Surname	Centre Number	Candidate Number
Other Names		2

GCE A level

1215/04

S15-1215-04

GEOLOGY – GL5

Thematic Unit 4
Geology of the Lithosphere

A.M. TUESDAY, 16 June 2015

ONE of TWO units to be completed in 2 hours

	For Examiner's use only		
	Question	**Maximum Mark**	**Mark Awarded**
Section A	**1.**	**15**	
Section B	**2.**	**25**	
	3.		
	4.		
	Total	**40**	

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ADDITIONAL MATERIALS

In addition to this and one other examination paper, you will need a calculator.

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 **question 1** in Section A (15 marks) and **one** question from Section B (25 marks).

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.
You are reminded of the necessity for good English and orderly presentation in your answers.

Examiner only

SECTION A

1. **Figure 1a** is a simplified geological map of the island of Sumatra in the east Indian Ocean. **Figure 1b** is a cross section (**X**–**Y**) showing the distribution of earthquake foci across the Sumatran subduction zone.

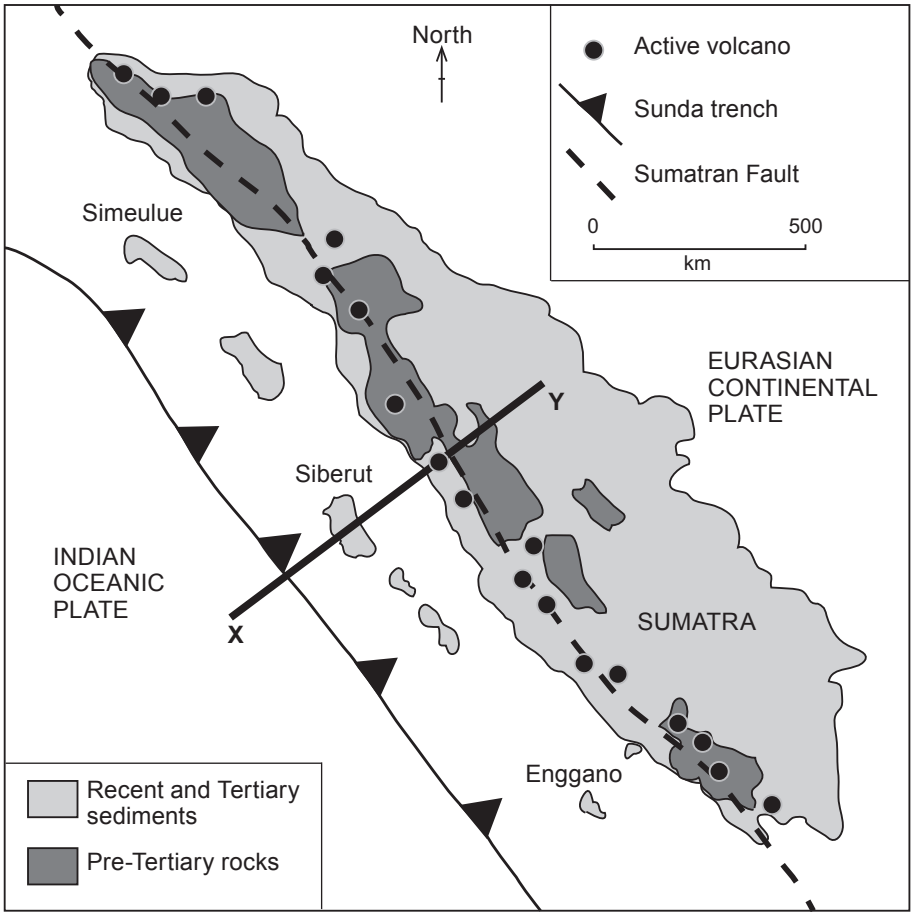

Figure 1a

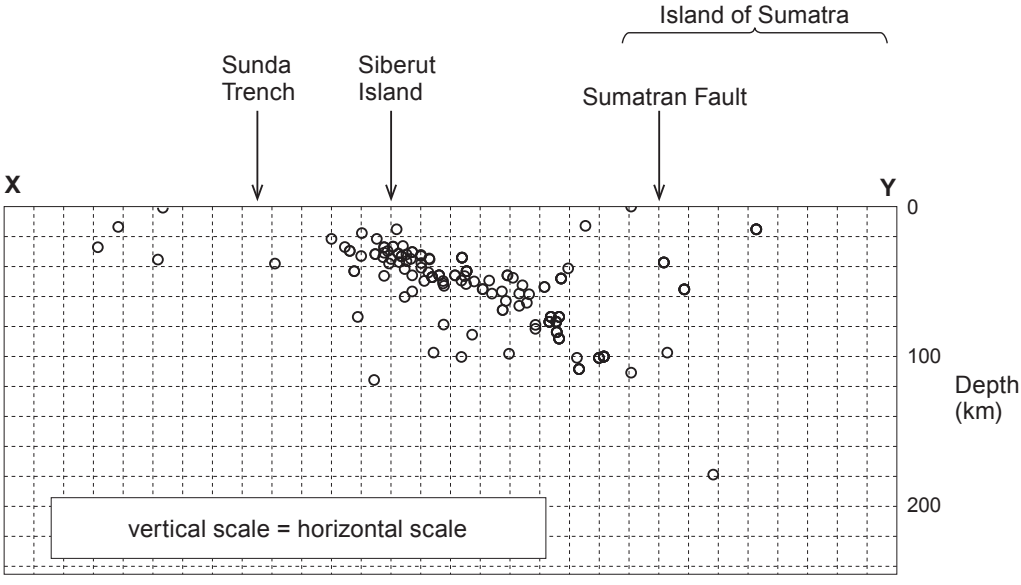

Figure 1b

Examiner only

(a) Describe the distribution of earthquake foci in **Figure 1b**. [3]

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.....

(b) (i) Draw and label on **Figure 1b** a line to show the probable position of the top of the subducted Indian Oceanic Plate. [2]

(ii) The Indian Oceanic Plate bends before it subducts. This may result in tensional forces at shallow depths in the plate. Label **one** earthquake focus (T →) on **Figure 1b** which may result from such a process. [1]

(iii) Earthquakes at shallow depths can also be generated as rising magma intrudes into brittle rocks. Label **one** earthquake focus (M →) on **Figure 1b** which may result from such a process. [1]

(c) The chain of islands stretching from Simeulue to Enggano on **Figure 1a** forms part of a modern day accretionary prism. Explain the evidence on **Figure 1a** to support this idea. [2]

.....

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.....

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Turn over.

Examiner only

(d) The **Pre-Tertiary rocks** of Sumatra can be divided into three main rock units (**Table 1**). These three units indicate that accretion has been occurring in the Sumatra region for more than 100 Ma. Explain the evidence in **Table 1** which supports this idea. [6]

Pre-Tertiary Rock Unit	Explanation of evidence
1. Altered peridotites, gabbros, dolerites and basalts (often pillowed)	....
2. Greywackes (turbidites) and fine-grained marine sediments	....
3. Andesite and basalt volcanics closely associated with reef limestones	....

Table 1

15

SECTION B

Answer **one** *question only.*

Write your answer in the remaining pages of this booklet.

2. *(a)* Describe how the rate **and** direction of seafloor spreading might be calculated from

- patterns of ocean magnetic anomalies
- mantle plume (hotspot) data.

(b) Evaluate the effectiveness of these two methods in determining the rate **and** direction of seafloor spreading.

[25]

3. *(a)* Describe the differences between oceanic and continental lithosphere in terms of

- composition
- thickness
- age.

(b) *"Our knowledge of the composition of the continental lithosphere is limited."* Evaluate this statement.

[25]

4. *"The strength of rocks and how they deform in the lithosphere is controlled solely by temperature."* Evaluate the validity of this statement. [25]

Turn over.

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END OF PAPER

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