GCE AS/A level

1211/01

GEOLOGY – GL1

Foundation Unit

A.M. TUESDAY, 13 May 2014

1 hour plus your additional time allowance

Surname _____

Other Names _____

Centre Number _____

Candidate Number 2 _____

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**17**	
2.	**14**	
3.	**14**	
4.	**15**	
Total	**60**	

ADDITIONAL MATERIALS

In addition to this examination paper, you will need:

the Mineral Data Sheet;
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.

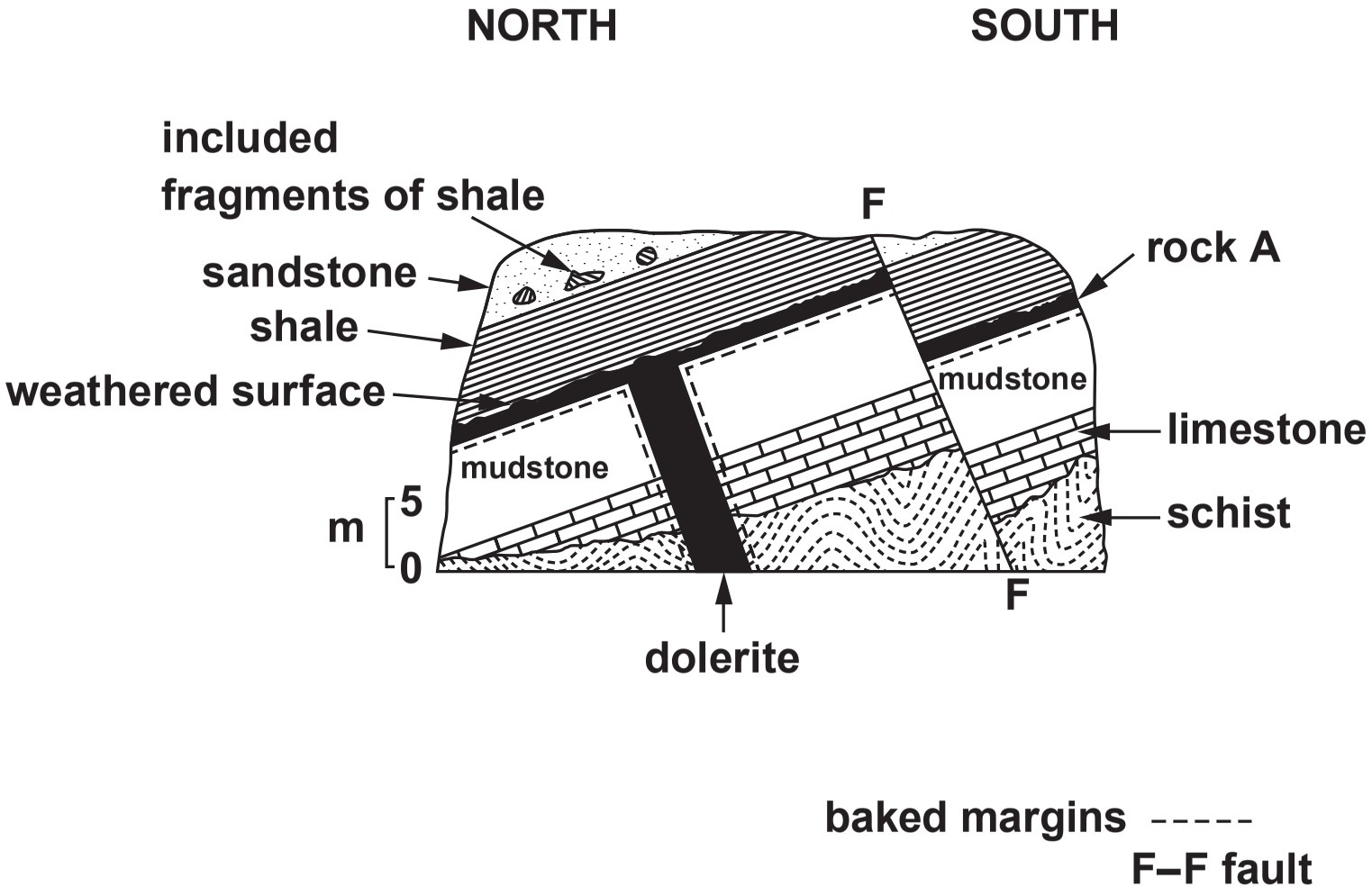
Answer ALL questions in the spaces provided in this booklet.

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.

FIGURE 1a


NORTH
SOUTH
included
fragments of shale
sandstone
shale
weathered surface
F
rock A
mudstone
limestone
schist
mudstone
m
5
0
F
dolerite
baked margins -----
F–F fault

Answer ALL questions.

1. FIGURE 1a opposite is a road cutting exposure showing the true dip of the sedimentary units.

(a) (i) State the dip direction of the limestone shown in FIGURE 1a. [1]

(ii) State the youngest rock shown in FIGURE 1a and give ONE reason to explain your answer. [2]

1(b) (i) **A student INCORRECTLY concluded that rock A on FIGURE 1a is a sill. Identify TWO pieces of evidence from FIGURE 1a which suggest that it is NOT a sill. [2]**

1. _____

_____

2. _____

_____

(ii) **Suggest ONE similarity and ONE difference in the texture and/or mineralogy you might expect to observe when comparing rock A and the dolerite shown on FIGURE 1a. [2]**

Similarity _____

_____

Difference _____

_____

1(c) (i) **Measure the throw (vertical displacement) of the fault shown in FIGURE 1a. [1]**

_____ **metres**

(ii) **State the type of fault shown on FIGURE 1a and give a reason to support your answer. [2]**

Type of fault _____

_____

Reason _____

_____

_____

_____

_____

1(d) (i) **Mark onto FIGURE 1a using the symbols below where you would expect to find examples of each of the following features.** **[2]**

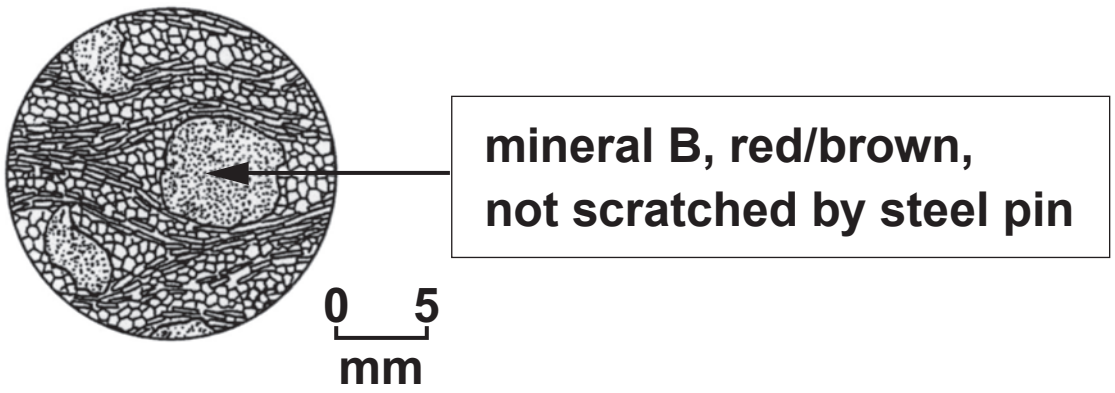
contact metamorphic rock **(C)** ⟶

regional metamorphic rock **(R)** ⟶

angular unconformity **(U)** ⟶

(ii) **FIGURE 1b below shows a microscope thin-section view of the schist on FIGURE 1a. Using the mineral data sheet identify mineral B in FIGURE 1b.** **[1]**

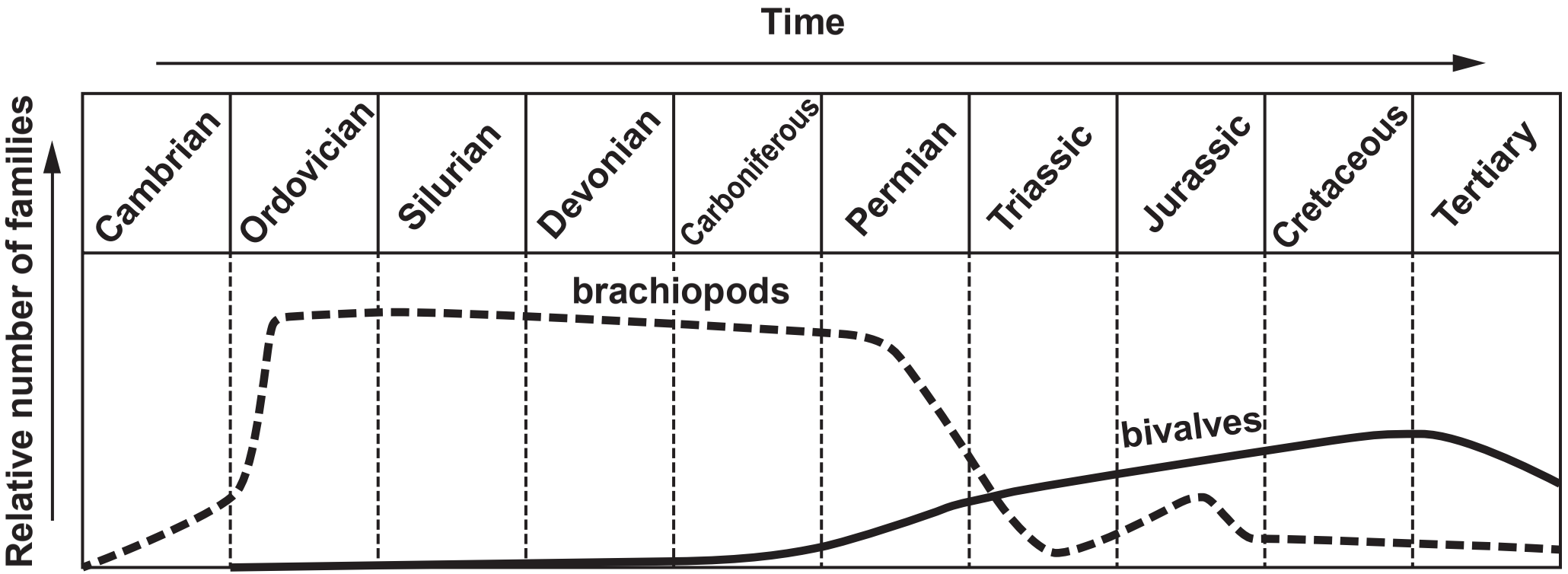
FIGURE 1b



1(d) (iii) Describe and explain the texture of the schist in FIGURE 1b. [4]

17

FIGURE 2a


Time
Relative number of families
Cambrian
Ordovician
Silurian
Devonian
Carboniferous
Permian
Triassic
Jurassic
Cretaceous
Tertiary
brachiopods
bivalves

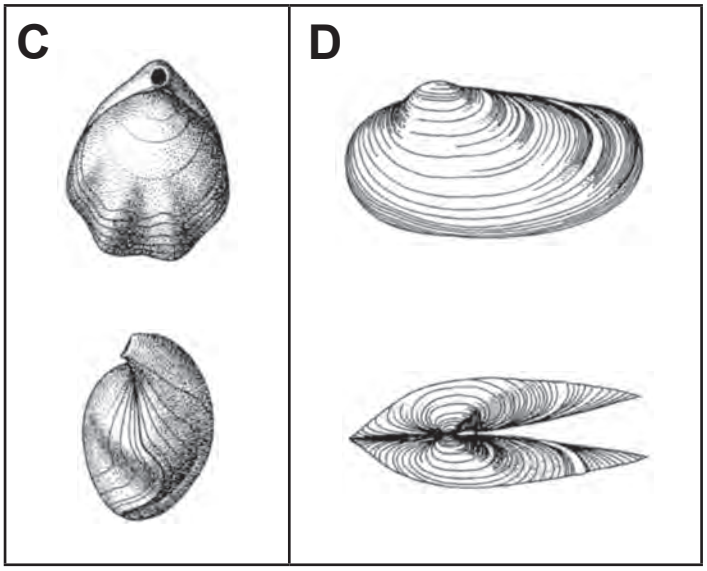
2. FIGURE 2a opposite shows the geological histories of the brachiopod and bivalve fossil groups.

(a) (i) With reference to FIGURE 2a, describe the changes in the relative numbers of bivalve families from the beginning of the Ordovician to the end of the Tertiary. [3]

(ii) State the geological period during which brachiopods and bivalves were both declining in numbers of families. [1]

2(b) **FIGURE 2b shows two fossil specimens (C and D) from different fossil groups.**

FIGURE 2b



(actual sizes)

(i) **With reference to FIGURE 2b, complete TABLE 2 using the appropriate letters (C or D) to indicate to which fossil group the description applies. [3]**

TABLE 2

Fossil Characteristics	Fossil
formed of two valves	C and D
one valve is larger than the other valve	
a plane of symmetry runs between the valves	
each valve has a plane of symmetry	

2(b) (ii) Name the fossil group represented by C. [1]

_____

_____

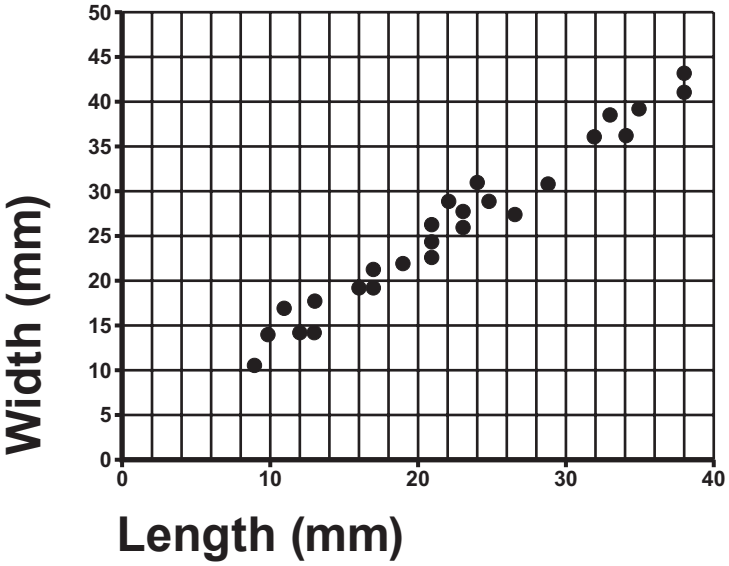
2(c) (i) **FIGURE 2c is a scatter graph showing the size of 26 specimens of fossil D preserved on a bedding plane surface. The outline of an additional sample is shown in FIGURE 2d.**

Measure the dimensions of this shell as indicated and plot onto FIGURE 2c. [2]

Length _____ **mm**

Width _____ **mm**

FIGURE 2c



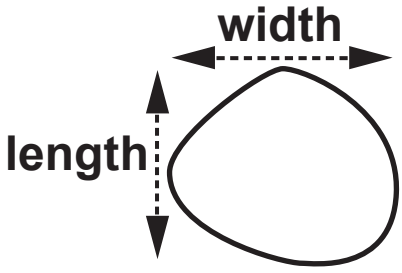


FIGURE 2d (actual size)

2(c) (ii) **With reference to FIGURE 2c suggest, giving reasons, whether the fossil specimens of fossil group D are likely to represent a life or death assemblage. [4]**

FIGURE 3a

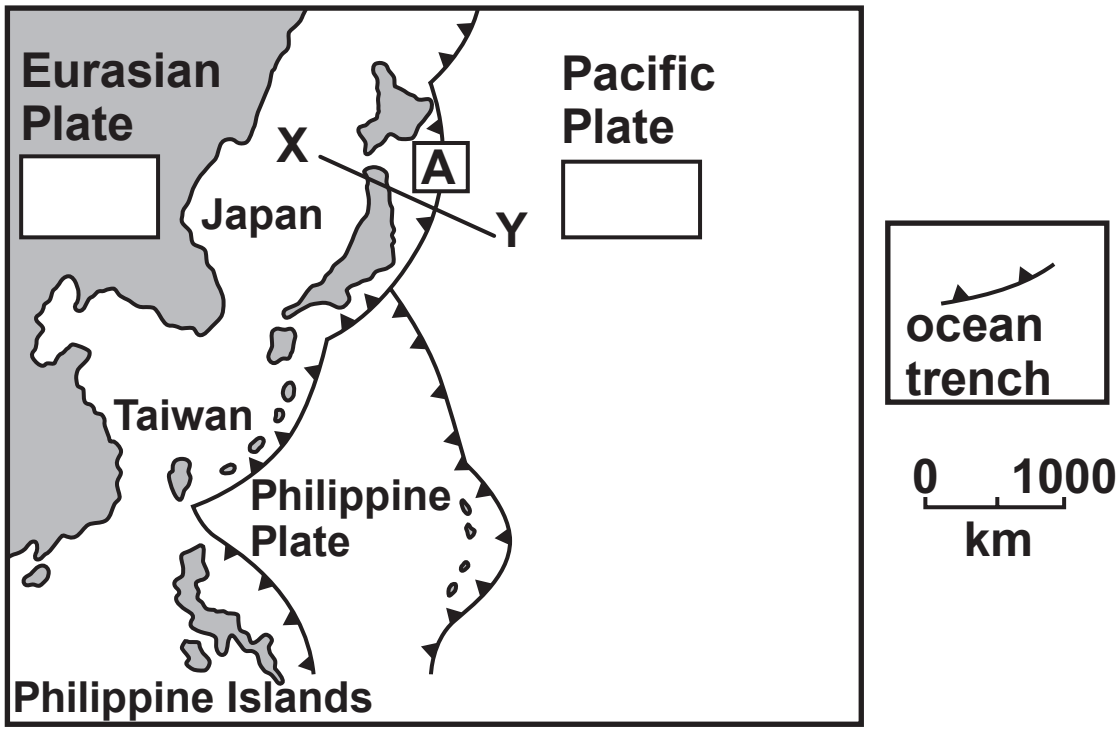
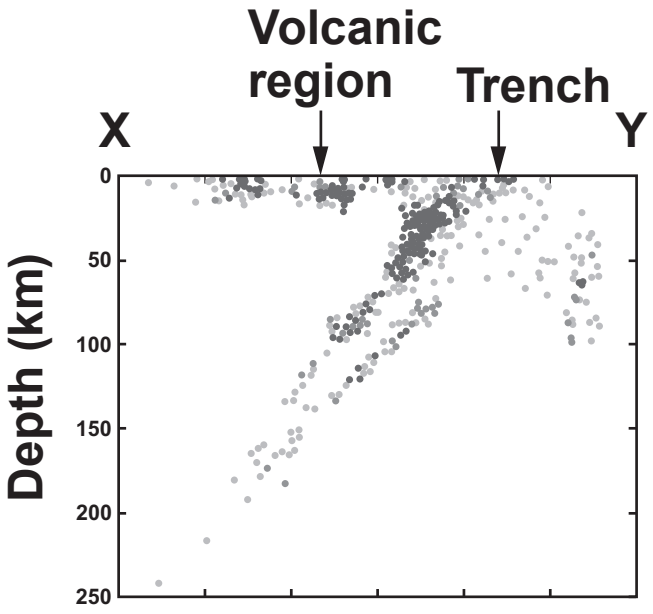


FIGURE 3b



3. **FIGURE 3a opposite is a simplified map showing plate tectonic features of part of the western Pacific.**

FIGURE 3b opposite shows the depth of earthquake foci along line X – Y on FIGURE 3a.

(a) (i) **Refer to FIGURE 3a and FIGURE 3b. Draw an arrow in each of the TWO blank boxes in FIGURE 3a to show the relative direction of movement of the Eurasian and Pacific plates. [2]**

(ii) **State the type of plate boundary present at locality A on FIGURE 3a by placing a tick in ONE of the boxes below. [1]**

Convergent ☐

Divergent ☐

Conservative ☐

3(b) (i) Describe the pattern of earthquake foci shown in FIGURE 3b. [3]

3(b) (ii) State and explain TWO reasons for the occurrence and distribution of earthquakes in FIGURE 3b. [4]

1. _____

_____

_____

_____

_____

_____

2. _____

_____

_____

_____

_____

_____

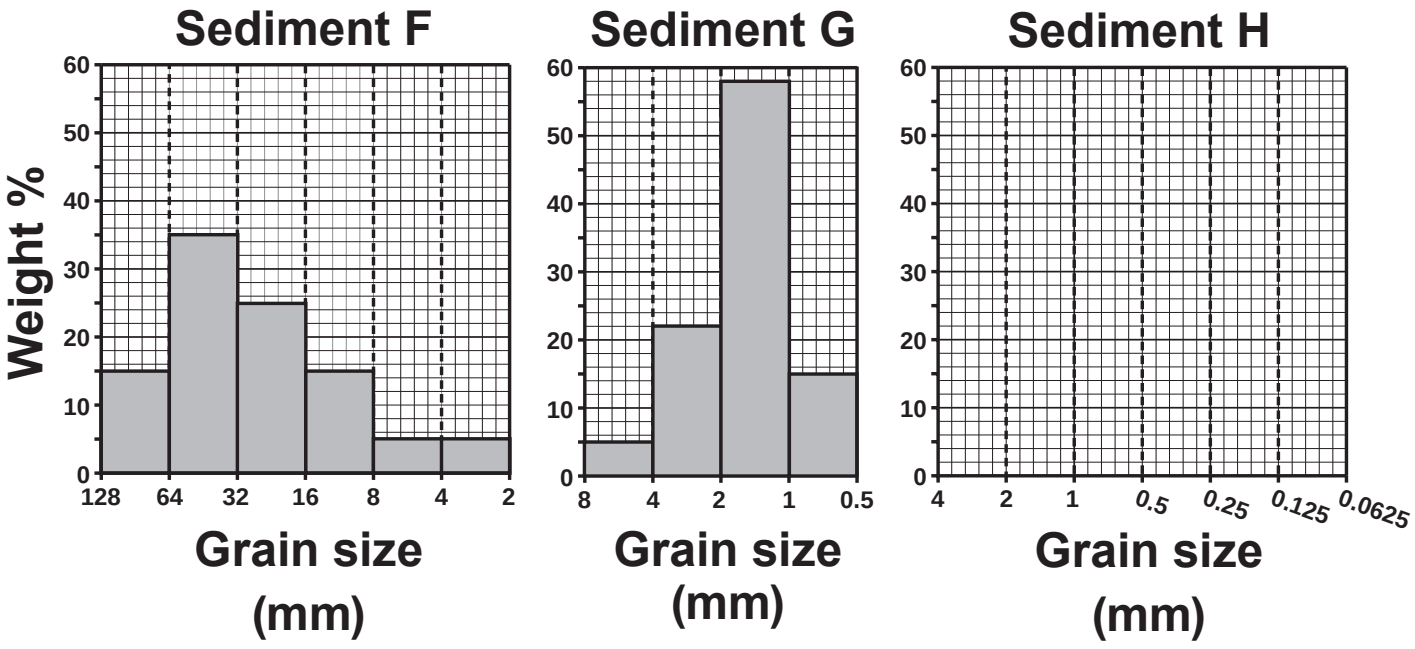
3(c) (i) **Magma generated beneath the Japanese Islands is ANDESITIC in composition. Explain why ANDESITIC magma forms at this plate tectonic setting. [2]**

(ii) **Explain why andesitic magma results in more explosive volcanic eruptions than basaltic magma. [2]**

TABLE 4

Grain size (mm)	64 to 128	32 to 64	16 to 32	8 to 16	4 to 8	2 to 4	1 to 2	0.5 to 1	0.25 to 0.5	0.125 to 0.25	0.0625 to 0.125
Weight % sediment F	15	35	25	15	5	5					
Weight % sediment G					5	22	58	15			
Weight % sediment H									5	35	60

FIGURE 4a



4. TABLE 4 opposite shows the grain size distribution of three sediments (F, G and H) collected from a river.

(a) (i) Use the data from TABLE 4 to construct a bar graph for sediment H in FIGURE 4a. [2]

(ii) State which of the three sediments (F, G or H) could be described as: [3]

	most coarse grained
	most poorly sorted
	most likely to be located furthest downstream

4(a) (iii) **Suggest why there is an absence of silt and clay sized particles (<0.0625 mm) in sediments F, G and H. [2]**

(iv) **Describe how grain size and shape are likely to change as a sediment is transported down a river towards the sea. Explain your answer. [3]**

FIGURE 4b

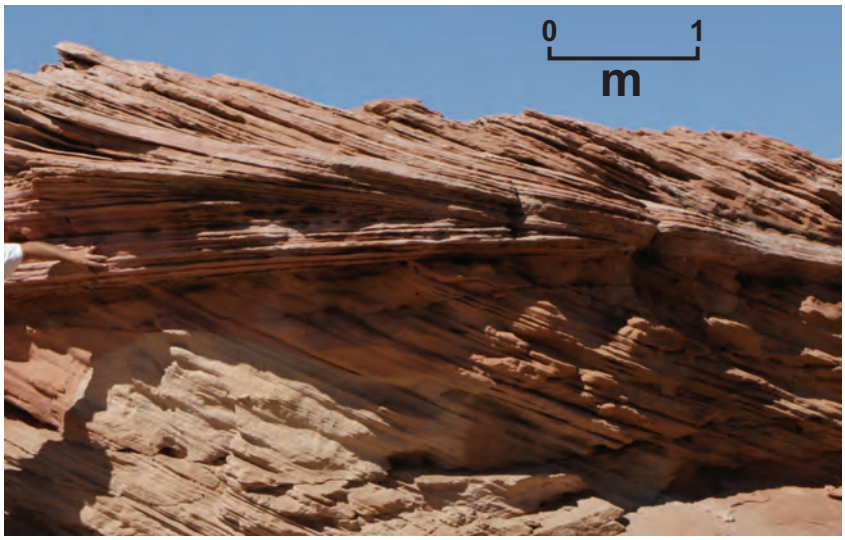
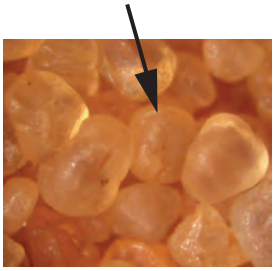


FIGURE 4c

quartz grains 0.5 mm in diameter cemented by haematite



4(b) **FIGURE 4b opposite shows a structure commonly found in sediments deposited by a current.**

FIGURE 4c shows detail of the texture of the rock shown in FIGURE 4b.

(i) **Name the sedimentary structure shown in FIGURE 4b. [1]**

(ii) **Explain why the sediment and sedimentary structure shown in FIGURE 4b and FIGURE 4c are UNLIKELY to have been formed in a high energy fluvial environment like sediment F in FIGURE 4a. [4]**

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END OF PAPER