Surname	Centre Number	Candidate Number
Other Names		2

GCE AS/A level

1211/01

GEOLOGY – GL1
FOUNDATION UNIT

P.M. THURSDAY, 16 May 2013

1 hour

		Examiner only
1.	**16**	
2.	**16**	
3.	**13**	
4.	**15**	
Total	**60**	

1211
010001

ADDITIONAL MATERIALS

In addition to this examination paper, you will need a copy of the **Mineral Data Sheet**.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

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

You are reminded that marking will take into account the use of examples and the quality of communication used in your answers.

Examiner only

Answer **all** *questions.*

1. **Figure 1a** shows the geological histories for trilobites and graptolites.

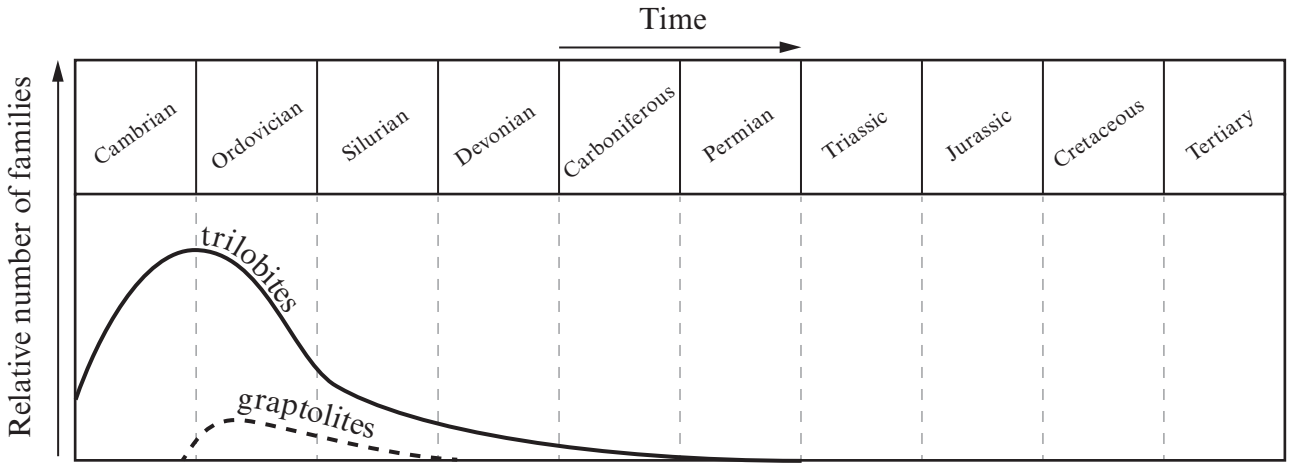

Figure 1a

(a) Refer to **Figure 1a**.

(i) During which geological period did the numbers of families of both trilobites and graptolites begin to decline? [1]

.....

(ii) Describe the geological history of the graptolites with reference to their first appearance, maximum diversity and eventual extinction. [3]

.....

.....

.....

.....

(iii) State **two** differences between the geological histories of trilobites and graptolites. [2]

.....

.....

.....

Examiner only

(iv) Graptolites are useful zone fossils in the Palaeozoic era. From your knowledge, describe **two** characteristics of graptolites that make them good zone fossils. [2]

.....

.....

.....

(b) **Figure 1b** shows a student's field sketch of a number of trilobite fossils on a single bedding plane.

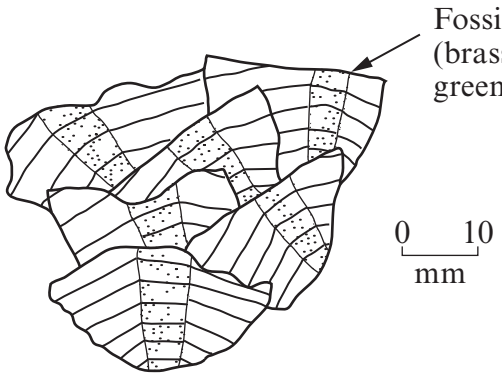

Figure 1b

(i) Name the part of the trilobite that has been preserved in **Figure 1b**. [1]

.....

(ii) The original hard parts of the trilobite are now made of mineral **A**. Using the Mineral Data Sheet, identify mineral **A**. [1]

.....

(iii) Name and describe the process by which the trilobites have been fossilised. [3]

.....

.....

.....

.....

(iv) A student concluded that the trilobites shown in **Figure 1b** represent a life assemblage. With reference to **Figure 1b** critically evaluate this statement. [3]

.....

.....

.....

.....

Examiner only

2. Figure 2 shows a cross section parallel to the true dip through an orogenic belt (not to scale).

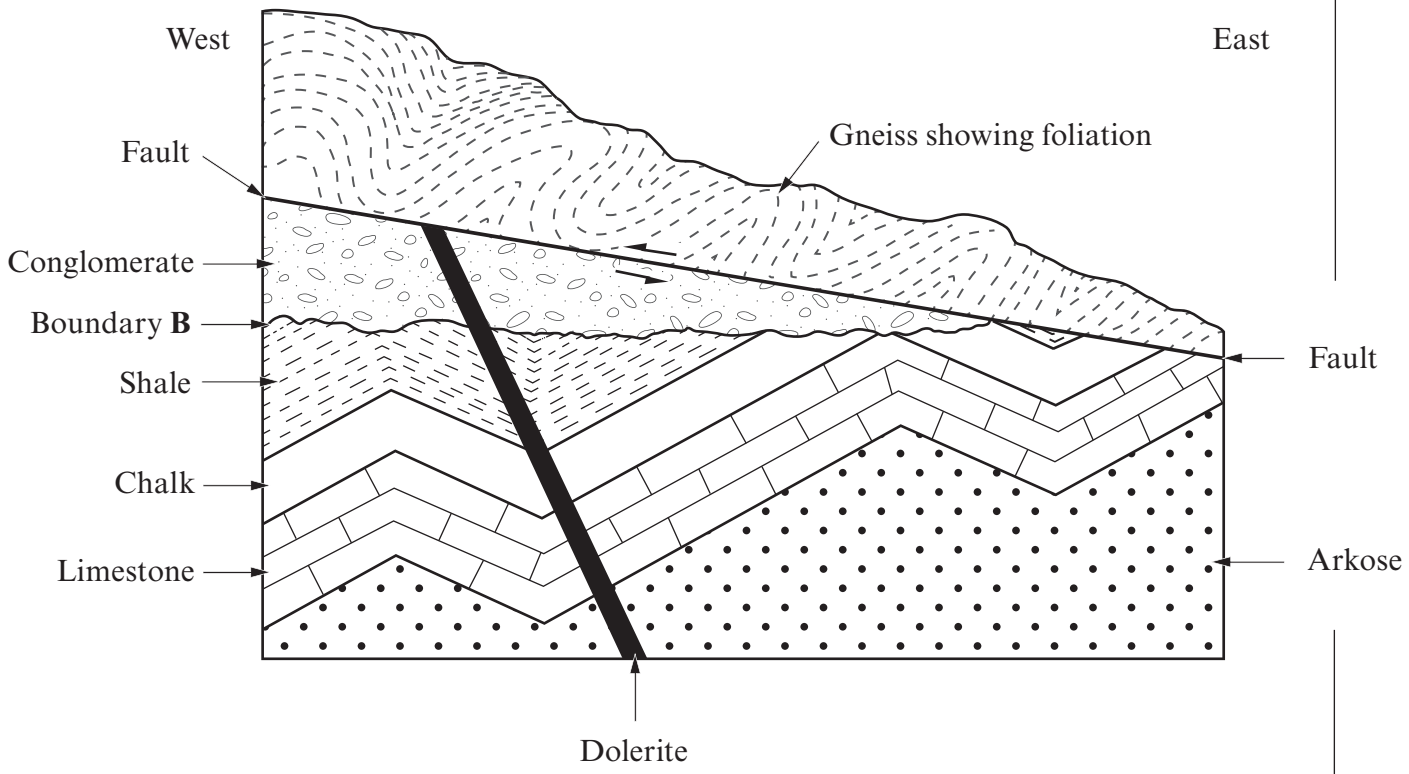

Figure 2

(a) (i) Name **one** metamorphic rock shown in **Figure 2**. ..... [1]

(ii) Indicate which **three** of the following statements most accurately describe the folding below the fault in **Figure 2**. Tick only **three** boxes. [3]

☐ The folds strike north-south

☐ The folds are overturned

☐ The folds strike east-west

☐ The fold limbs dip at different angles

☐ Symmetrical synclines and anticlines (limbs of equal length)

☐ The fold limbs have similar dip angles

☐ Asymmetrical synclines and anticlines (limbs of different lengths)

Examiner only

(b) (i) Name the type of fault shown in **Figure 2**, giving **two** reasons to explain your answer. [3]

Type of fault .....

Reasons .....

.....

.....

(ii) Describe **one** piece of evidence you would look for **in the field** to confirm the presence of the fault shown in **Figure 2**. [2]

.....

.....

.....

(c) Using **Figure 2** and your knowledge, explain the evidence that boundary **B** separates rock units of very different ages. [3]

.....

.....

.....

.....

(d) A student concluded that the **gneiss** (showing foliation) and the **dolerite** were the youngest rocks shown in **Figure 2**. Critically evaluate this statement. [4]

.....

.....

.....

.....

.....

.....

1211 010005

Examiner only

3. **Figure 3a** is a map showing South America and part of the Pacific Ocean. The Pacific sea floor is subdivided based on the age of ocean floor sediments.

Figure 3b is a graph of data collected along line **B-C** on **Figure 3a**, showing the age of ocean floor sediment based on microfossil content.

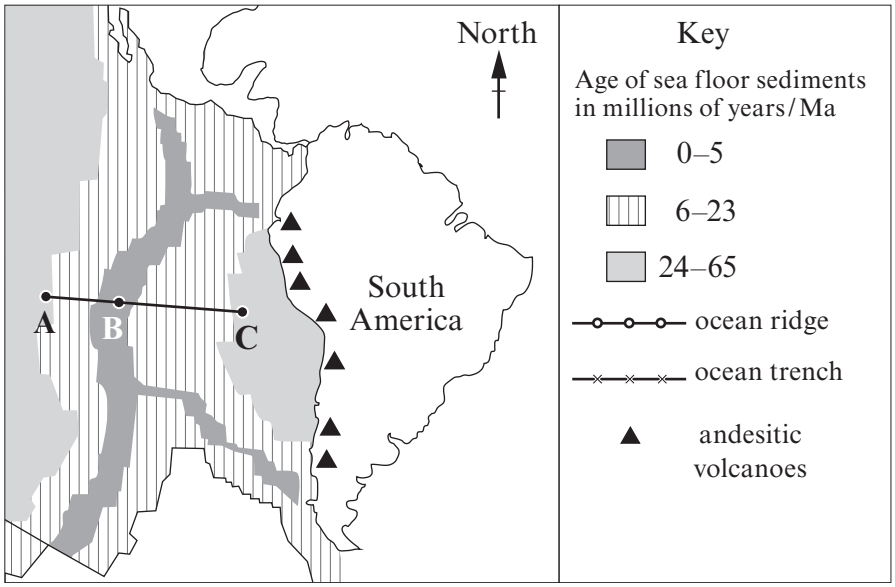

Figure 3a

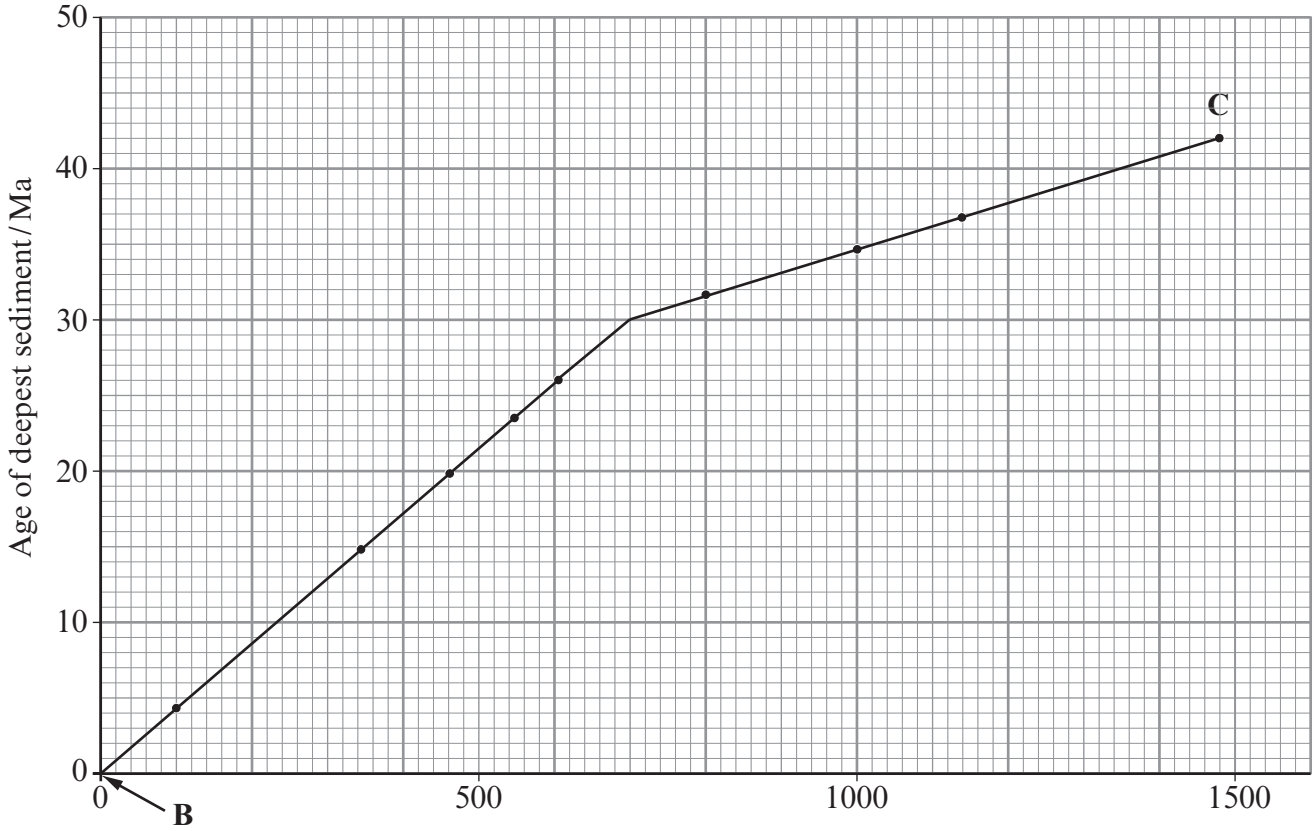

Figure 3b

Examiner only

(a) (i) Refer to **Figure 3a**. Using the symbols in the key mark on **Figure 3a**, the most likely position of:

1. An ocean ridge;

2. An ocean trench. [2]

(ii) Using **Figure 3a**, describe how the age of the Pacific Ocean floor varies along line **A-B-C**. [2]

.....

.....

.....

(b) Refer to **Figure 3b**.

(i) Calculate the average rate of spreading (in centimetres per year) from the divergent boundary over the **last 30** million years. Show your working. [2]

..... cm yr^{-1}

(ii) Describe how the rate of spreading has **changed** over the last 42 million years. [2]

.....

.....

.....

(iii) The data plotted on **Figure 3b** are based on the study of microfossils in sea floor sediment. Outline **one** other method that could be used to date the oceanic lithosphere. [2]

.....

.....

.....

(c) With reference to **Figure 3a** describe and explain the origin of the andesitic magma beneath the volcanoes along the western edge of South America. [3]

.....

.....

.....

.....

Examiner only

4. **Figure 4a** shows an exposure of granite on Dartmoor in south west England.

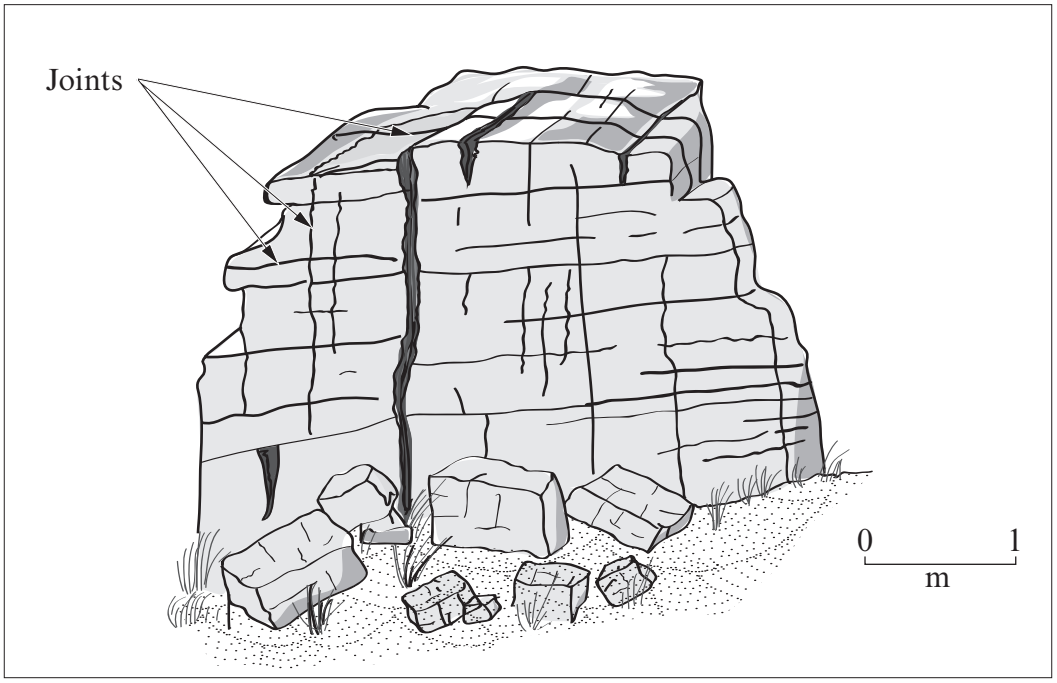

Figure 4a

(a) (i) Describe the pattern of joints shown in **Figure 4a**. [2]

.....

.....

.....

(ii) Suggest **one** possible way in which the joints may have formed in **Figure 4a**. [1]

.....

(iii) Name and describe **one** process that may be responsible for the loose angular blocks of rock at the base of the exposure shown in **Figure 4a**. [3]

Name .....

Description .....

.....

.....

(b) **Figure 4b** is a photograph of a sediment derived from the weathering and erosion of the granite shown in **Figure 4a**.

Examiner only

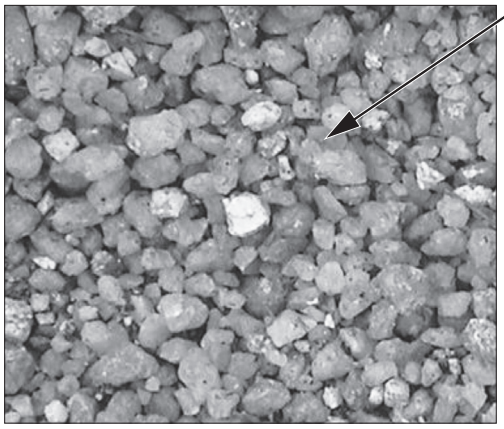

Figure 4b

	Mineral Content	
	Granite (**Figure 4a**)	Sediment (**Figure 4b**)
Quartz	40%	85%
Feldspar	55%	12%
Mica	5%	3%

Table 4c

(i) Using the Mineral Data Sheet, identify mineral **B** in **Figure 4b**. [1]

.....

(ii) Describe the size, shape and sorting of the sediment shown in **Figure 4b**. [3]

Size .....

Shape .....

Sorting .....

Refer to **Figure 4a**, **Figure 4b** and **Table 4c**.

(iii) Suggest reasons to account for the differences in mineral content between the granite in **Figure 4a** and the sediment in **Figure 4b**. You may wish to use the Mineral Data Sheet. [2]

.....

.....

.....

(iv) A student concluded that the sediment shown in **Figure 4b** had been formed by aeolian processes. Critically evaluate this statement. [3]

.....

.....

.....

.....

END OF PAPER