

Candidate Name	Centre Number	Candidate Number
		2



GCE AS/A level

1213/01

New AS

**GEOLOGY - GL3
GEOLOGY AND THE HUMAN
ENVIRONMENT**

P.M. THURSDAY, 8 January 2009

1¼ hours

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 answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

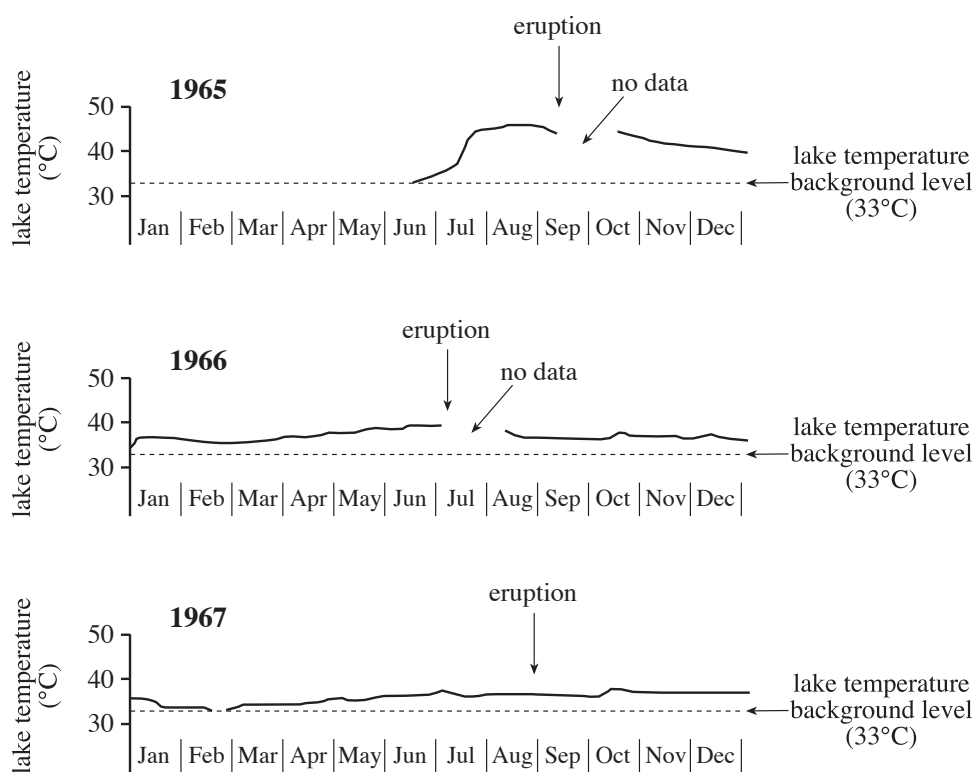
The number of marks is given in brackets at the end of each question or part-question.

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.

SECTION A

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

1. **Figure 1** shows volcanic crater lake temperatures above the background level (33°C) before and after the eruptions of Taal Volcano (Philippines) between 1965 and 1967. **Table 1** is a partly completed chart of the changes in crater lake temperatures during this period.



Adapted from: Volcanoes(1997)
Decker & Decker (W.H. Freeman)

Figure 1

Year	Number of degrees above lake background level (33°C) at the time of the eruption	Number of months prior to eruption that temperature was recorded above background level (33°C)
1965	• °C	• months
1966	6°C	Temp did not fall to background temperature since previous eruption
1967	4°C	6 months

Table 1

- (a) State **two** volcanic hazards associated with crater lakes that might present a danger to the local population. [2]

Hazard 1

Hazard 2

- (b) Complete **Table 1** to show
 - (i) the number of degrees the crater lake temperature rose above its background level at the time of the **1965** eruption, [1]
 - (ii) the number of months before the **1965** eruption that the crater lake temperature was recorded above its background level (33°C). [1]

- (c) Explain why volcanic crater lake temperatures might rise prior to an eruption. [2]

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- (d) Explain how the data (**Figure 1** and **Table 1**) suggest that crater lake temperatures alone might not be reliable in forecasting eruptions of Taal Volcano. [3]

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- (e) Using your knowledge, explain the use of **one** other method that might be employed in predicting volcanic eruptions. [3]

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Total 12 marks

2. **Figure 2** shows data affecting mining subsidence at two coal mines (A and B).

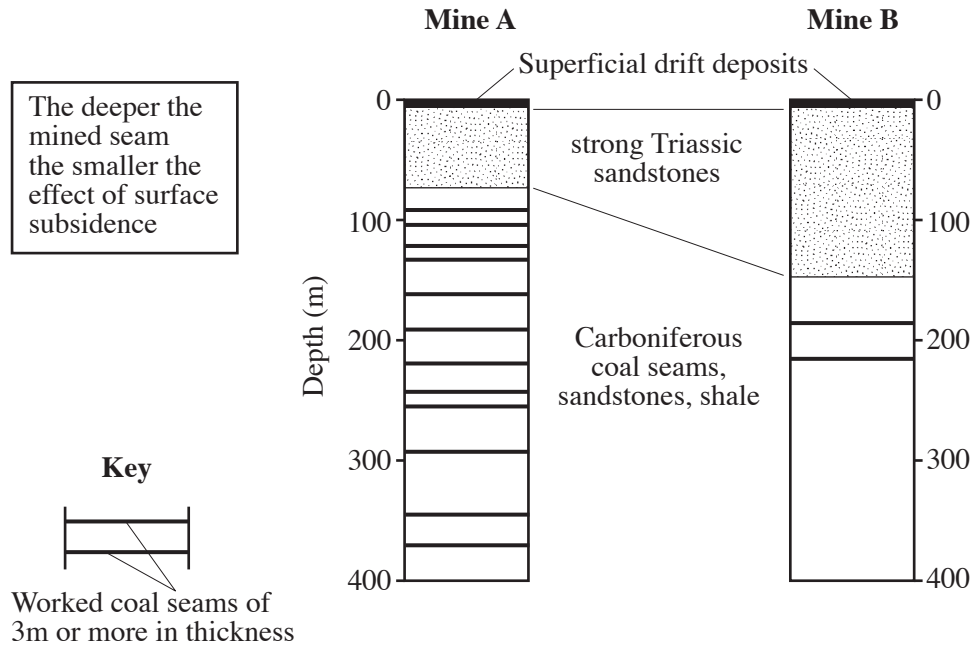


Figure 2

Mining factors	Mine A	Mine B
Date of initial mining	1922	1962
Depth to water table	10m	12m
Thickness of superficial drift deposit	8m	6m
Thickness of Triassic sandstones	63m	•
Depth of deepest worked seam	•	213m
Number of worked coal seams of 3 metre or more in thickness	12	2
Total surface subsidence to date (since initial mining)	3.36m	0.08m

Table 2

Refer to **Figure 2** and **Table 2**.

- (a) Complete **Table 2** by estimating
 - (i) the depth of the deepest worked seam in **Mine A**, [1]
 - (ii) the thickness of Triassic sandstones in **Mine B**. [1]
- (b) Explain how mining can result in subsidence at the surface. [2]

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- (c) Assess the effects of any **three** mining factors in **Table 2** that might account for the difference in the total subsidence of **Mine A** compared to **Mine B**. Explain your answers. [6]

Factor 1

Explanation

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Factor 2

Explanation

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Factor 3

Explanation

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- (d) Using your knowledge, describe **one** geological hazard, **other than subsidence**, often associated with abandoned mine workings. [3]

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Total 13 marks

SECTION B

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

*The marks you will be awarded in your essay take into account:
evidence of geological knowledge and understanding;
the use of geological examples;
legibility, accuracy of spelling, punctuation and grammar;
the selection of an appropriate form and style of writing;
the organisation of material, and use of geological vocabulary.*

EITHER,

3. (a) Describe the differences between the magnitude and intensity of an earthquake event and the scales used in their measurement. [10]
- (b) Using diagrams, explain how the dip and orientation of rock discontinuities (bedding, cleavage, joint and fault planes) and rock strength might affect ground stability during an earthquake event. [15]

OR,

4. (a) Describe, with reference to one or more case studies, how the destructive effects of volcanoes may be managed and controlled. [10]
- (b) Explain what geological factors might be investigated when developing a hazard map for an active volcano. [15]

OR,

5. (a) Using diagrams, describe how the over pumping of an aquifer can result in contamination of the water supply. [10]
- (b) A quarry has been proposed as a landfill site. Explain the properties of the rock forming the quarry that you would investigate to assess the suitability of the quarry as a landfill site. [15]

