

Candidate Name	Centre Number	Candidate Number

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. THURSDAY, 11 January 2007

(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 past and potential volcanic hazards for the island of Tenerife.

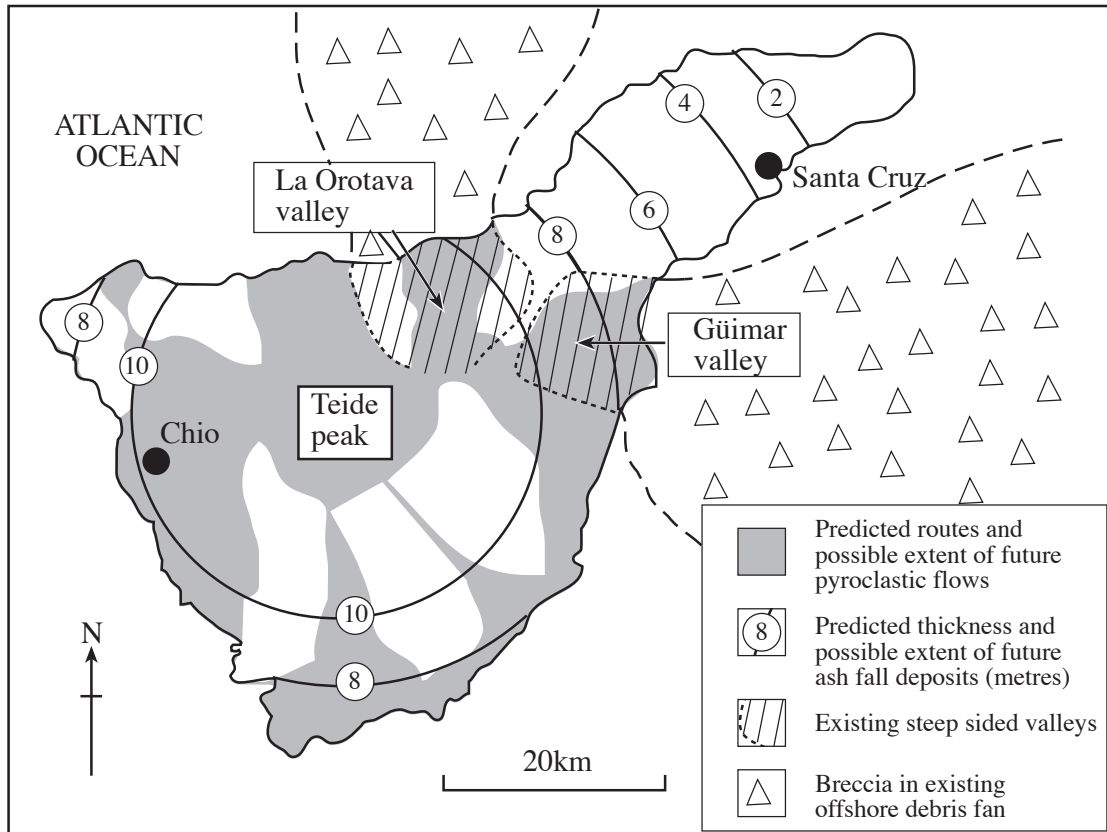


Figure 1

Refer to the data in Figure 1.

(a) (i) For each of the following hazards, state **one** characteristic that may cause loss of life and property damage during a volcanic eruption. [2]

Pyroclastic flows

Ash falls

(ii) Contrast the potential hazards that could occur at Santa Cruz and Chio if the volcano erupted as predicted. [2]

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(iii) Describe the type of data that might have been collected in order to produce this hazard map. [3]

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(b) (i) Using the evidence from **Figure 1**, explain how the valleys of Güimar and La Orotava might have been formed. [2]

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(ii) Explain how the formation of these valleys may have caused devastation in coastal areas many hundreds of kilometres from Tenerife. [3]

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Total 12 marks

2. **Figure 2a** is a map and **Figure 2b** a geological section of an area of coastline in southern England which is undergoing retreat.

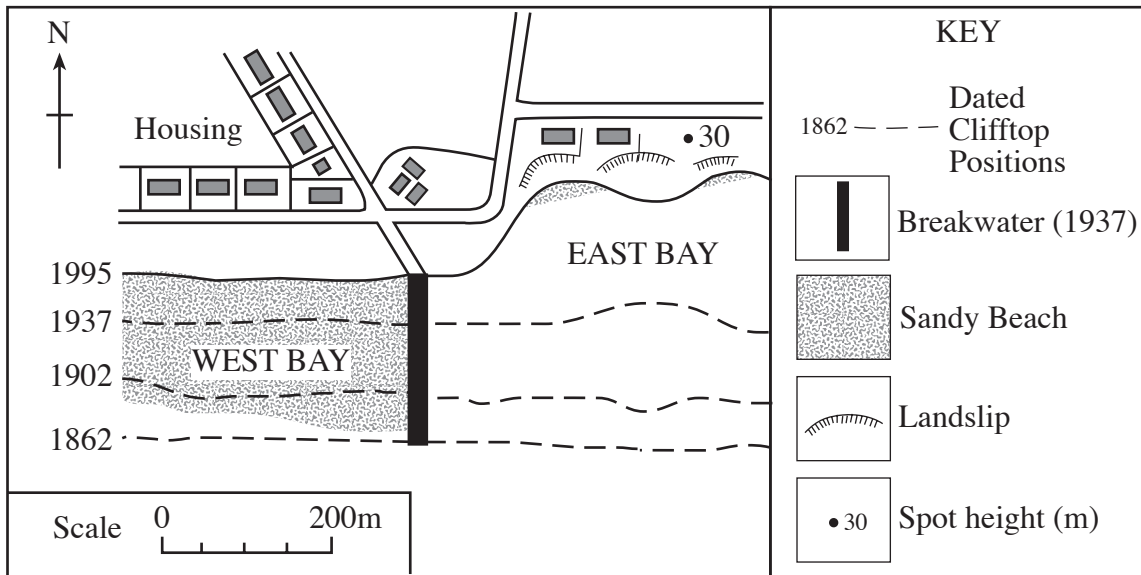


Figure 2a

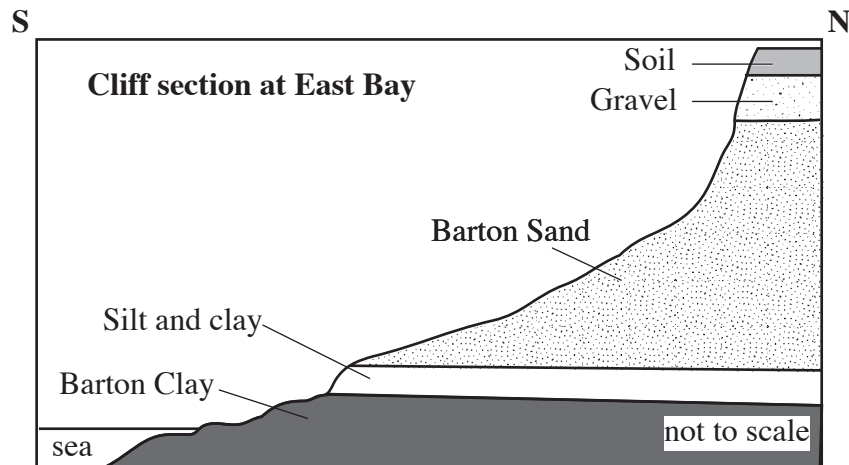


Figure 2b

(a) (i) Calculate the average rate of retreat in West Bay measured at the breakwater between 1862 and 1995. Show your working. [2]

Rate of retreat m/yr

(ii) Explain the difference in the rates of retreat of East and West Bays **since** the construction of the breakwater in 1937. [2]

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(b) **Figure 2c** shows the influence of slope height on stable slope angles in saturated clay.

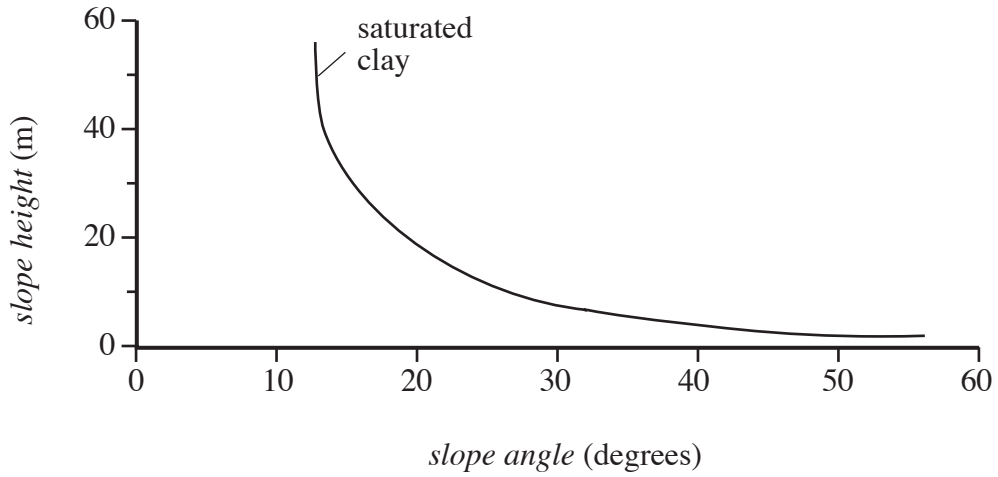


Figure 2c

Refer to **Figure 2c**.

- (i) State the minimum angle at which the 30 m high cliffs at East Bay would become stable if they were composed entirely of saturated clay. [1]

Stable angle

- (ii) Complete **Figure 2c** by drawing a line to represent the probable relationship between cliff height and stable slope angles in **dry** clay. (The stable slope angle for a 30 m high cliff in dry clay is 35 degrees). [2]

- (c) Using **Figure 2b**, explain how the local geology has influenced the way in which the coast has retreated. [3]

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- (d) From your knowledge, explain the use of **one** measure that might help remedy the coastal instability in **East Bay**. [3]

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Total 13 marks

Turn over.

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) Explain why many of the world's most hazardous (usually explosive) volcanoes are confined to a distinct zone around the Pacific. [15]
- (b) Describe how the hazards associated with volcanoes **and** earthquakes and their management might be similar. [10]

OR,

4. (a) Describe how groundwater pollution can result from the following human activities:
- (i) waste disposal;
 - (ii) mining. [15]
- (b) For **one** of the human activities in (a), explain how the problems associated with groundwater pollution might be overcome or reduced. [10]

OR,

5. (a) Using annotated diagrams, explain how problems of ground stability may be associated with **two** of the following:
- (i) dip of strata;
 - (ii) orientation of rock cleavage, joint and fault patterns;
 - (iii) variations in the water table. [15]
- (b) Describe how sites of potential ground instability may be monitored. [10]

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