



GCE AS/A level

1213/01

GEOLOGY – GL3

Geology and the Human Environment

A.M. MONDAY, 23 May 2016

1 hour 15 minutes plus your additional time allowance

Surname _____

Other Names _____

Centre Number _____

Candidate Number 2 _____

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
Section A		
1.	13	
2.	12	
Section B		
3.	25	
4.		
5.		
Total	50	

ADDITIONAL MATERIALS

In addition to this examination paper, you will need a calculator.

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball-point pen or your usual method.

Write your name, centre number and candidate number in the spaces provided on the front cover.

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 questions.

1. FIGURE 1a opposite is a simplified geological section through part of a volcanic island. It shows one method used to extract the island's fresh water by pumping from wells.

(a)(i) State the type of igneous body represented by structure X in FIGURE 1a. Give ONE reason for your answer. [2]

STRUCTURE X _____

REASON _____

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

(iii) Draw a line on FIGURE 1a to show the continuation of the fresh water table. [2]

(b)(i) Describe the texture of the volcanic ash in FIGURE 1b (opposite page 4). [2]

1(b)(ii) Explain why the volcanic ash makes a good aquifer. [2]

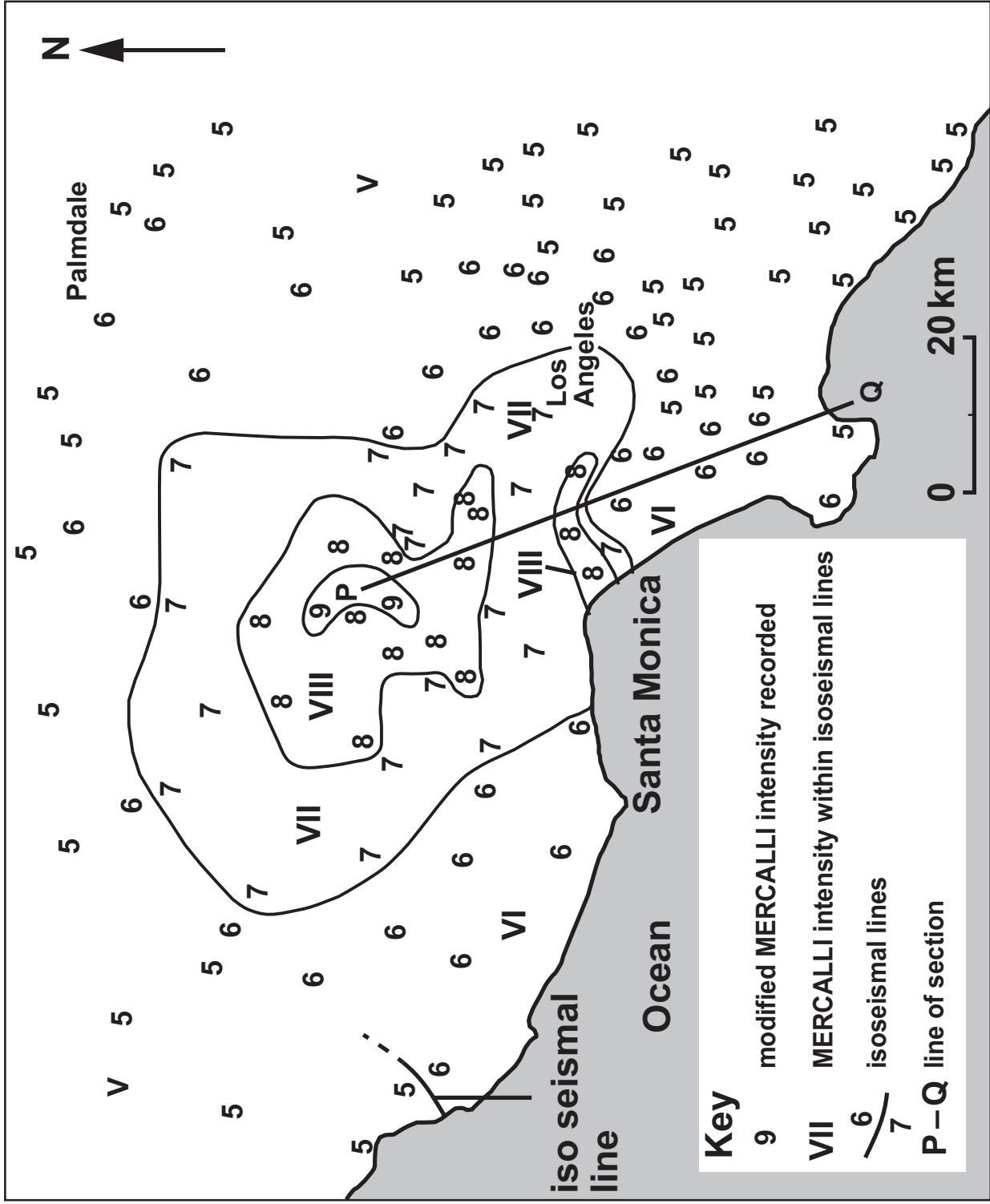
(c) Explain why the over-extraction of fresh water in FIGURE 1a might lead to a future water supply problem. [3]

2. **FIGURE 2a** opposite is a simplified map of Southern California showing intensity data from the 1994 Northridge earthquake (magnitude 6.7).

Refer to **FIGURE 2a**.

- (a)(i) Using a labelled arrow (\downarrow **E**), mark the most likely position of the earthquake epicentre on **FIGURE 2a**. [1]
- (ii) Complete **FIGURE 2a** by drawing in the intensity contour (isoseismal line) to represent the modified Mercalli intensity value **VI (6)**. [2]

FIGURE 2a



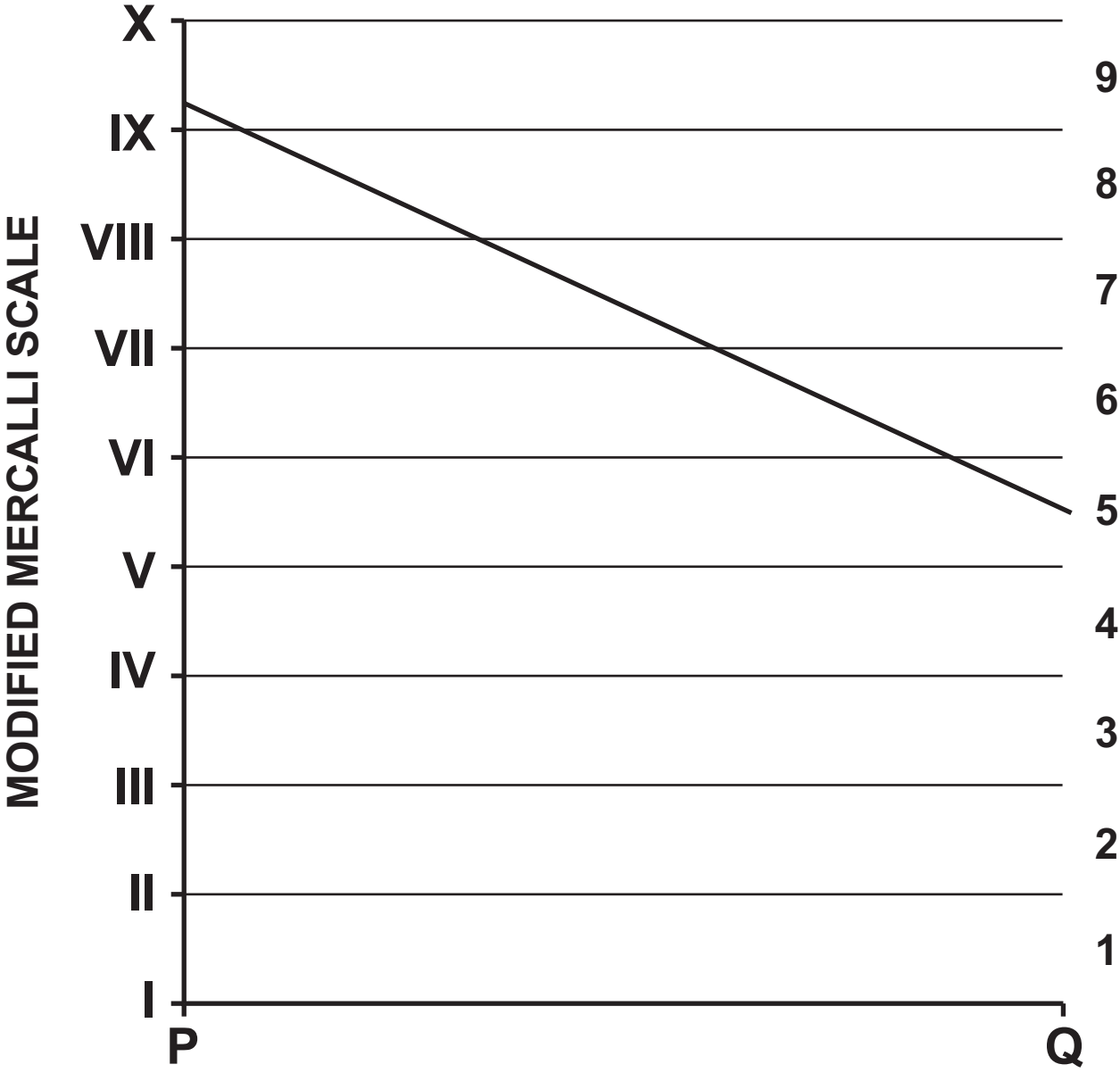
2(b) For each of the Mercalli intensity descriptions below, complete the chart by assigning the correct Mercalli intensity value from the following: **VI, IX, XII**. [2]

Modified Mercalli intensity descriptions	Modified Mercalli intensity value
vibrations - similar to a passing lorry	III
waves form on ground surface	
ground cracks, pipes break	
trees sway, falling objects	

2(c) FIGURE 2b opposite shows the expected relationship between modified Mercalli intensity values and distance along the line P–Q on FIGURE 2a.

(i) Describe and explain the relationship on FIGURE 2b. [2]

FIGURE 2b



2(c) (ii) Using FIGURE 2a, draw a line on FIGURE 2b to show how the OBSERVED Mercalli intensity varies with distance along the transect P–Q. [2]

(iii) With reference to FIGURE 2a and FIGURE 2b, explain why Mercalli values do not always follow the expected relationship.

[3]

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 geological factors that need to be considered in order to avoid ground instability in major civil engineering works. [10]**
- (b) Explain how civil engineering can be used to avoid interference with the coastal system (coastal erosion and deposition, longshore drift). [15]**

OR,

- 4(a) Describe how surface groundwater pollution can result from EACH of the following human activities.**
- (i) Waste disposal**
 - (ii) Mining [10]**
- (b) For ONE of the human activities in (a), explain how the problems associated with groundwater pollution might be overcome or reduced. [15]**

OR,

5(a) Describe the extent to which TWO of the following can be used to predict earthquakes.

- (i) Groundwater levels and pressure**
- (ii) Ground movement**
- (iii) Radon gas emissions [10]**

(b) Using one or more case studies explain the relationship between earthquakes and active fault zones. [15]

FIGURE 1a

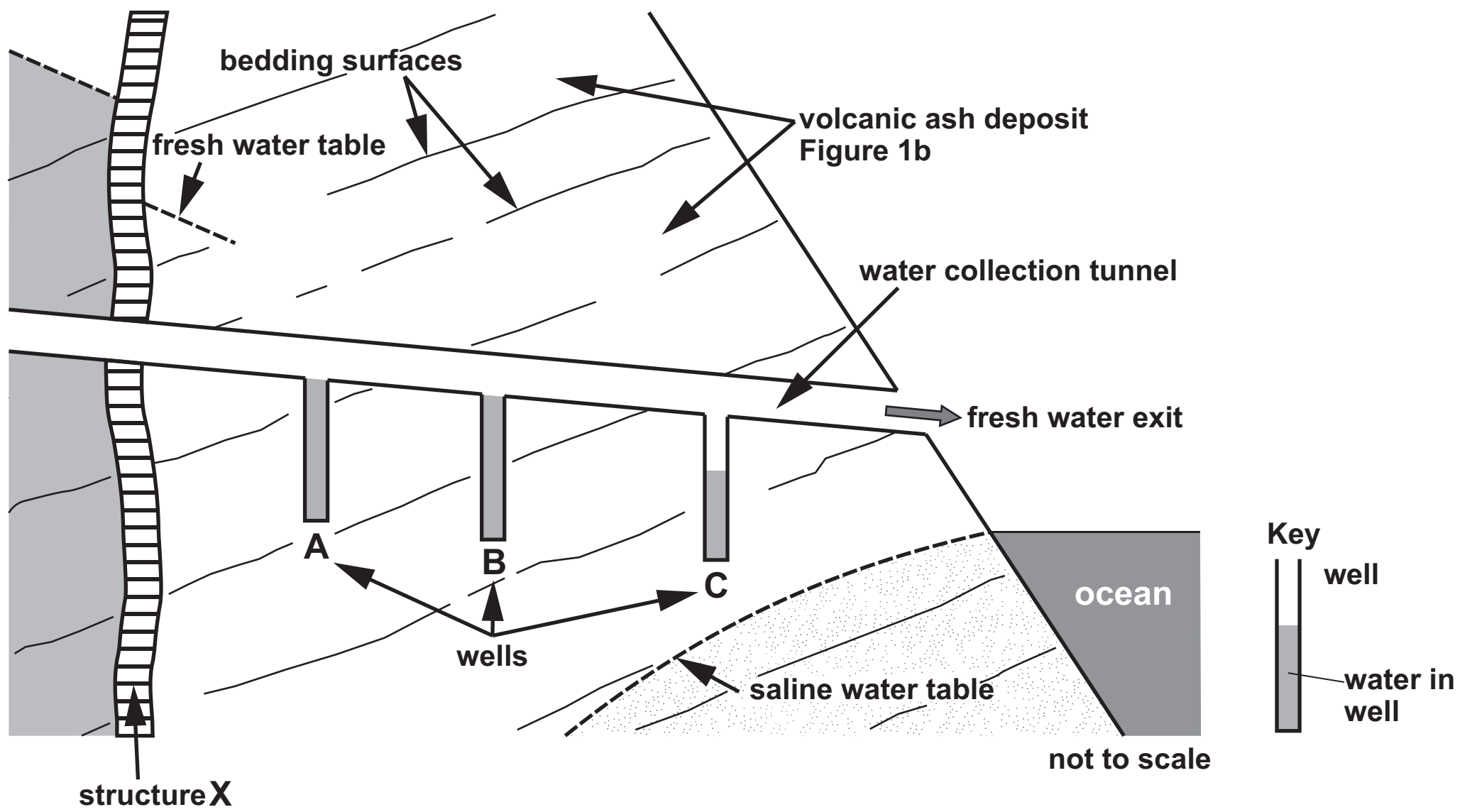


FIGURE 1b

