| Candidate Name | Centre Number | Candidate Number |
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**WELSH JOINT EDUCATION COMMITTEE**
**General Certificate of Education**
**Advanced Subsidiary/Advanced**

**CYD-BWYLLGOR ADDYSG CYMRU**
**Tystysgrif Addysg Gyffredinol**
**Uwch Gyfrannol/Uwch**

453/01

# GEOLOGY - GL3

## GEOLOGY AND THE HUMAN ENVIRONMENT

P.M. WEDNESDAY, 11 January 2006

(1 hour 15 minutes)

**For Examiner's Use only.**

| | | |
|---|---|---|
| **Section A** | **1** | |
| | **2** | |
| **Section B** | **3** | |
| | **4** | |
| | **5** | |
| | **Total 50** | |

**ADDITIONAL MATERIALS**

In addition to this examination paper, you may require a calculator.

**INSTRUCTIONS TO CANDIDATES**

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

Answer **all** questions from Section **A** and **one** from Section **B**.

Write your answer 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.

Candidates are reminded that marking will take into account the use of examples and the quality of communication used in answers, especially in the structured essay.

No certificate will be awarded to a candidate detected in any unfair practice during the examination.

## SECTION A

*Answer* **both** *questions,* **1** *and* **2,** *on the lines provided in the question.*

**1.** **Figure 1** is a map showing details of the SE Asian earthquake disaster on Boxing day 2004.

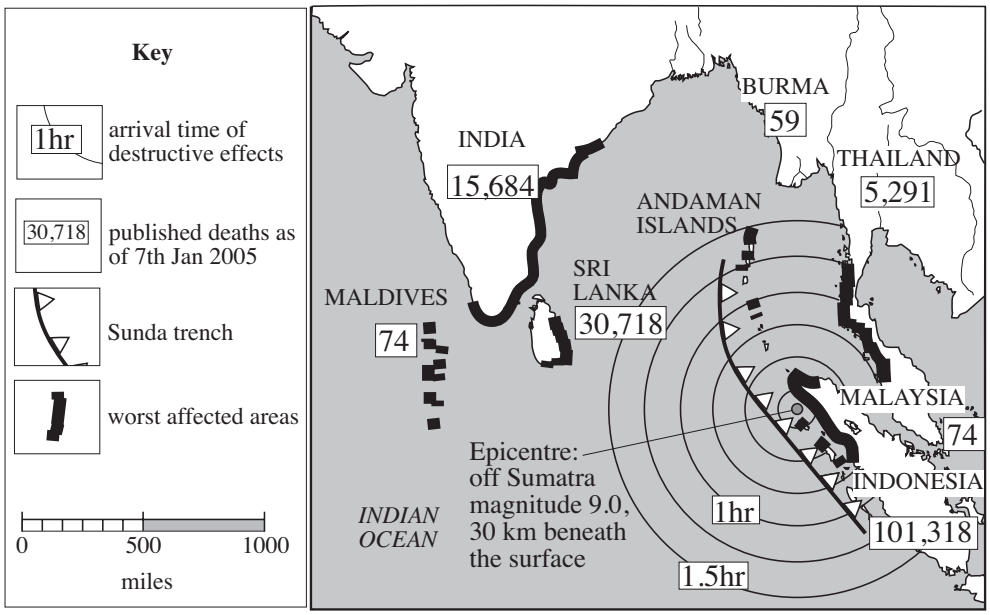


**Figure 1**

*(a)* With reference to the theory of plate tectonics, explain why an earthquake occurred at this location. [2]

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(*b*) (i) Estimate how long it took for the destructive effect of the earthquake to reach Sri Lanka. [1]

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(ii) Explain how this earthquake could have caused damage and loss of life on such a scale, so far from its epicentre and over such a long time. [3]

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*(c)* Despite the loss of human life, the wild animal population along the coast generally survived the catastrophe more or less unharmed. Explain this anomaly and suggest how it may help in earthquake prediction. [3]

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*(d)* Explain why the risk of damage to property and loss of life from earthquake hazards is often greater in areas with lower levels of economic development. [3]

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**Total 12 marks**

**2.** **Figure 2** is a simplified geological section through part of a volcano on the island of Tenerife. It shows one method used to extract the island's fresh water resources.

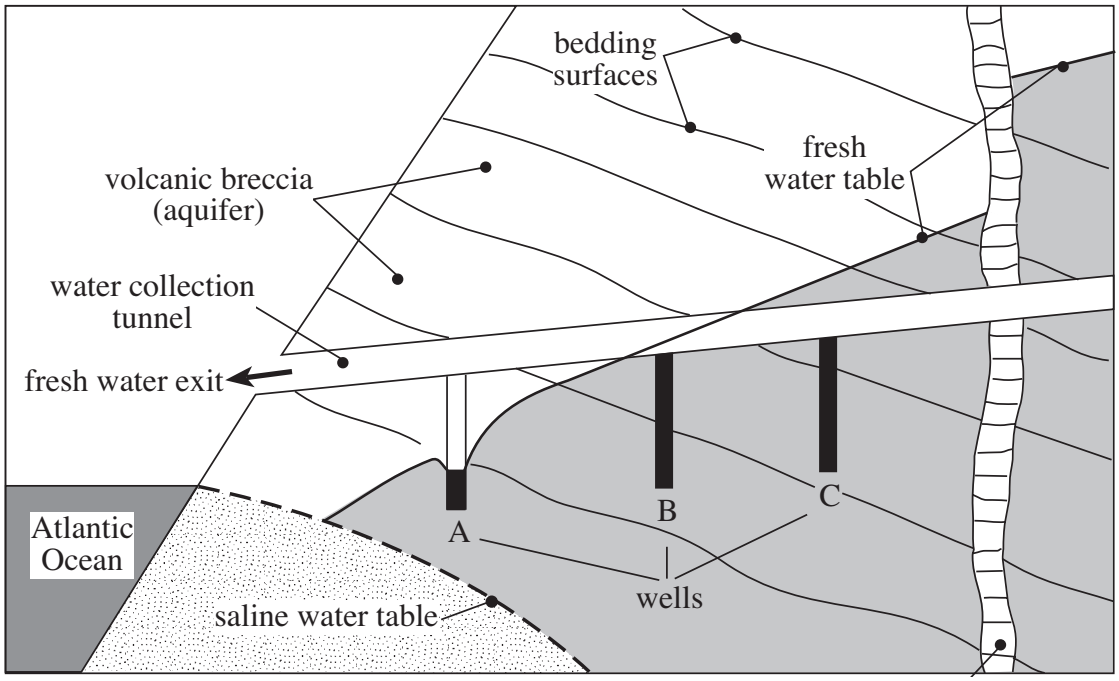


**Figure 2**

*(a)* (i) State the type of igneous body represented by structure **X**.
Give a reason for your answer. [2]

Type .....

Reason .....

(ii) Explain why the fresh water table is at different heights on either side of structure **X**. [2]

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*(b)* Describe **two** geological characteristics of the volcanic breccia (e.g. texture, structure) that would make the rock a good aquifer. [2]

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*(c)* (i) Give **one** reason why **well C** would result in fresh water flowing naturally into the water collection tunnel without the need for pumping. [1]

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(ii) Explain why the **natural** flow of fresh water from **well B** might be less reliable than from **well C**. [2]

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(iii) Over-extraction by pumping requires the continual extension of the water tunnels and wells to maintain present flow rates. Describe **two** potential hazards from such overuse of the limited water supply. [2]

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*(d)* Tenerife is an active volcano, although currently there are no signs of an immediate eruption. Explain how **current volcanic** hazards might make working conditions difficult during the excavation of the island's tunnels and wells. [2]

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**Total 13 marks**

## SECTION B

*Answer* **one** *question from this Section on the following pages.*

*You are advised to make use of examples where possible in your answer.*

**EITHER,**

**3.** *(a)* Describe the geological problems often associated with the extraction of rock or minerals from the ground. [15]

*(b)* Explain the relative importance of **two** of these different problems with reference to one or more mining operations you have studied. [10]

**OR,**

**4.** Using one or more **case studies**,

*(a)* describe the extent to which the destructive effects of lava flows might be controlled. [10]

*(b)* explain the difference in the hazards typically associated with the eruption of

(i) basaltic (silica poor) and

(ii) andesitic (silica rich) magmas. [15]

**OR,**

**5.** *(a)* Describe the engineering activity that can speed up or slow down the effects of longshore drift in coastal areas. [10]

(*b*) Explain the hazardous effects of such interference with the coastal system. [15]

Examiner only
*Arholwr yn unig*



**Turn over.**

Examiner only
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Examiner only
*Arholwr yn unig*



**Turn over.**

Examiner only
*Arholwr yn unig*