the Question Paper.

**OCR supplied materials:**

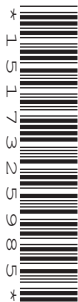
None

**Other materials required:**

- Ruler (cm/mm)
- Protractor

**Duration: 1 hour**

**MODIFIED LANGUAGE**




|                       |  |                      |  |
|-----------------------|--|----------------------|--|
| Candidate<br>forename |  | Candidate<br>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 pages at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the bar codes.

### 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 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 Seismologists study earthquakes. There are a number of ways of classifying and predicting earthquakes.

(a) (i) Define the term *focus*.

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

(ii) Name the point at the Earth's surface, above the focus.



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

..... [1]

(iii) What is the range of depths at which *shallow focus* earthquakes occur?

..... [1]

(iv) Explain why there are no earthquakes with a depth of focus greater than 720 km.

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

(b) (i) Describe and explain how the following **two** methods can be used to attempt to predict earthquakes.

seismic gap .....  
 .....  
 .....  
 ..... [2]

gas measurements .....  
 .....  
 .....  
 ..... [2]

- (ii) Describe **one** social consequence of making an earthquake prediction.

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

- (c) At 5.04 pm on 17 October 1989, an earthquake of magnitude 6.9 on the Richter scale at Loma Prieta rocked the San Francisco Bay area. Reports stated that fires started to burn in several areas of San Francisco. Many people were trapped under collapsed elevated sections of roads.

- (i) What does the Richter scale measure?

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

- (ii) How is the Richter magnitude determined from a seismogram?

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

- (iii) Suggest why fires started to burn after this earthquake.

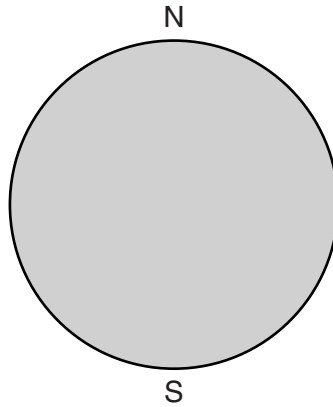
.....  
 ..... [1]

- (iv) The elevated sections of roads have now been replaced or repaired. Describe a measure used to prevent damage in future earthquakes.

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

[Total: 14]

- 2 The Earth's magnetic field is similar to the field produced by a bar magnet. A simplified cross-section of the Earth is given below.



- (a) (i) Draw at least **four** lines on the cross-section of the Earth to show the shape of the Earth's magnetic field. [1]

- (ii) Describe the likely origin of the Earth's magnetic field.

.....

.....

.....

..... [2]

- (iii) Describe how palaeomagnetism forms in rocks.

.....

.....

.....

..... [2]

- (iv) Explain how magnetic inclination in rocks is used as evidence for continental drift.

.....

.....

.....

..... [2]

- (b) Describe the evidence for continental drift using rock types.

.....

.....

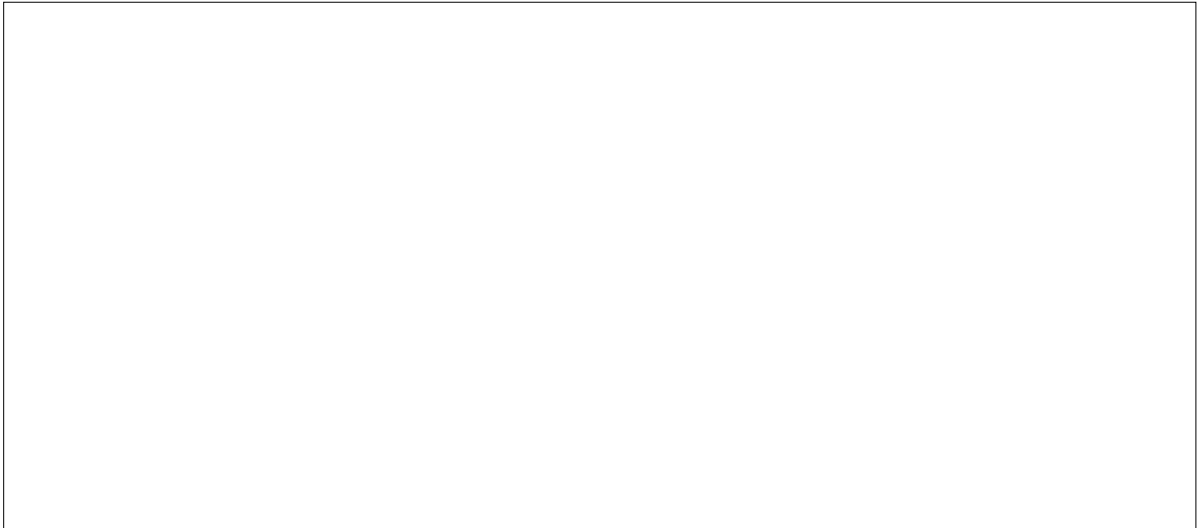
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..... [2]

[Total: 9]

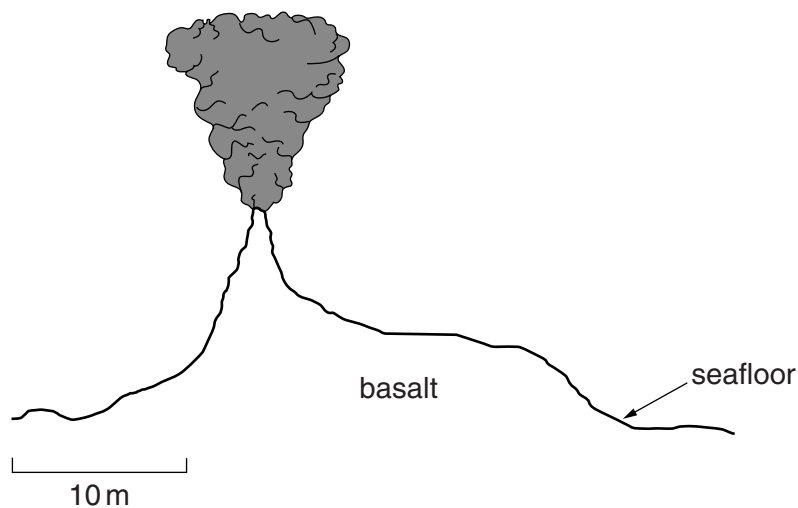
- 3 (a) In the space below draw a fully labelled cross-section diagram of a mid-ocean ridge. Add the following labels:

- volcanic activity
- axial rift
- rising magma
- direction of movement.



[3]

- (b) Black smokers have been discovered on mid-ocean ridges. A simplified cross-section of a black smoker is given below. Describe a black smoker and explain how it formed.



.....

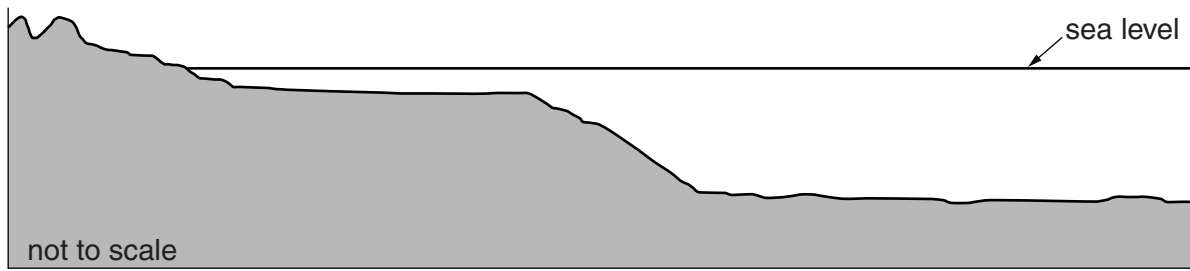
.....

.....

.....

[2]

(c) The cross-section diagram below shows the edge of a continent and the deep sea floor.



(i) Label the continental slope and the continental shelf. [1]

(ii) Describe **one** characteristic feature of the continental slope.

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

(iii) State the term used for the deep sea floor and state **two** characteristic features of this area.



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

term .....  
 1 .....  
 2 ..... [2]

(d) State **three** characteristic features of continental shields.

1 .....  
 2 .....  
 3 ..... [2]

(e) Describe how fold mountains form at plate margins.

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

[Total: 13]

- 4 (a) (i) The terms below relate to layers of rock. Choose the correct term to match each definition in the table.

- apparent dip
- bed
- dip
- strike

| Term | Definition   |
|------|--|
|      | the maximum angle of inclination of a rock surface from the horizontal |
|      | a horizontal line on a rock surface                                    |
|      | a layer of sedimentary rock with a thickness greater than 1 cm         |

[2]

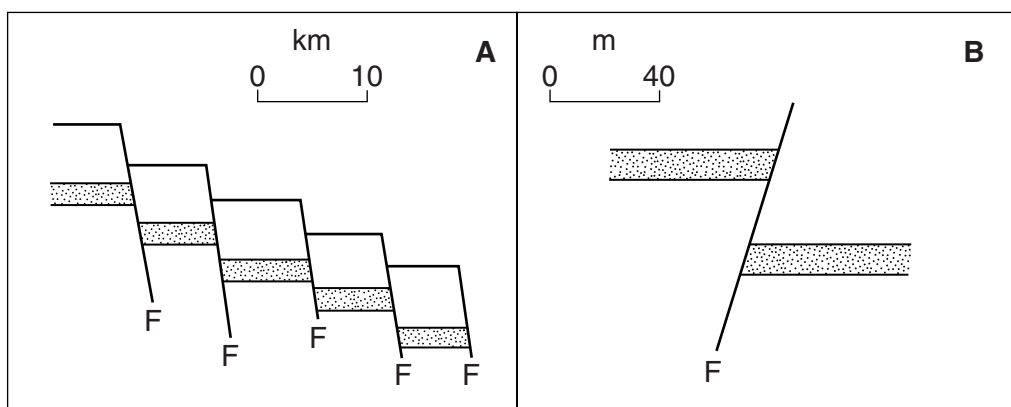
- (ii) Describe how a geologist measures both the strike and dip of a rock surface.

.....

.....

..... [1]

- (b) The diagrams below show cross-sections of two different fault structures.



- (i) Name the fault structures shown in the diagrams above.

A ..... B ..... [1]

- (ii) Name the type of stress that formed each fault structure.

A ..... B ..... [1]



- (c) Draw a cross-section view to show a horst and a graben. Draw a minimum of one bed and label upthrow and downthrow.

|       |        |
|-------|--------|
| horst | graben |
|-------|--------|

[2]

- (d) Competent and incompetent rocks react differently when folded.

- (i) How is a competent rock affected by folding?

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

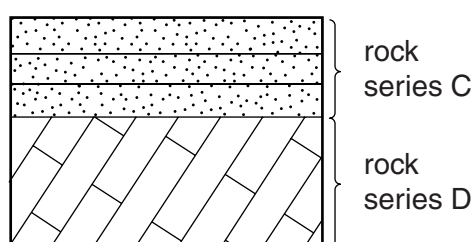
- (ii) Name a competent sedimentary rock.

..... [1]

- (iii) Suggest a structure that forms within an incompetent rock when folded.

..... [1]

- (e) The cross-section below shows beds of sedimentary rock of different ages.



- (i) Draw clearly the plane of unconformity on the diagram. [1]

- (ii) Describe the sequence of events that formed the cross-section above.

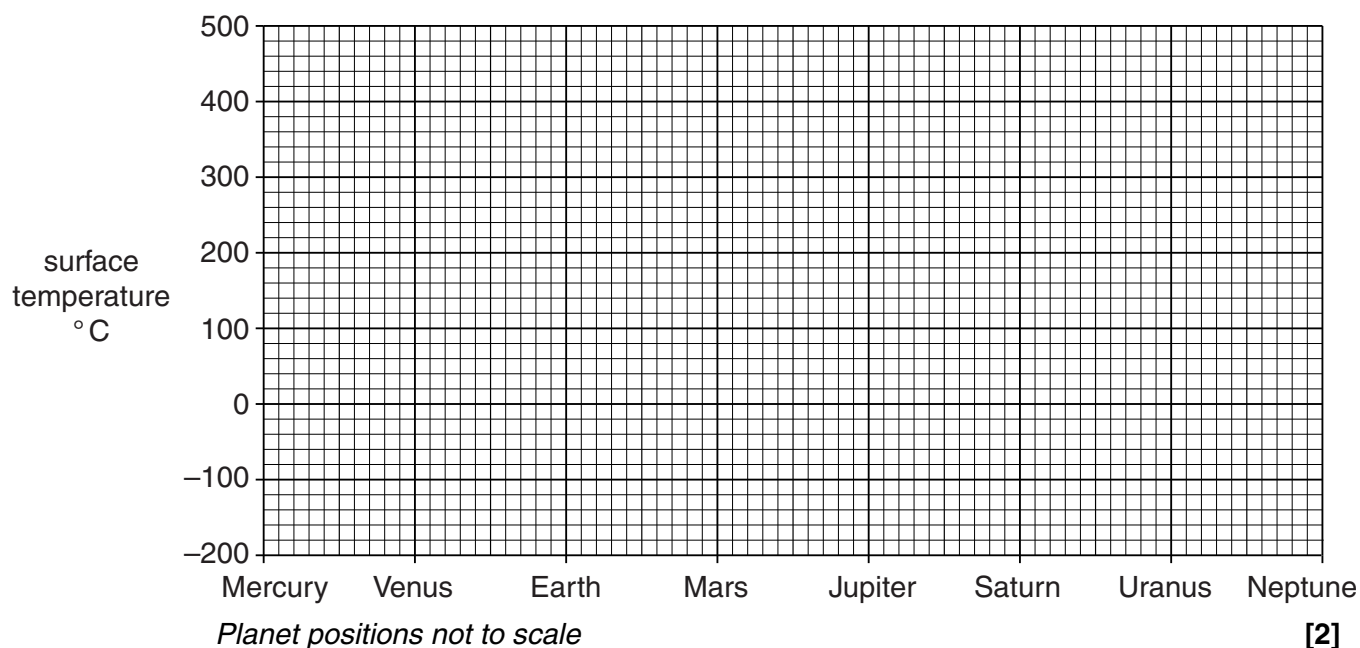
.....  
 .....  
 ..... [1]

[Total: 12]

- 5 The table below shows the average surface temperature in °C of the planets within the solar system.

| Planet                           | Mercury | Venus | Earth | Mars | Jupiter | Saturn | Uranus | Neptune |
|----------------------------------|---------|-------|-------|------|---------|--------|--------|---------|
| Average surface temperature (°C) | 167     | 464   | 15    | −65  | −110    | −140   | −195   | −200    |

- (a) Using the data in the table, plot points on the grid below to show the average surface temperatures.



- (b) Label an anomalous result on the grid. [1]

- (c) Describe the general relationship between average surface temperature and distance from the Sun.

.....

..... [1]

[Total: 4]

- 6** Explain how the properties of P and S waves result in shadow zones which can be used to determine the state and depth of the inner and outer core of the Earth. You may use diagrams to illustrate your answer.

..... [8

**[Total: 8]**

**END OF QUESTION PAPER**

[illegible]