Surname

Centre Number

Other Names

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**GCE A Level** 

1215/04

S17-1215-04

**GEOLOGY – GL5 Thematic Unit 4 Geology of the Lithosphere** 

THURSDAY, 8 JUNE 2017 – AFTERNOON

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.		
	3.	25	
	4.		
	Total	40	

# **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.

### **SECTION A**

2

1. Figure 1a shows the variation of heat flow across a section of ocean floor. Figure 1b is a crosssection showing the possible geological structure beneath this section of ocean floor.



Figure 1a



- (a) On Figure 1b draw a labelled arrow to show the position of the:
  - (i) Mohorovičić discontinuity (M  $\rightarrow$ )
  - (ii) base of the lithosphere  $(L \rightarrow)$

[2]

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# (i) Describe the variation in heat flow measurements across the ocean floor on Figure 1a. (ii) Using Figure 1b explain the variation in heat flow measurements across the section of ocean floor on Figure 1a.

(c) The age of the oceanic crust can be estimated by using the following equation

$$T = \left(\frac{H_d - H_r}{0.35}\right)^2$$

Formula key

T = the age of the oceanic crust (Ma) at a distance d (km) from the ocean ridge  $H_d$  = the depth below sea level (km) of the ocean floor at a distance d (km) from the ocean ridge

 $H_r$  = the depth below sea level (km) of the ocean ridge

### (i) Use Figure 1b to complete Table 1.

the depth below sea level of the ocean floor at location <b>X</b>	H <sub>d</sub> =	km
the depth below sea level of the ocean ridge	$H_r =$	km

# Table 1

(ii) Use your values from **Table 1** to calculate the age of the oceanic crust at location **X**. Show your working. [2]

..... Ма

[2]

(d)	Use <b>Figure 1a</b> , <b>Figure 1b</b> and your knowledge to explain the elevated relief of ocean ridges. [3]	Examiner only
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### **SECTION B**

5

### Answer one question only.

Write your answer in the remaining pages of this booklet.

- **2.** (a) Describe how the J. Tuzo Wilson cycle of ocean growth and destruction is supported by the size, structure and distribution of present day oceans.
  - (b) Evaluate the evidence for the J. Tuzo Wilson cycle being a cyclic process. [25]
- **3.** (a) Describe how the structure of an accretionary prism provides evidence for the process of accretion.
  - (b) Evaluate the role of accretion in the growth of continental crust. [25]
- **4.** *'The type of deformation a rock undergoes in the lithosphere is controlled primarily by depth'.* Evaluate this statement. [25]

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### Acknowledgements

Figures 1a and 1b adapted from Hamblin and Christiansen, 1995, Earth's Dynamic Systems Eighth Edition