



GCE AS/A level

1211/01

GEOLOGY - GL1

FOUNDATION UNIT

P.M. FRIDAY, 18 May 2012

1 hour plus your additional time allowance

Surname _____

Other Names _____

Centre Number _____

Candidate Number 2 _____

		Examiner only
1.	14	
2.	17	
3.	17	
4.	12	
Total	60	

ADDITIONAL MATERIALS

In addition to this examination paper, you will need a copy of the MINERAL DATA SHEET.

INSTRUCTIONS TO CANDIDATES

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

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

Answer ALL questions 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.

You are reminded that marking will take into account the use of examples and the quality of communication used in your answers.

GL1 – FOUNDATION GEOLOGY

Answer ALL questions.

1. FIGURE 1a opposite shows an assemblage of fossils on a bedding surface of rock R.

(a) Refer to FIGURE 1a.

(i) Name the hard parts labelled X and Y. [2]

Hard part X _____

Hard part Y _____

(ii) State which of the following rocks is most likely to be rock R. [1]

Limestone

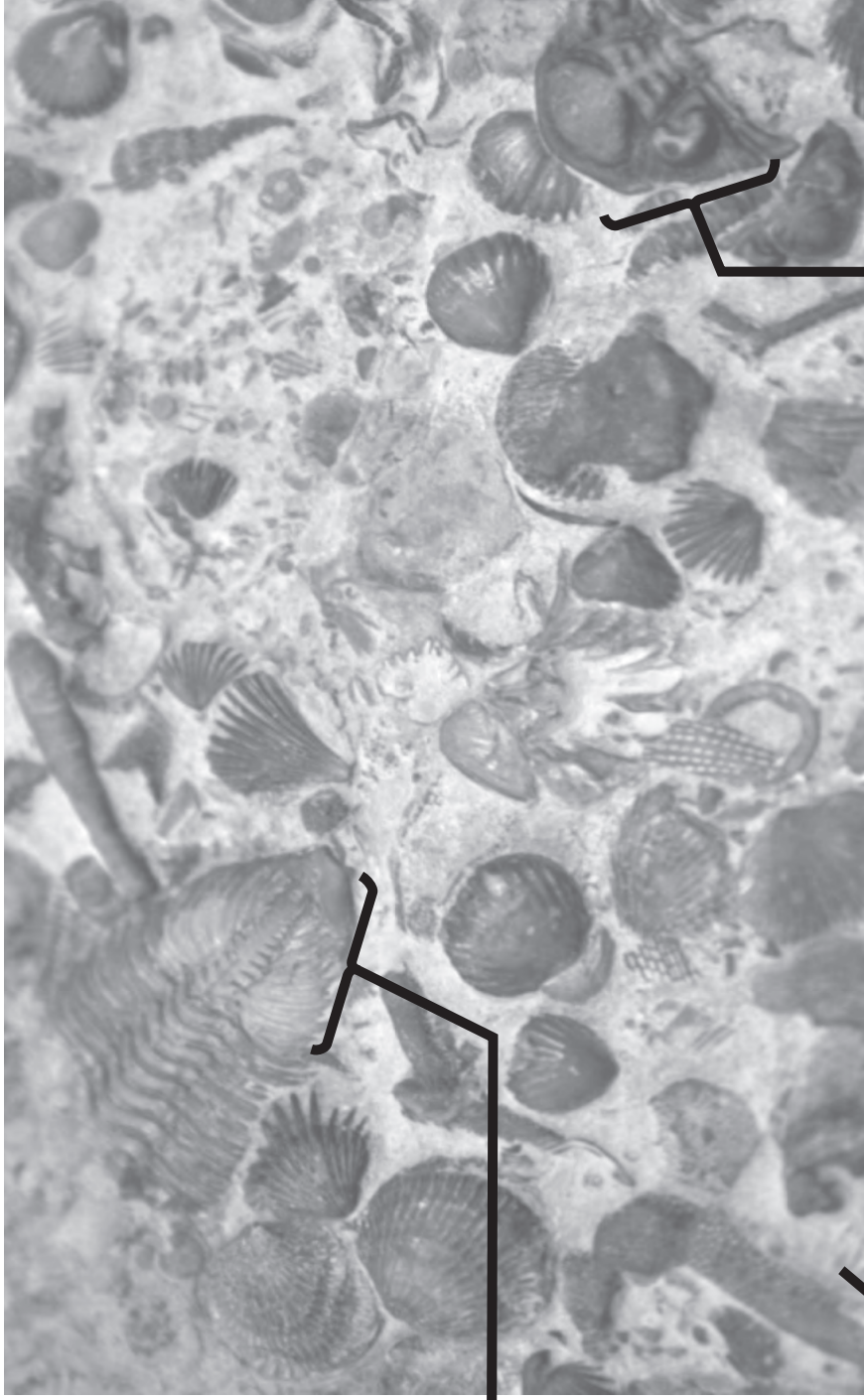
Shale

Conglomerate

Granite

Rock R _____

FIGURE 1a



feature Y

feature X

**rock R containing
more than 80%
calcium carbonate**

**0 2 4
cm**

Source: www.britainloveswikipedia.org
Author: Mike Peel

1(b) With reference to FIGURE 1a describe the environment in which rock R was deposited. Give reasons for your answer. [3]

1(c) A student has concluded that the fossils in FIGURE 1a are preserved as a LIFE ASSEMBLAGE. Evaluate this statement, giving your reasons. [3]

FIGURE 1b opposite shows the time ranges of selected trilobite species (A-E).

1(d) Refer to FIGURE 1b.

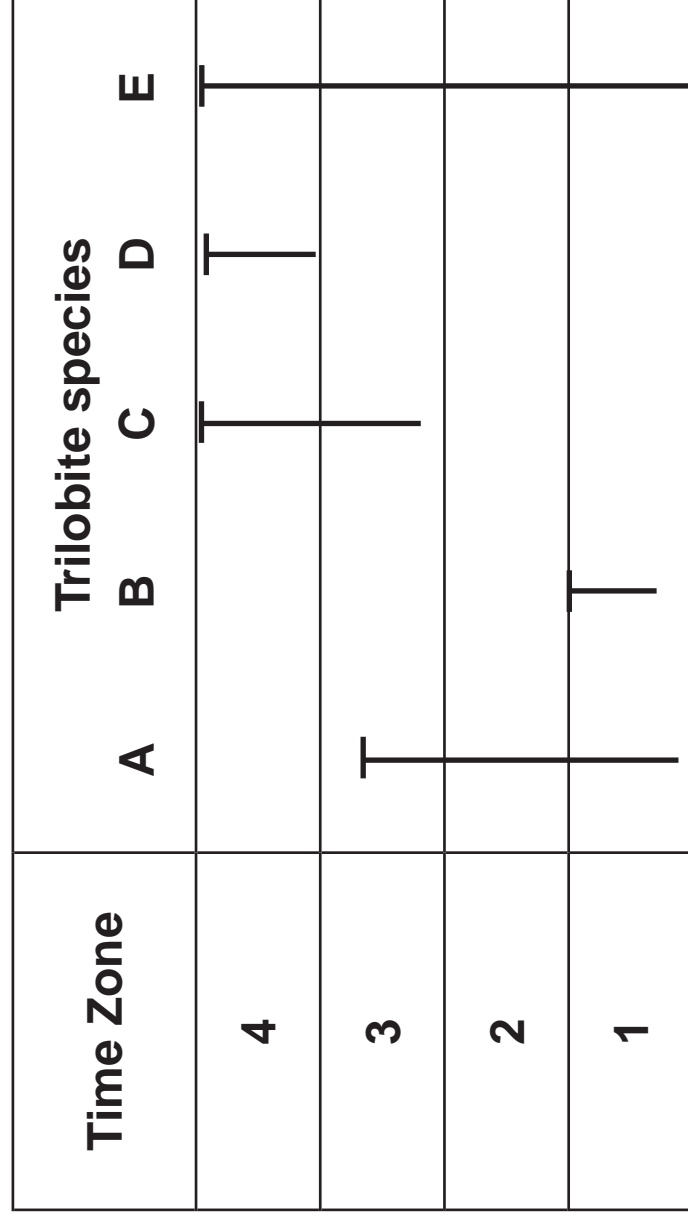
- (i) A bedding surface contains specimens of species A and C. State during which time zone (1-4) it is most likely to have been deposited. Give a reason for your answer.**

[2]

Time Zone _____

Reason _____

FIGURE 1b



Extinction
Time range

1(d) (ii) A bedding surface contains specimens of species B, D and E. One of these is a derived fossil. State during which time zone (1-4) the bedding surface was deposited. Explain your reasoning. [3]

Time Zone _____

Explanation _____

TOTAL 14 MARKS

2. **FIGURE 2a** opposite shows the travel paths of **P-waves** and **S-waves** for an earthquake. **FIGURE 2b** opposite shows a seismogram for the earthquake shown in **FIGURE 2a**.

- (a) (i) Show the epicentre of this earthquake on **FIGURE 2a**, with an arrow labelled **E** (**E →**). [1]

- (ii) Explain why no **S-waves** are recorded in the **S-wave shadow zone**. [2]

FIGURE 2a

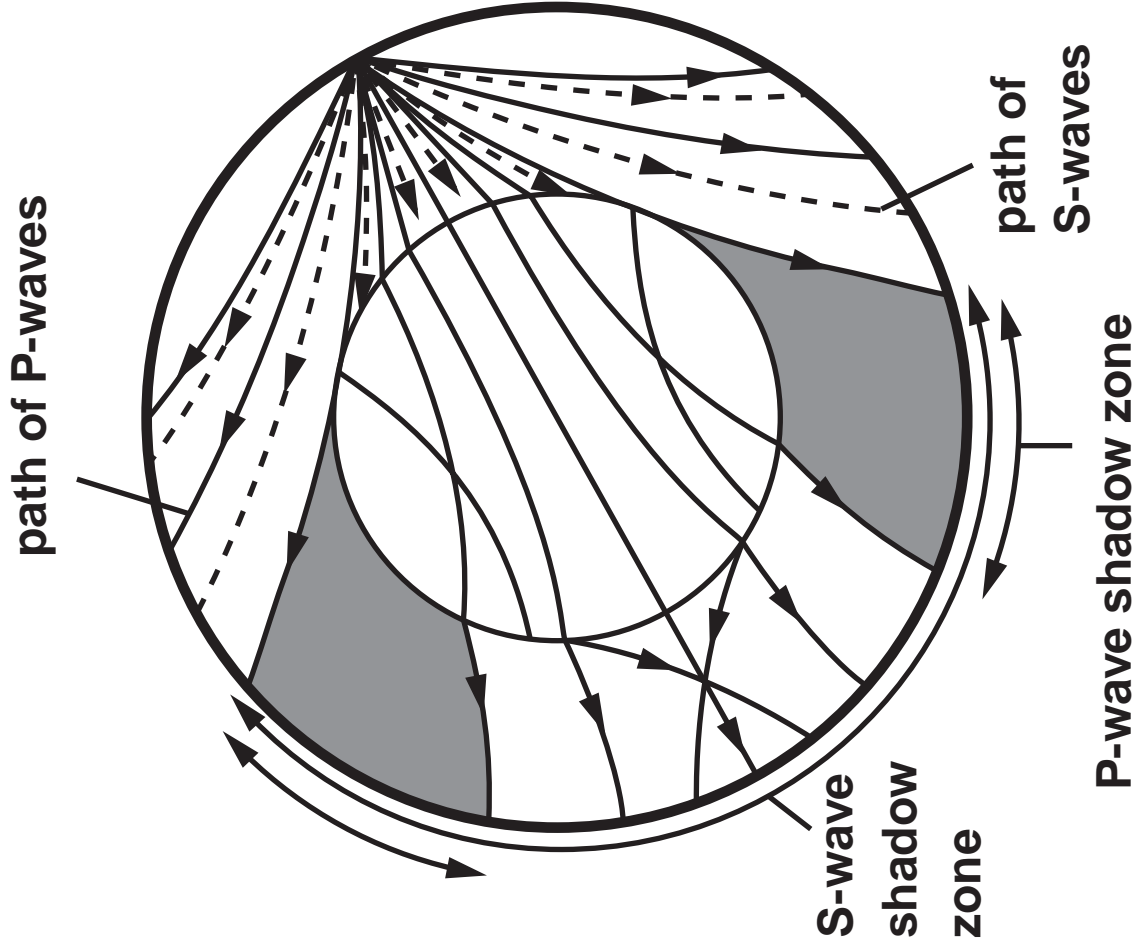
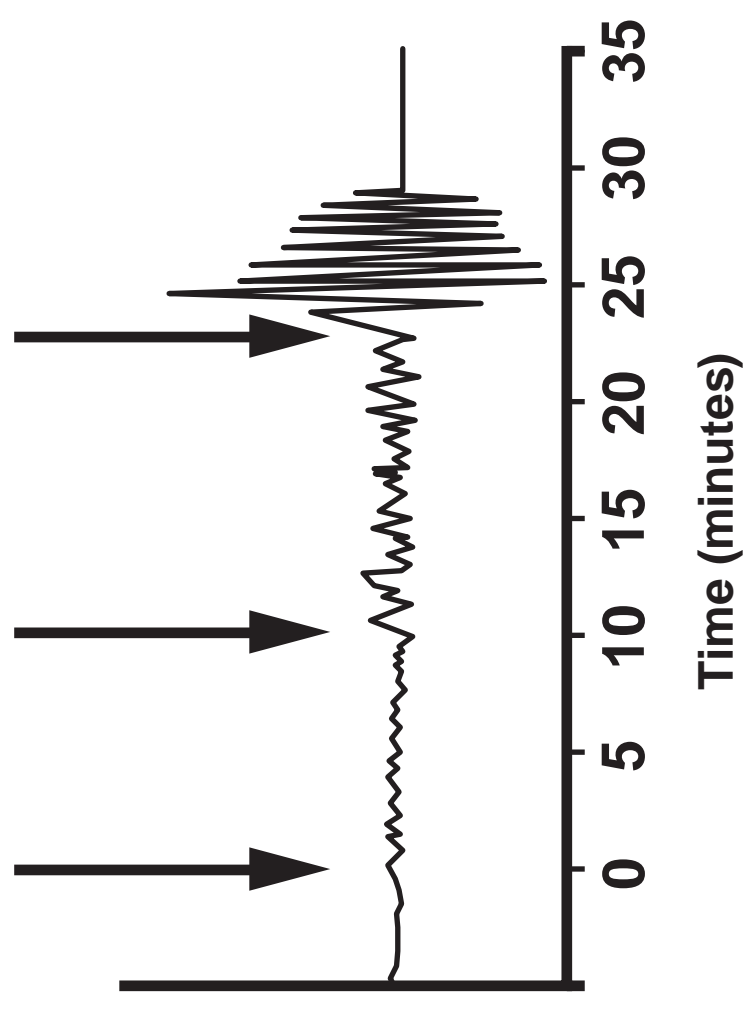


FIGURE 2b



2(b) (i) Label EACH of the three arrows on FIGURE 2b to indicate the first arrival of the following seismic waves. [2]

SURFACE

P

S

(ii) Explain why the three different types of seismic waves first arrive at different times on the seismogram. [2]

- 2(b) (iii) Indicate on FIGURE 2a with an arrow labelled N ($N \rightarrow$), a likely location on the Earth's surface where a seismic station could have recorded the seismogram shown in FIGURE 2b. Give a reason for your answer. [2]

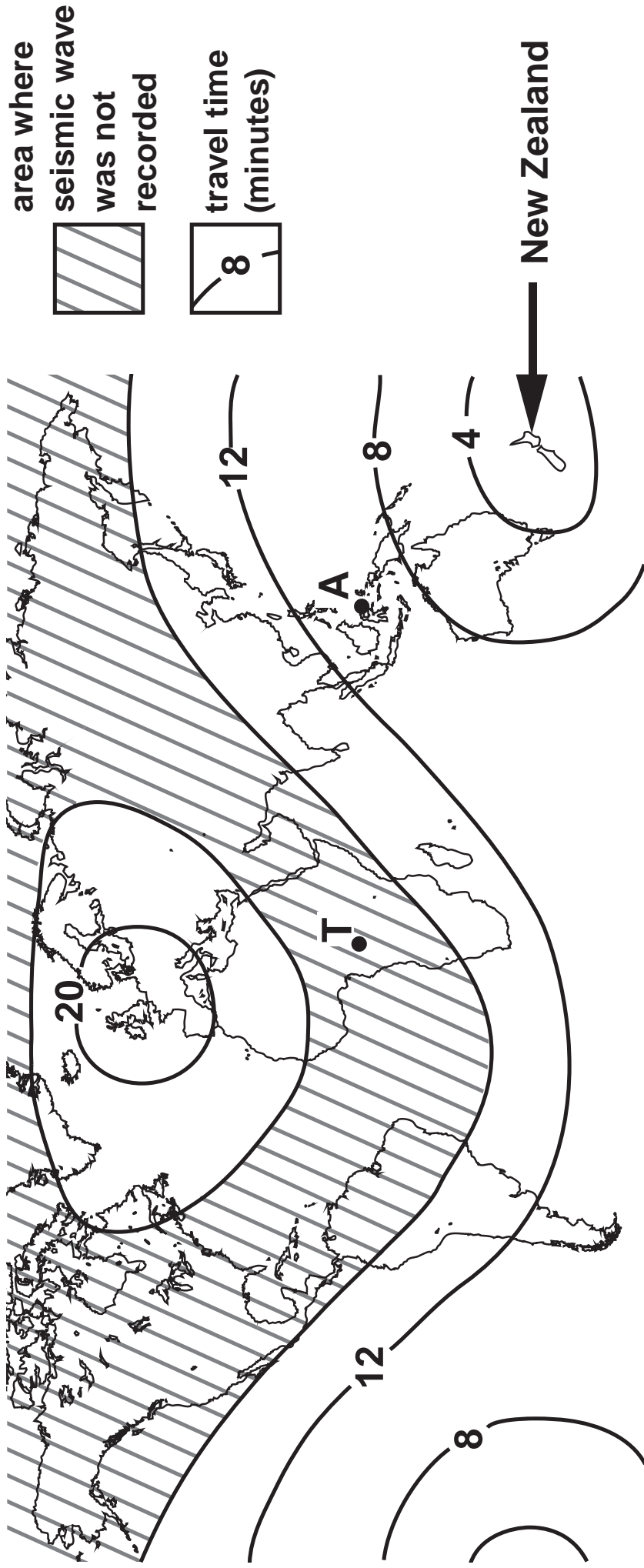
- (c) FIGURE 2c opposite shows the travel times (in minutes) for one of the types of seismic wave generated by an earthquake in New Zealand. The wave was not recorded in the shaded area.

Refer to FIGURE 2c.

- (i) The seismic wave travel path from the epicentre in New Zealand to seismic station A is 6600 km long. Calculate the mean velocity of these seismic waves (in km/second) reaching station A. Show your working. [3]

_____ km/second

FIGURE 2c



2(c) (ii) With reference to FIGURE 2a state for which type of seismic wave (P, S or SURFACE) the travel times are shown on FIGURE 2c. Give reasons for your answer.

[3]

Type of seismic wave _____

Reasons _____

2(c) (iii) State which type of seismic wave (P, S or SURFACE) might be recorded at location T on FIGURE 2c. Explain your answer. [2]

Type of seismic wave _____

Explanation _____

TOTAL 17 MARKS

3. **FIGURE 3** opposite is a student’s field sketch showing the geology in the floor and vertical face of a quarry.

(a) (i) Complete **TABLE 3** to describe the orientation of igneous body **A¹** in **FIGURE 3**. [3]

Strike	•
Angle of dip	•
Direction of dip	•

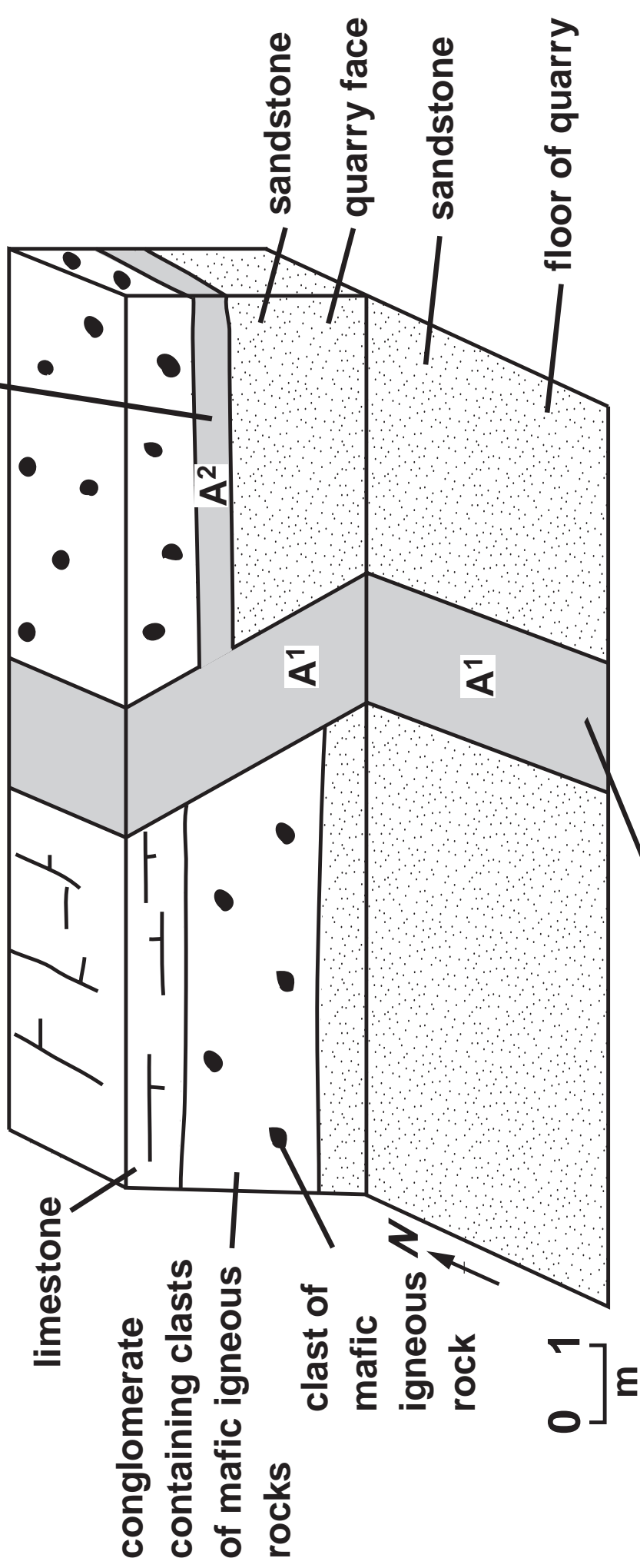
(ii) Identify the type of igneous body (dyke, sill, pluton, lava flow) represented by igneous body **A¹**. Give reasons for your answer. [3]

Type _____

Reasons _____

FIGURE 3

igneous body A2
• mafic composition
• an offshoot of
igneous body A1



3(b) The student concluded that igneous body A¹ formed along the line of a fault showing normal movement. Evaluate, with reasons, the student's conclusion. [3]

3(c) The PRINCIPLE OF SUPERPOSITION and the LAW OF INCLUDED FRAGMENTS can be used as relative dating techniques.

(i) Using an example from FIGURE 3, state and explain what is meant by the PRINCIPLE OF SUPERPOSITION. [3]

3(c) (ii) Using an example from FIGURE 3, explain what is meant by the LAW OF INCLUDED FRAGMENTS. [2]

3(c) (iii) State the relative age (older, younger, same age) of the CLASTS of mafic igneous rock in the conglomerate and IGNEOUS BODY A². Give reasons for your answer. [3]

Relative age of the clasts _____

Reasons _____

TOTAL 17 MARKS

4. **FIGURE 4a opposite is a cross-section showing the geological features associated with a fold with limbs dipping towards the east and west. FIGURE 4b opposite shows the detail of feature M in FIGURE 4a. FIGURE 4c opposite shows the detail of load casts and flame structures on an original bedding plane between the slate and metaquartzite layers.**

(a) (i) Name feature M in FIGURES 4a and 4b. [1]

Name _____

(ii) With reference to the MINERAL DATA SHEET identify minerals L and P in FIGURE 4b. [2]

Mineral L _____

Mineral P _____

4(b) Refer to Figure 4c opposite page 19.

(i) Describe how the load casts and flame structures were formed. [2]

4(b) (ii) Explain how the load casts and flame structures can be used to confirm that the fold in FIGURE 4a is an anticline. [3]

4(c) The rocks in Figure 4a were originally sedimentary rocks which have since been altered. Describe the conditions which resulted in the alteration of these rocks. Give reasons for your answer. [4]

FIGURE 4a

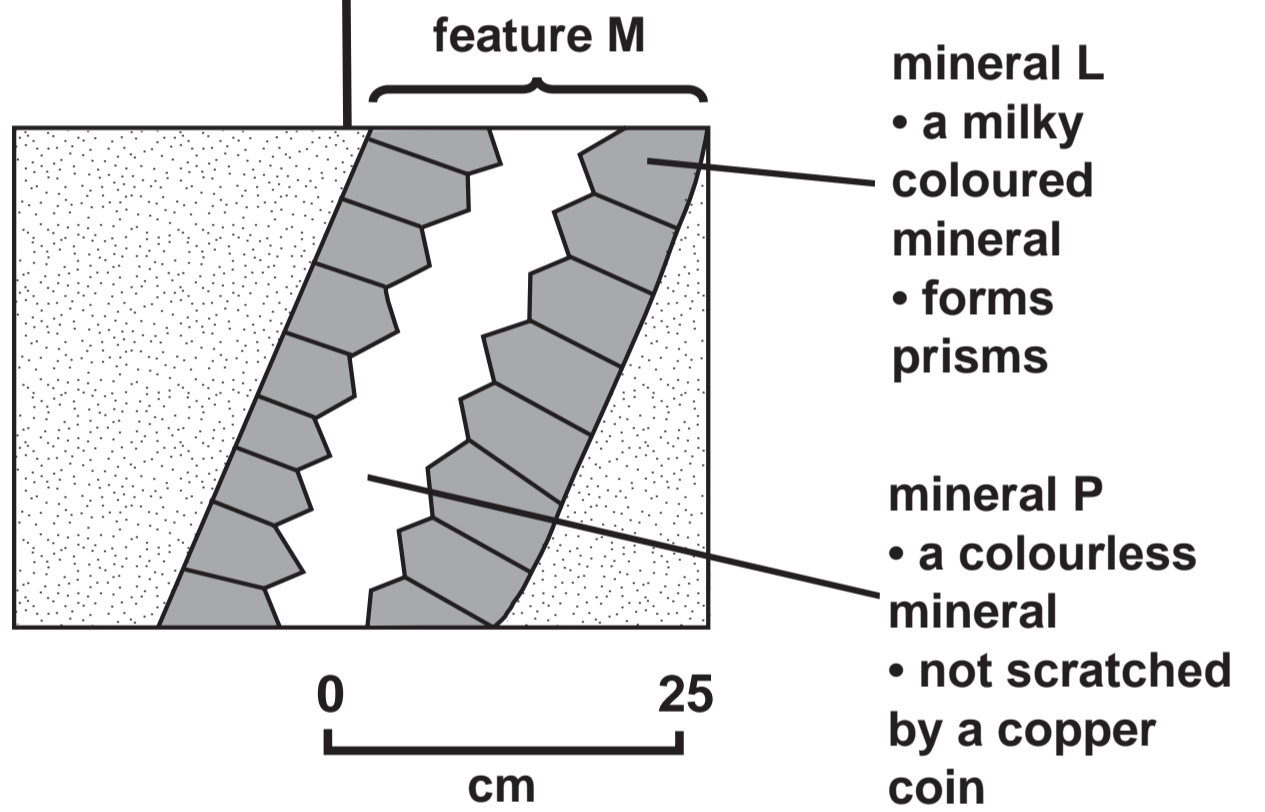
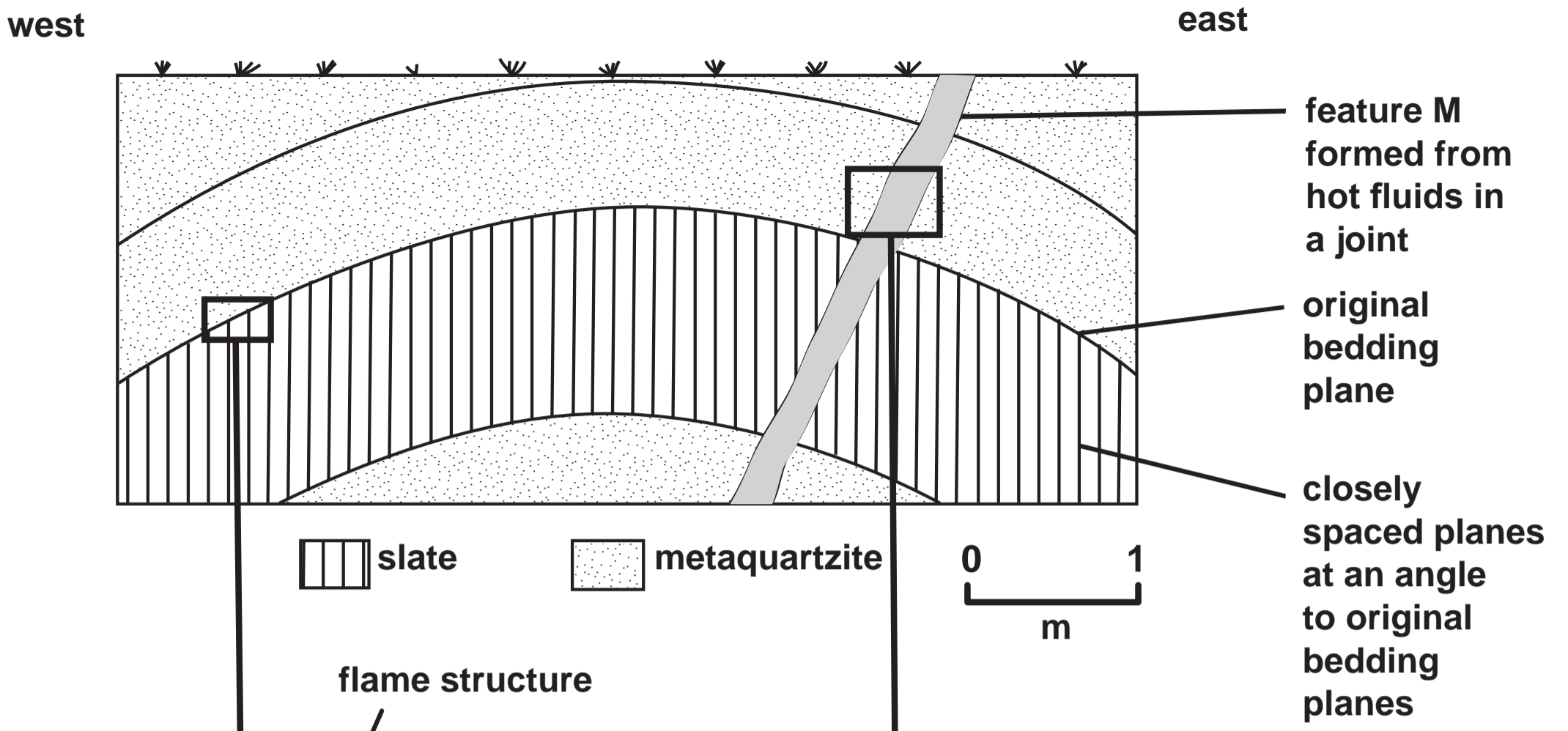


FIGURE 4c

FIGURE 4b