Surname	Centre Number	Candidate Number
Other Names		2

GCE A level

1215/04

GEOLOGY – GL5

Thematic Unit 4
Geology of the Lithosphere

P.M. TUESDAY, 10 June 2014

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** shows the elevation above and the depth below sea level of the Earth's surface.

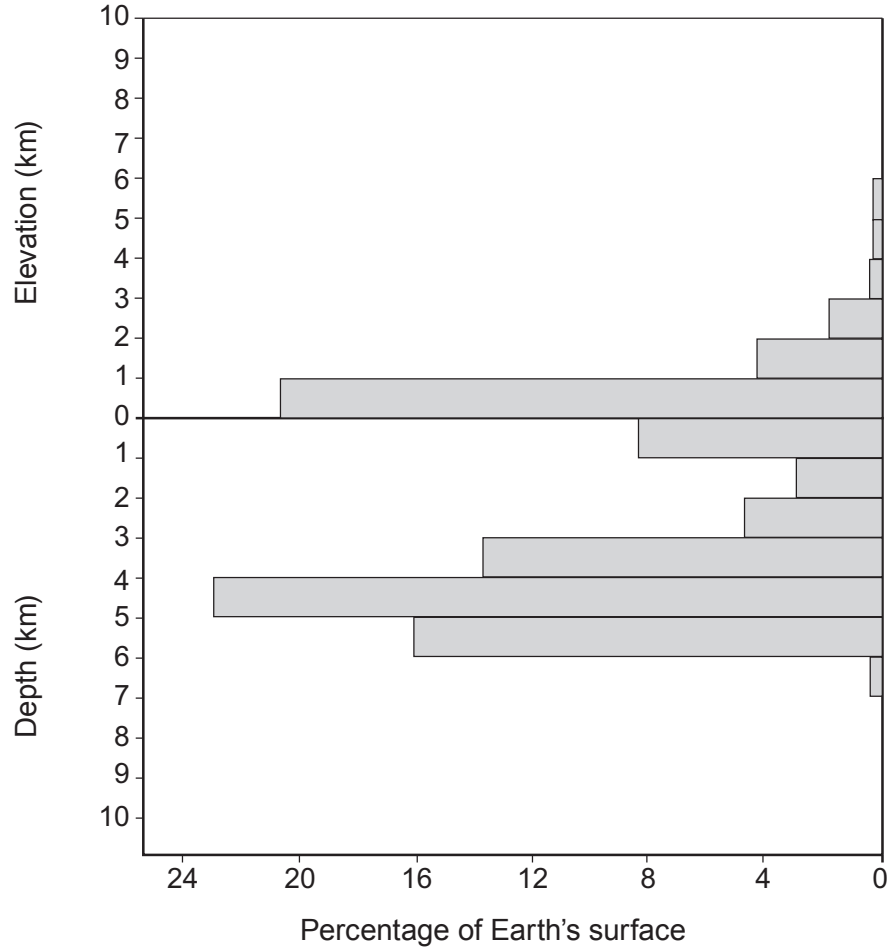

Figure 1a

(a) (i) Use **Figure 1a** to complete **Table 1**. [2]

Percentage of the Earth's surface with an elevation between 0 and 1 km	%
Percentage of the Earth's surface with an elevation above 3 km	%

Table 1

(ii) Explain why the percentage of the Earth's surface with an elevation above 3 km is so small. [3]

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Examiner only

Figure 1b shows the relationship between the elevation of the Earth's surface and the depth to the base of the crust.

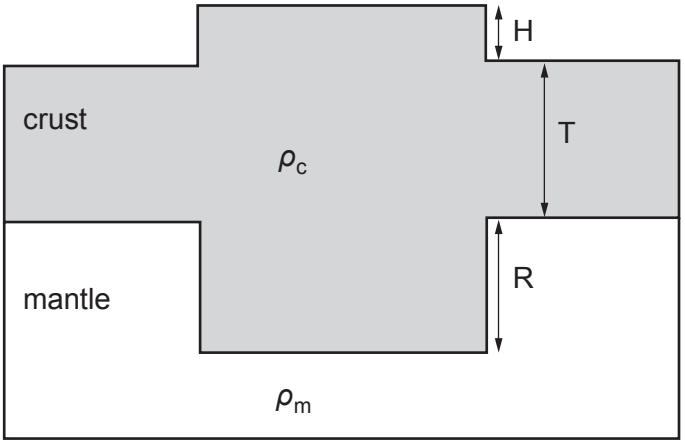

Figure 1b

H = height of a mountain above sea level
(the height of Mount Everest is 8850 m)
T = normal thickness of the crust
(the normal thickness of the crust in the Himalayan region is 40 km)
R = thickness of the root of a mountain
ρ_c = density of the crust, approximately 2700 kg m^{-3}
ρ_m = density of the mantle, approximately 3300 kg m^{-3}

(b) Use the data from **Figure 1b**.

(i) Calculate the thickness R of the root of Mount Everest in km. Show your working. [3]

R may be calculated using the formula: $R = \dfrac{H \times \rho_c}{\rho_m - \rho_c}$

..... km

(ii) Calculate the thickness of the continental crust beneath the summit of Mount Everest in km. Show your working. [2]

..... km

Turn over.

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(c) In mountain belts with very thick continental crust, the high pressures and temperatures can result in the base of the crust recrystallising to form the rock eclogite. A possible consequence of this recrystallisation is a process called delamination, as shown in **Figure 1c**.

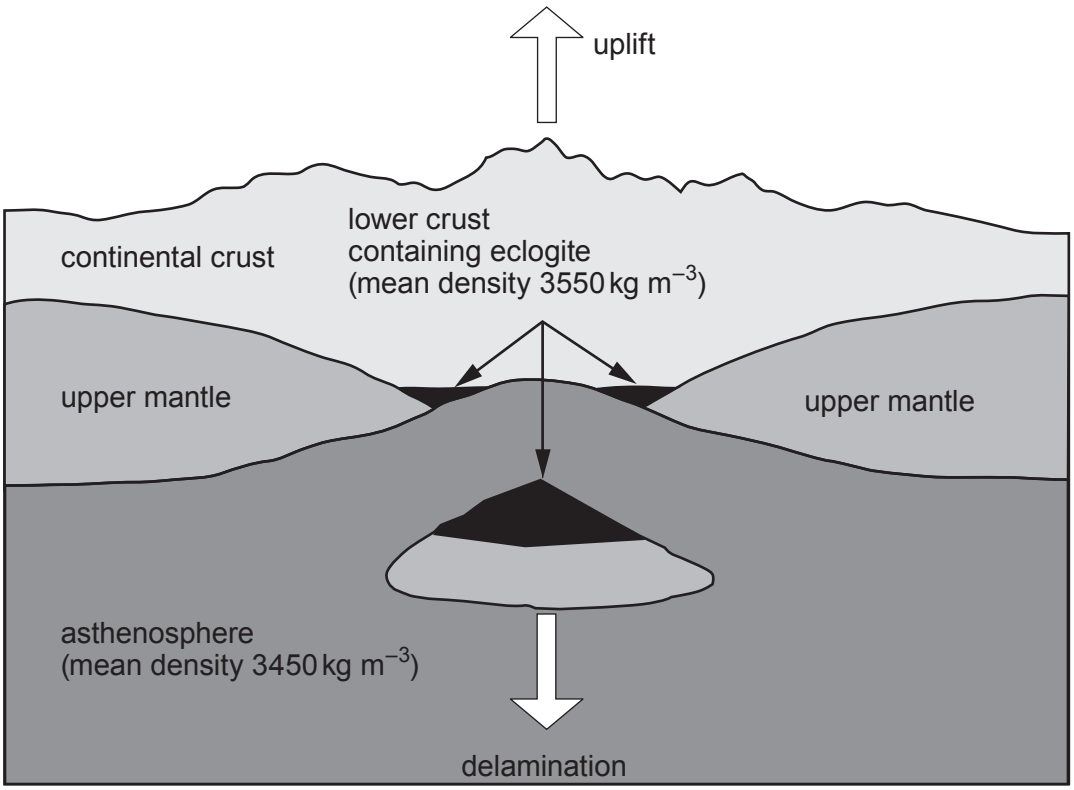

Figure 1c

(i) Using **Figure 1c** explain how delamination can take place. [3]

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(ii) Use the information given in **Figures 1b** and **1c** to explain why mountains experience uplift when delamination occurs. [2]

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.....

15

SECTION B

Answer **one** *question only.*

Write your answer in the remaining pages of this booklet.

2. Describe and evaluate the factors that influence the composition of the magma formed at

- constructive plate boundaries and
- destructive (island arc and cordilleran) plate boundaries. [25]

3. Describe and evaluate the role that seismology has played in determining the

- structure and
- composition of the lithosphere. [25]

4. *(a)* Describe and explain the pattern of surface heat flow across

- an active spreading centre and
- an active ocean-continent subduction zone.

(b) Evaluate the role that temperature has on the type of deformation a rock experiences. [25]

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END OF PAPER

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