



GCE AS/A level

1211/01

GEOLOGY – GL1

Foundation Unit

A.M. MONDAY, 11 May 2015

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.	15	
2.	14	
3.	15	
4.	16	
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.

Answer ALL questions.

1. **FIGURE 1a** is a map showing an igneous rock intruded into orthoquartzite. **TABLE 1b** on page 5 shows how the average crystal size varies between **A** and **B** on **FIGURE 1a**.

FIGURE 1a

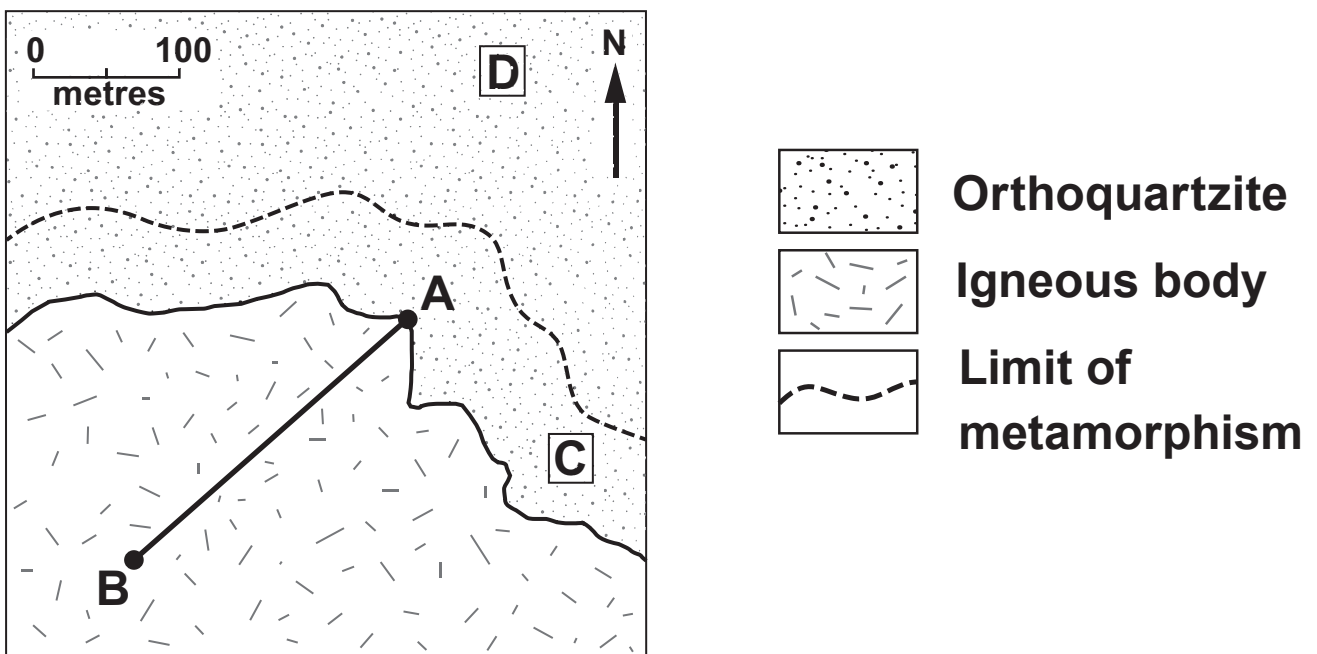
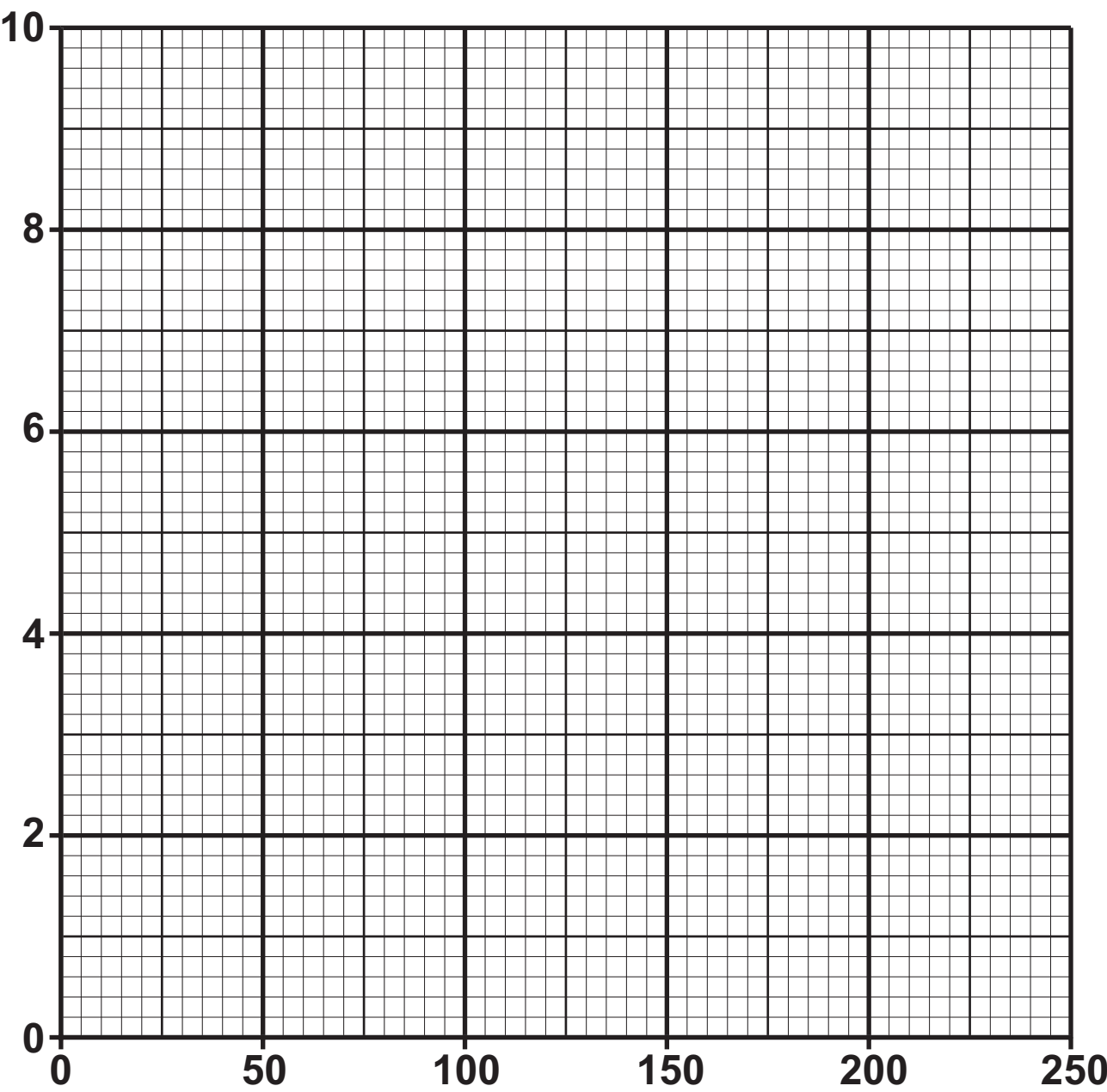


TABLE 1b

Distance from A (metres)	0	50	100	150	200	250
Crystal size (millimetres)	0.5	5	6	7	7.5	8

FIGURE 1c

Crystal size (millimetres)



Distance from A (metres)

1(a) Refer to FIGURE 1a and TABLE 1b on page 4.

- (i) Complete the graph in FIGURE 1c opposite by plotting the data in TABLE 1b below and joining up the points with a curved line. [2]**

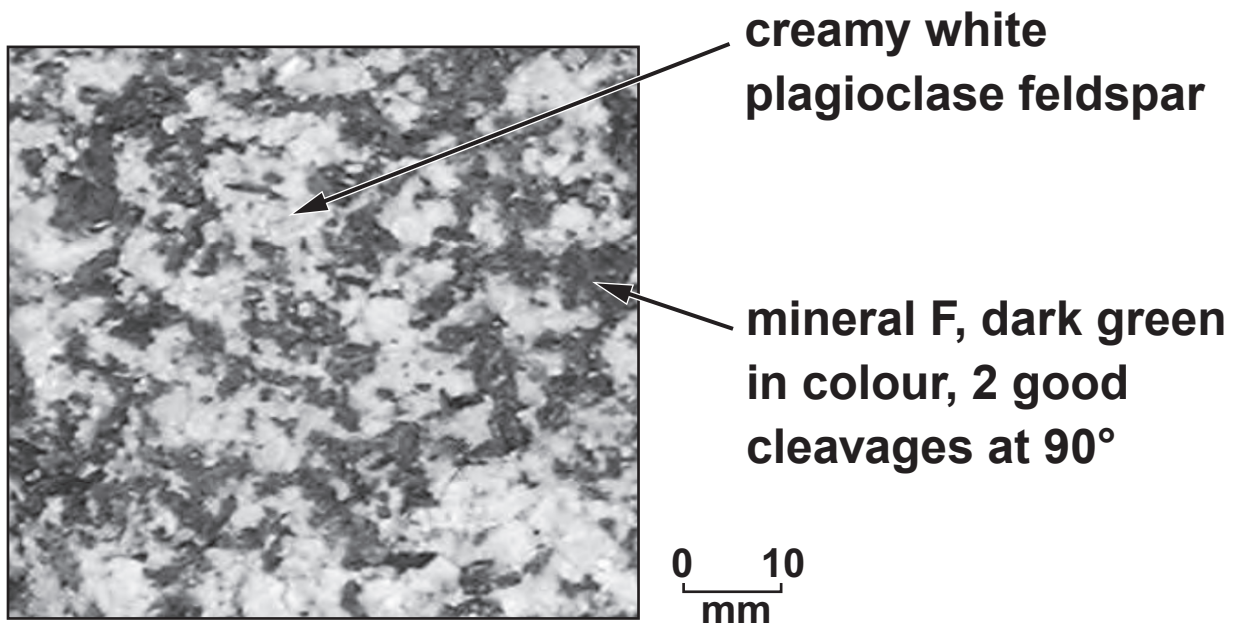
TABLE 1b

Distance from A (metres)	0	50	100	150	200	250
Crystal size (millimetres)	0.5	5	6	7	7.5	8

- (ii) Explain the variation in crystal size between locations A and B in FIGURE 1a. [2]**

- 1(b) **FIGURE 1d** shows a specimen from the igneous intrusion shown in **FIGURE 1a**. The specimen was collected at location **B** on **FIGURE 1a**.

FIGURE 1d



- (i) Using the Mineral Data Sheet, identify mineral **F**. [1]

- 1(b) (ii) Which **THREE** terms below best describe the igneous rock shown in **FIGURE 1d**?
Tick only **THREE** boxes. [2]

☐

foliated

☐

porphyritic

☐

mafic

☐

equigranular

☐

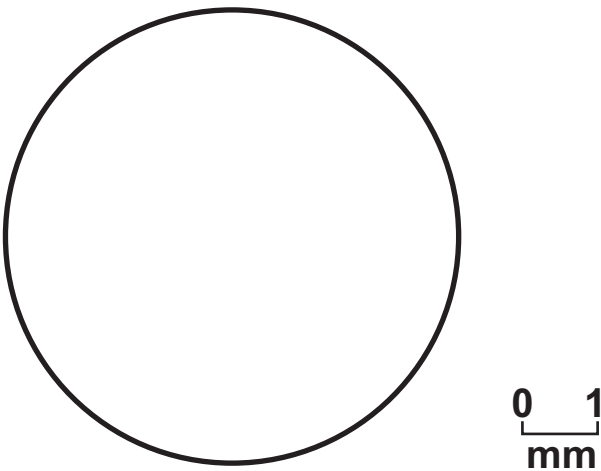
crystalline

☐

silicic

- (iii) Name the igneous rock shown in **FIGURE 1d**.
[1]

FIGURE 1e



- 1(c) (i) Complete FIGURE 1e opposite to show the texture of a sample of metaquartzite with a mean crystal size of 1.5 mm representative of location **C** on FIGURE 1a. [3]
- (ii) Compare the mineral composition and texture of the rocks found at locations **C** and **D** on FIGURE 1a. Explain your answers. [4]

MINERAL COMPOSITION _____

TEXTURE _____

15

2. **FIGURE 2** opposite shows a roadside rock exposure with the fossils and structures contained in each of the sedimentary units.

Refer to **FIGURE 2**.

- (a) (i) Name the morphological features of graptolite **B** labelled **P** and **Q**. [2]

P _____

Q _____

- (ii) Describe **TWO** differences in the morphological features of graptolites **A** and **C**. [2]

- 2(b) (i) The graptolites in FIGURE 2 have been replaced by a BRASS YELLOW COLOURED MINERAL WITH A METALLIC LUSTRE. Using the Mineral Data Sheet, identify the mineral most likely to have replaced the original organic matter of the graptolites.**

[1]

- (ii) All the graptolite fossils shown in FIGURE 2 are casts. Describe the geological processes that have led to this type of preservation. [3]**

- 2(b) (iii) Graptolites are considered to be useful zone fossils in relative dating and correlation in the Palaeozoic. Using FIGURE 2 and your knowledge, describe THREE factors that enable graptolites to be useful as zone fossils. [3]**

2(c) The strata in FIGURE 2 are overturned. Explain the reasons that would support this statement. [3]

FIGURE 3a

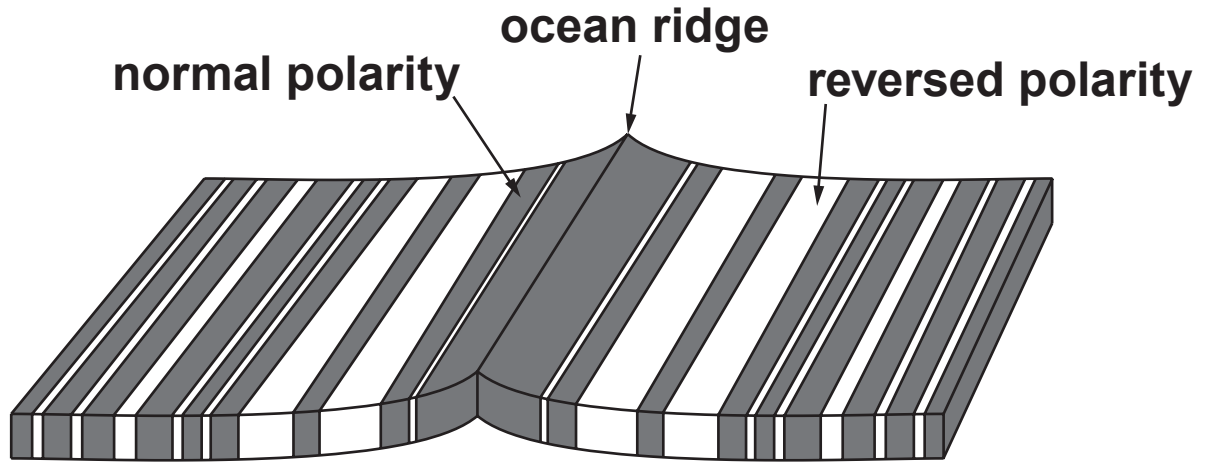


FIGURE 3b

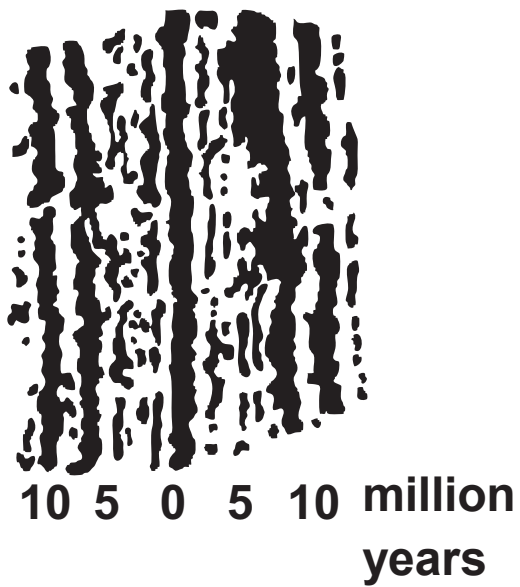
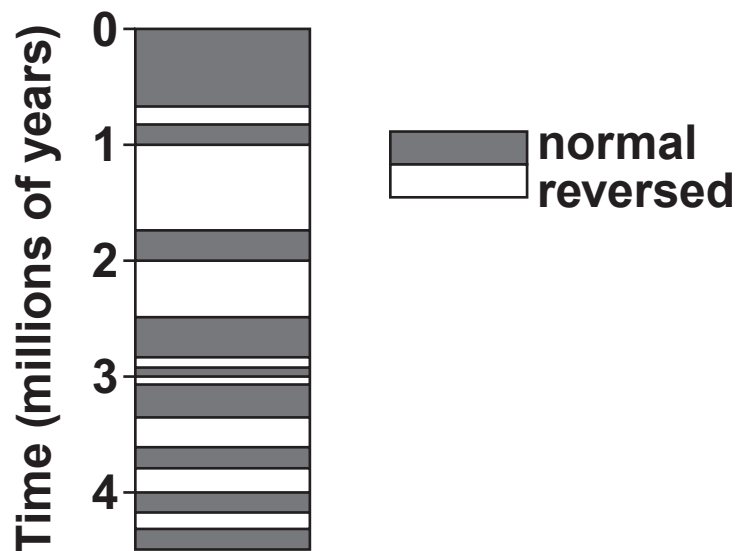


FIGURE 3c



3. **FIGURE 3a** opposite shows an ocean ridge with a simplified pattern of magnetic reversals in the rocks of the oceanic crust.

FIGURE 3b opposite shows the actual pattern of magnetic reversals in the oceanic crust of the Atlantic Ocean.

FIGURE 3c opposite shows the time scale for magnetic reversals in the oceanic crust over the last 4.5 million years.

- (a) (i) Name the type of plate margin shown in **FIGURE 3a**. Tick only **ONE** box. [1]

☐

convergent

☐

conservative

☐

divergent

- 3(a) (ii) Describe the pattern shown by the magnetic reversals in FIGURE 3a. [2]**

- (iii) Explain how a record of the Earth's magnetic field may be preserved in the igneous rocks of the ocean floor. [3]**

- 3(a) (iv) Explain the age distribution of the rocks of the oceanic crust shown in FIGURE 3b. [3]**

- (b) (i) With reference to FIGURE 3c state how long the current period of normal polarity has lasted. [1]**

- 3(b) (ii) Using FIGURE 3C state how many magnetic reversals have occurred during the last 2 million years. Calculate the mean time between magnetic reversals in years. [2]**

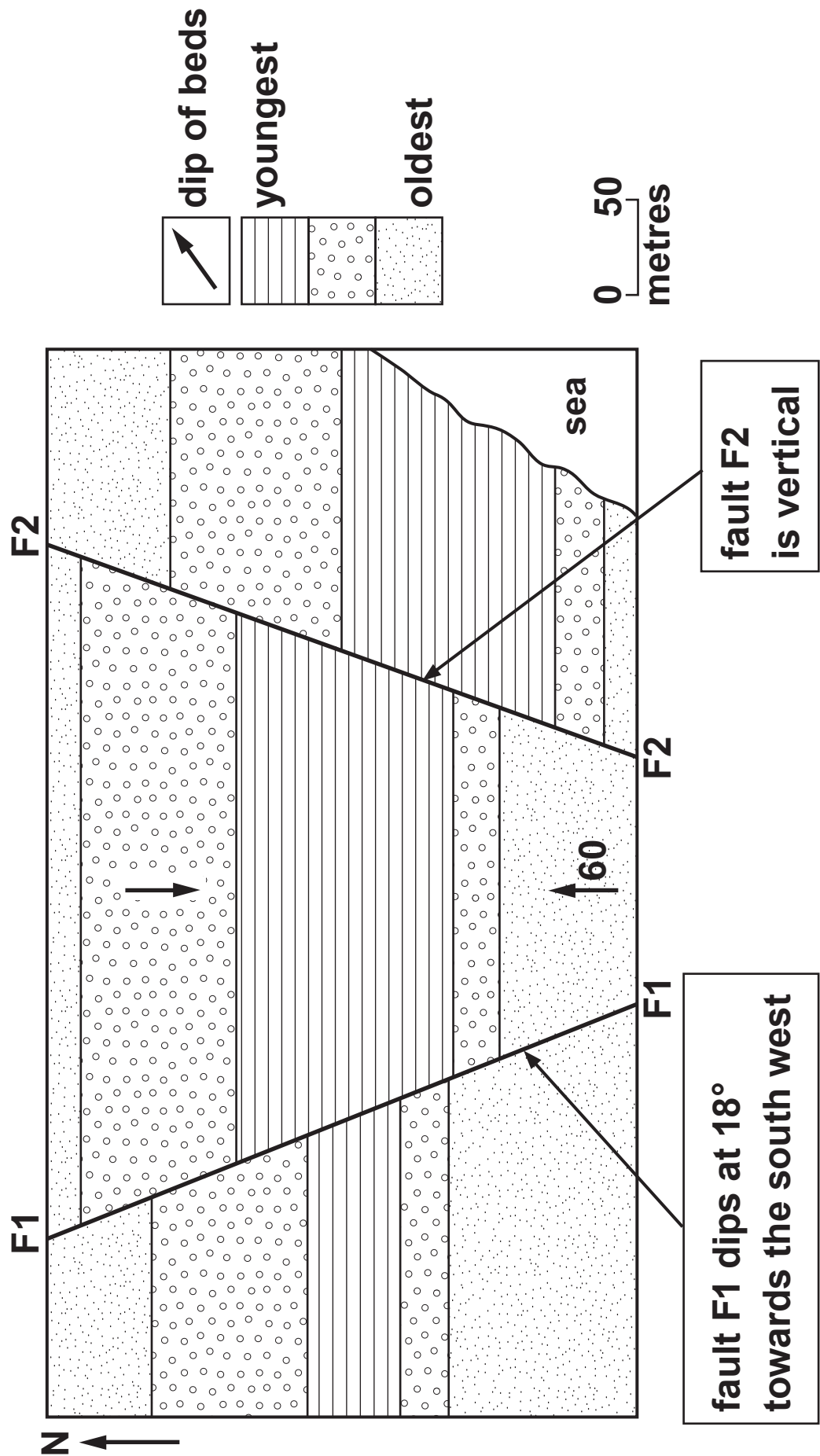
Number of reversals

Mean time between reversals

years

- 3(b) (iii) Refer to FIGURE 3b and suggest TWO reasons to explain why the actual pattern of magnetic reversals on the sea floor is more complex than the simplified model shown in FIGURE 3a. [3]**

FIGURE 4



4. **FIGURE 4** opposite is a geological map. The land in the area is flat.

(a) (i) Refer to **FIGURE 4**. State which **TWO** of the following statements are **CORRECT**.
Tick only **TWO** boxes. [2]

☐

The fold is an anticline

☐

The fold has limbs of equal dips

☐

The fold is a syncline

☐

The fold is younger than the faults

☐

The fold has been overturned

☐

The northern limb of the fold dips at less than 60°

(ii) Draw in the axial plane trace of the fold to the east of fault **F1** on **FIGURE 4**. [2]

- 4(b) (i) Fault **F1** involves vertical movement with a downthrow to the east. State the evidence from **FIGURE 4** for **F1** being downthrown to the east. [2]

EVIDENCE _____

- (ii) **F1** is a thrust fault. State the evidence for this from **FIGURE 4**. [2]

EVIDENCE _____

- 4(c) (i) Fault **F2** shows only strike-slip movement (horizontal displacement). Describe **ONE** piece of evidence from **FIGURE 4** to support this statement. [2]

- (ii) Measure the amount of horizontal displacement that has occurred along fault **F2** in metres and state whether the movement has been to the left or right. [2]

DISPLACEMENT _____ metres

MOVEMENT TO THE _____

- 4(d) A student came to the following conclusions about the geological structures shown in FIGURE 4. State whether or not you agree with each conclusion and give reasons for your answers. [4]**

The fold and fault F1 were formed at the same time and by the same type of stress

4(d) **F2 is younger than F1**

16

END OF PAPER