FOR OFFICIAL USE

Total

X043/201

NATIONAL QUALIFICATIONS 2008

MONDAY, 19 MAY
1.00 PM – 3.00 PM

GEOLOGY
INTERMEDIATE 2

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth
Day Month Year

Scottish candidate number

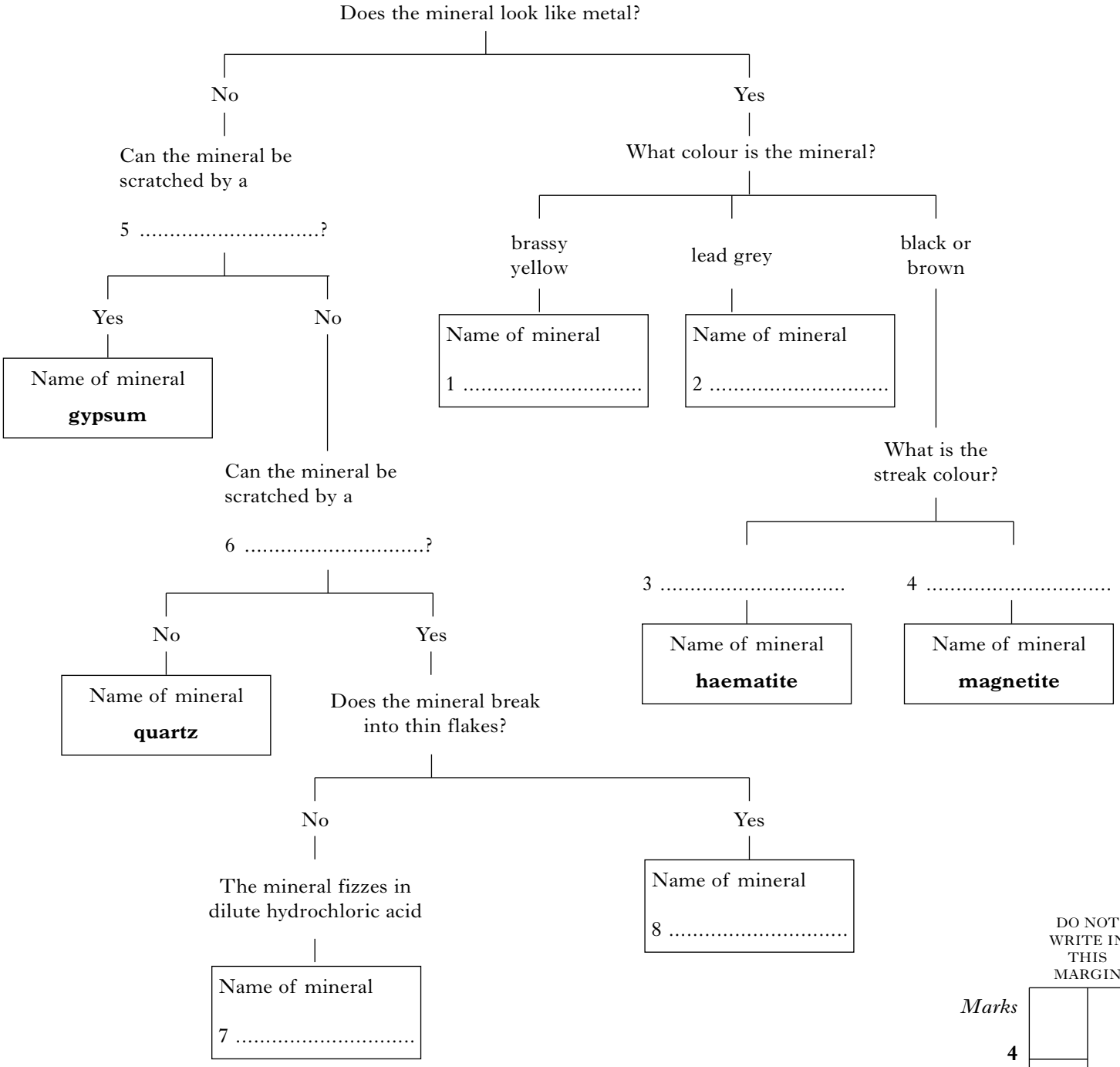
Number of seat

1 You should attempt **all** of the questions.
2 All answers should be written in the spaces provided in this answer book and should be written clearly and legibly in ink.
3 The marks allocated to each question or part of a question are shown at the end of each question or part of a question.
4 Before leaving the examination room you must give this book to the invigilator. If you do not, you may lose all the marks for this paper.

All questions should be attempted.

1. (*a*) Use **eight** of the terms in the word box to complete the key below.

halite, biotite, galena, calcite, sphalerite, pyrite, fingernail, steel blade, dark-brown, red-brown, black.



DO NOT WRITE IN THIS MARGIN

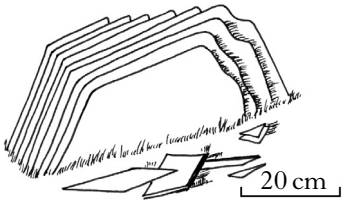
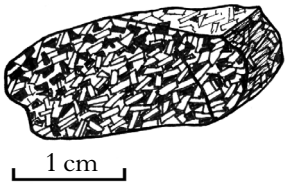
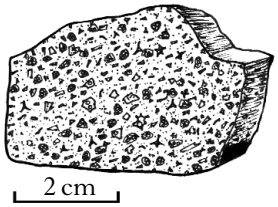
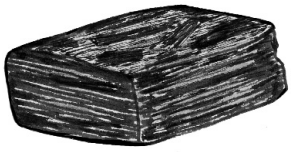
Marks

4

1. (continued)

Marks

(*b*) Complete the table.

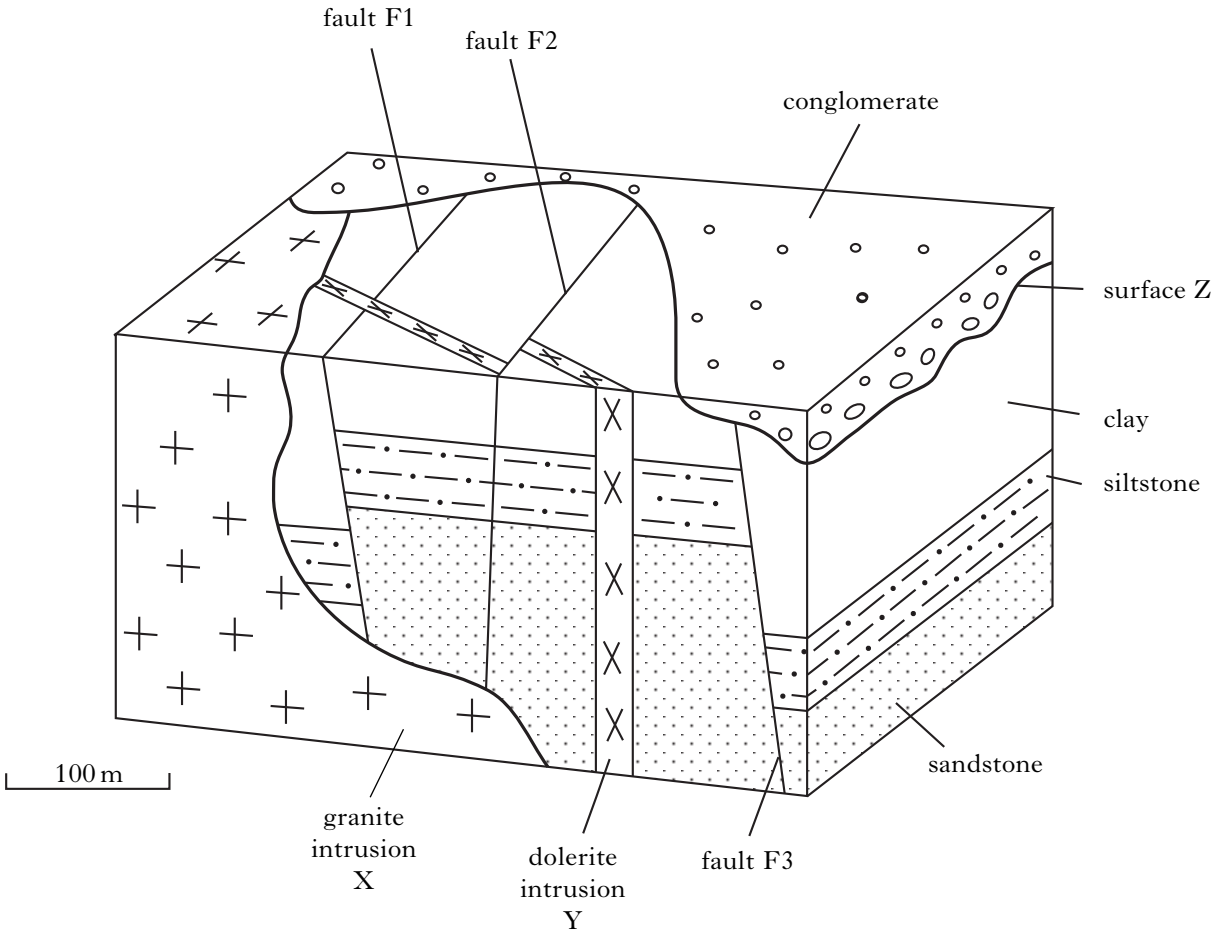
Name of rock	*Drawing of rock*	*Grain size*	*How the rock formed*
Slate		fine	
Breccia		coarse	Formed from angular rock fragments
Dolerite			Formed from basaltic magma cooled at a moderate rate
		fine	Formed from volcanic ash
Coal		medium	
Rhyolite		fine	Formed from a very viscous lava

6

[Turn over

Marks

2. Study the block diagram.



(*a*) What types of faults are F1, F2 and F3?

Fault F1 .....

Fault F2 .....

Fault F3 ..... **3**

(*b*) What types of intrusion are X and Y?

Intrusion X .....

Intrusion Y **2**

(*c*) Name surface Z and say how it was formed.

Name of surface Z .....

How formed .....

.....

..... **2**

DO NOT WRITE IN THIS MARGIN

Marks

2. (continued)

(*d*) On the block diagram, mark the letter H where you would expect to find hornfels. **1**

(*e*) Place the following events in the correct order from oldest to youngest.

A Movement on fault F1

B Movement on fault F2

C Deposition of siltstone

D Intrusion of granite

E Deposition of conglomerate

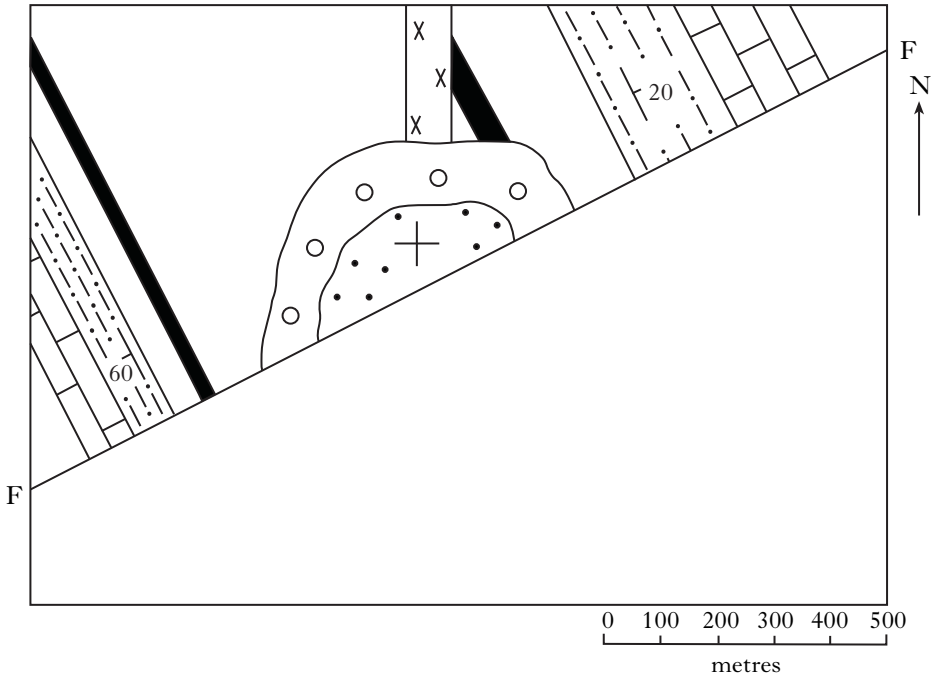
F Intrusion of dolerite

Give only the letters: ..... → ..... → ..... → ..... → ..... → .....
oldest youngest **3**

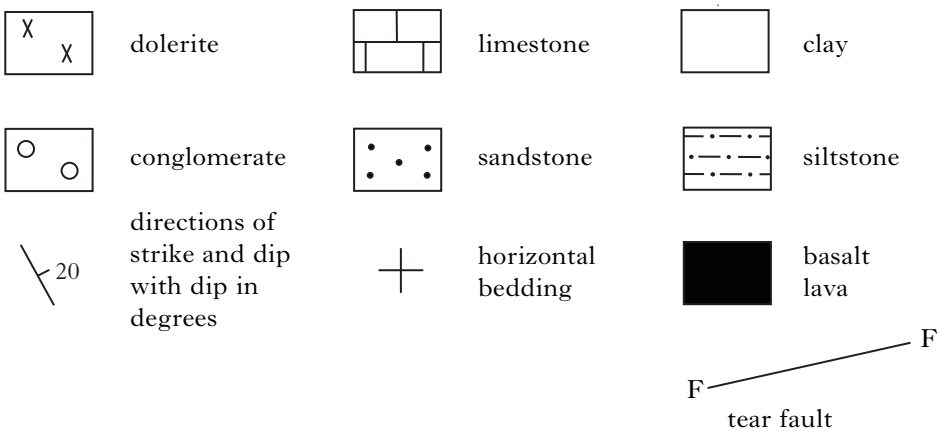
[Turn over

Marks

3. Study the geological map.



Key (Rocks not in order of age)



(*a*) (i) What type of fold is shown on the map? Give a reason for your answer.

Fold type .....

Reason .....

..... **2**

Marks

3. (*a*) (continued)

(ii) Explain why the outcrop of the siltstone is wider in the north-east than in the south-west. Use a labelled diagram to illustrate your answer.

2

(*b*) The tear fault has moved the rocks on its south-east side 100 metres towards the north-east. On the map, draw in the rock outcrops on the south-east side of the tear fault. **4**

(*c*) Place the following events in the correct order from oldest to youngest.

A Movement on tear fault

B Deposition of limestone

C Folding of rocks

D Eruption of basalt lava

E Intrusion of dolerite

F Deposition of sandstone

Give only the letters: ..... → ..... → ..... → ..... → ..... → .....
oldest youngest **3**

[Turn over

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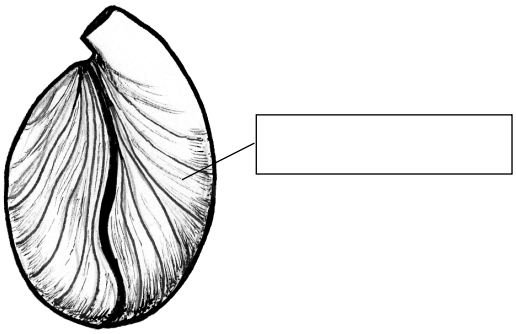
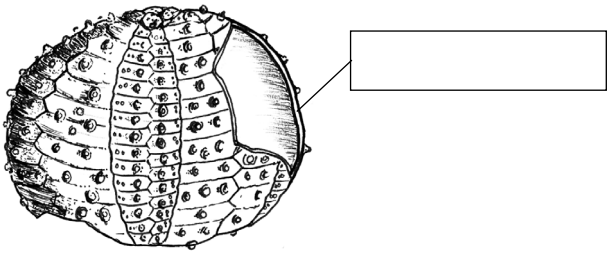
4. (*a*) Name the parts of the fossils.

Marks

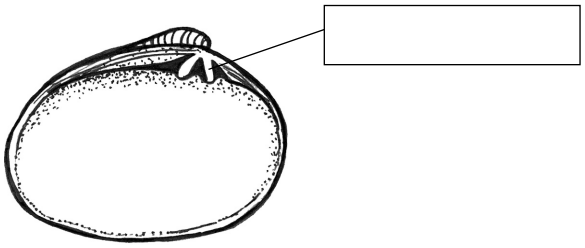
Fossil P



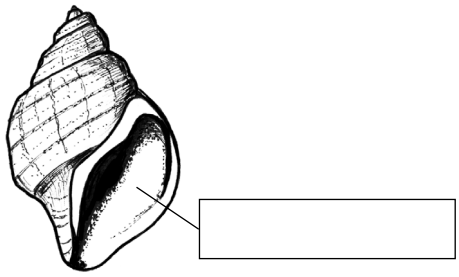
Fossil Q



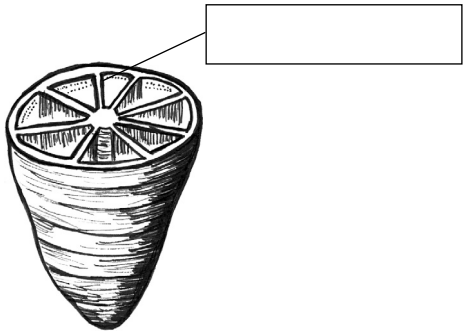
Fossil R



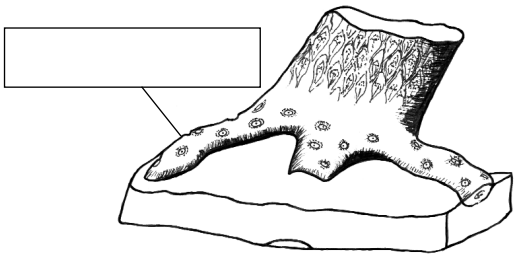
Fossil S



Fossil T



Fossil U



3

(*b*) Name fossils P, Q, R, S, T and U.

Name of fossil P .....

Name of fossil Q .....

Name of fossil R .....

Name of fossil S .....

Name of fossil T .....

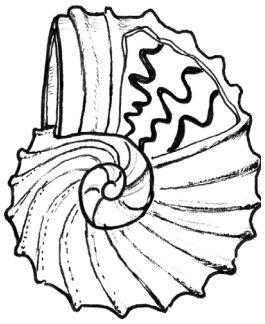
Name of fossil U **3**

Marks

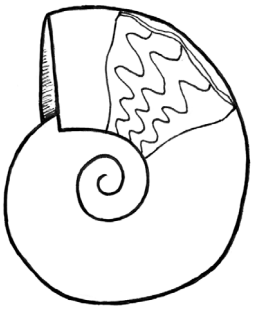
4. (continued)

(*c*) Give **two** reasons to explain why ammonite R could probably live in deeper water than ammonite S.

Ammonite R



Ammonite S



Reason 1 .....

.....

Reason 2 .....

..... **2**

(*d*) Give **two** reasons to explain why ammonites make good zone fossils.

Reason 1 .....

.....

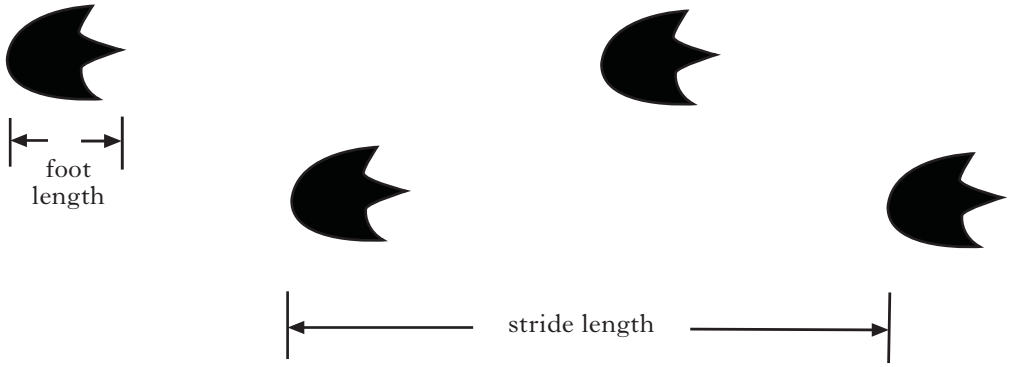
Reason 2 .....

..... **2**

[Turn over

Marks

5. The diagram shows a fossilised dinosaur track.



Foot length and stride length can be measured from the track. It is also known that

- the dinosaur's leg length is 4 times its foot length
- if $\frac{\text{stride length}}{\text{leg length}}$ is less than 2·0, the dinosaur was walking
- if $\frac{\text{stride length}}{\text{leg length}}$ is greater than 2·9, the dinosaur was running.

(*a*) Complete the table.

Dinosaur	*Foot length* (metres)	*Leg length* (metres)	*Stride length* (metres)	*Stride length divided by leg length*	*Was the dinosaur walking or running?*
X	0·25		1·20		
Y	0·40		4·80		

3

Marks

5. (continued)

(*b*) (i) Give **two** reasons to explain why dinosaur P was probably not able to run very fast.

Dinosaur P

Reason 1 .....

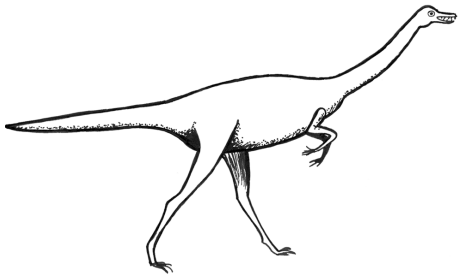
.....

Reason 2 .....

..... **2**

(ii) Give **two** reasons to explain why dinosaur Q was probably able to run fast.

Dinosaur Q



Reason 1 .....

.....

Reason 2 .....

..... **2**

[Turn over

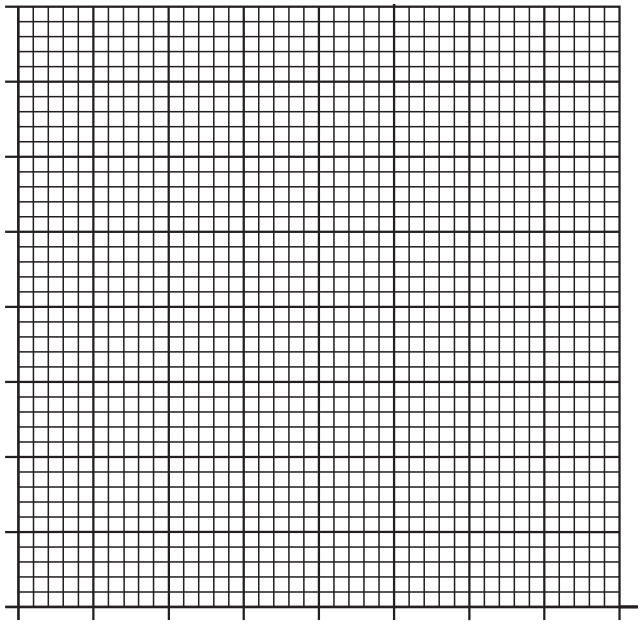
Marks

5. (continued)

(*c*) The table shows stride lengths and speeds for a dinosaur.

Stride length (metres)	*Speed* (metres per second)
0	0
0·2	0·05
0·8	0·54
1·2	1·06
2·0	2·50
3·0	4·90
4·0	7·93

(i) On the graph paper provided below, draw a line graph of stride length against speed.



3

(ii) What general relationship is shown by the graph?

.....

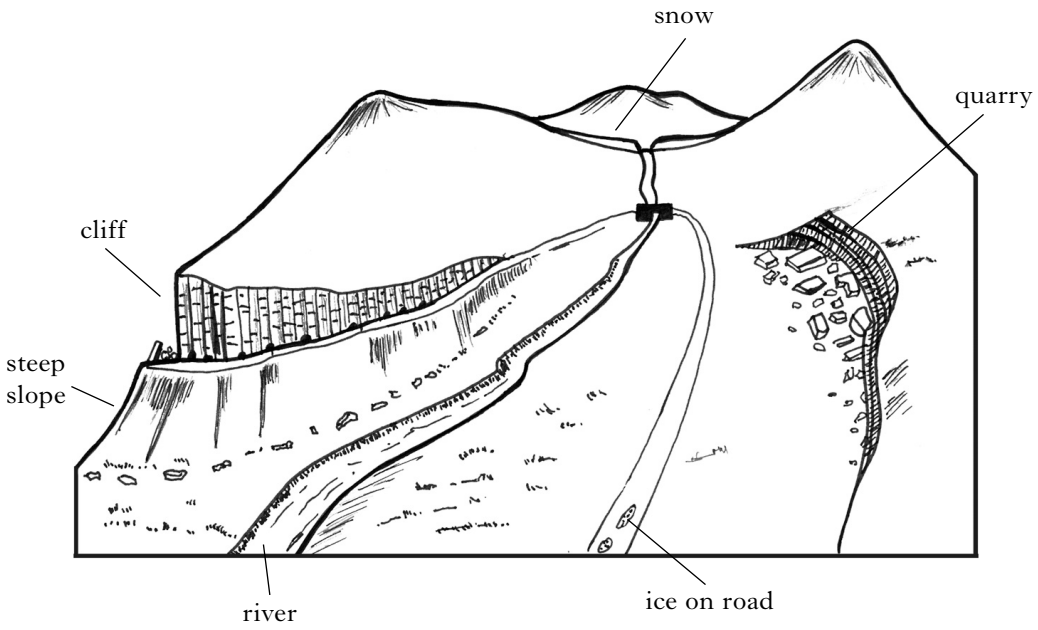
.....

..... **2**

[Turn over for Question 6 on *Page fourteen*

Marks

6. The diagram shows an area visited on a field trip.



(*a*) The field trip was done in January. Describe **four** safety precautions you would take when visiting this area.

1 .....

.....

2 .....

.....

3 .....

.....

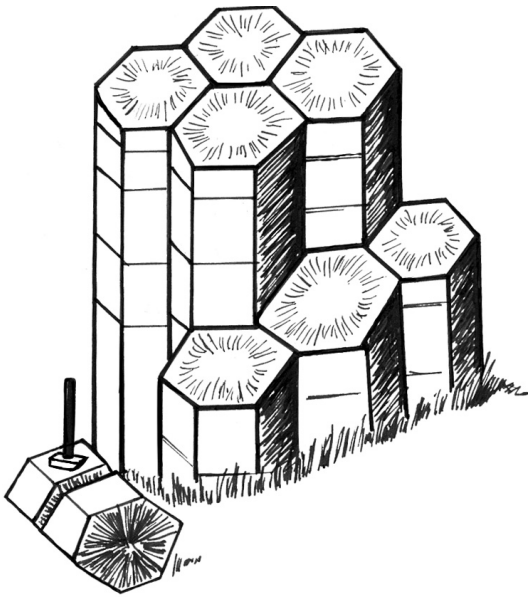
4 .....

..... **2**

Marks

6. (continued)

(*b*) The diagram shows structures found in the cliff. Name the structures and say how they were formed.



Name of structures **1**

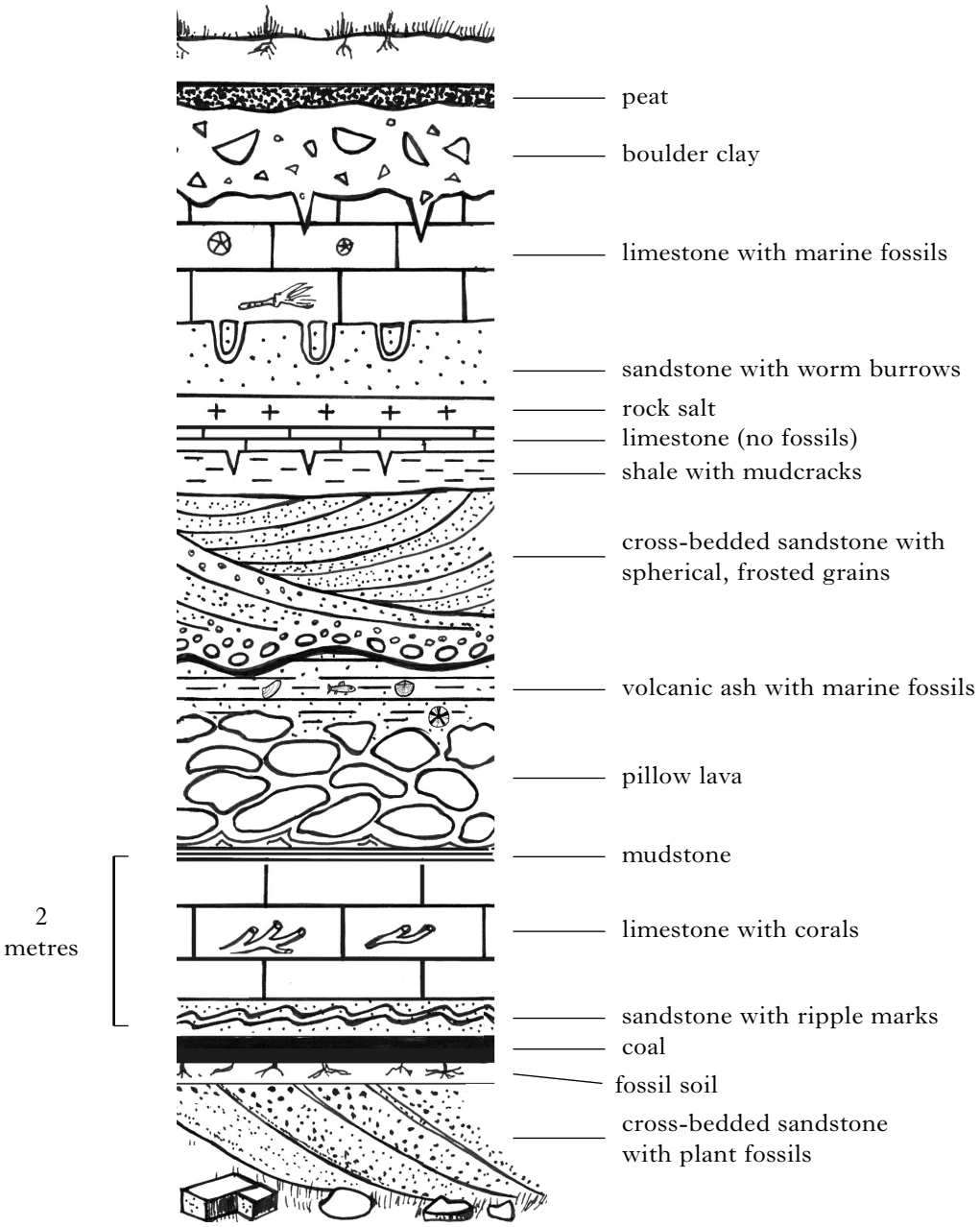
How formed (*Labelled diagrams must be used*).

2

[Turn over

6. (continued)

(*c*) The diagram shows the rocks seen in the quarry.



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Marks

6. (*c*) (continued)

Write a geological history of the rocks and structures seen in the quarry.

6

[Turn over

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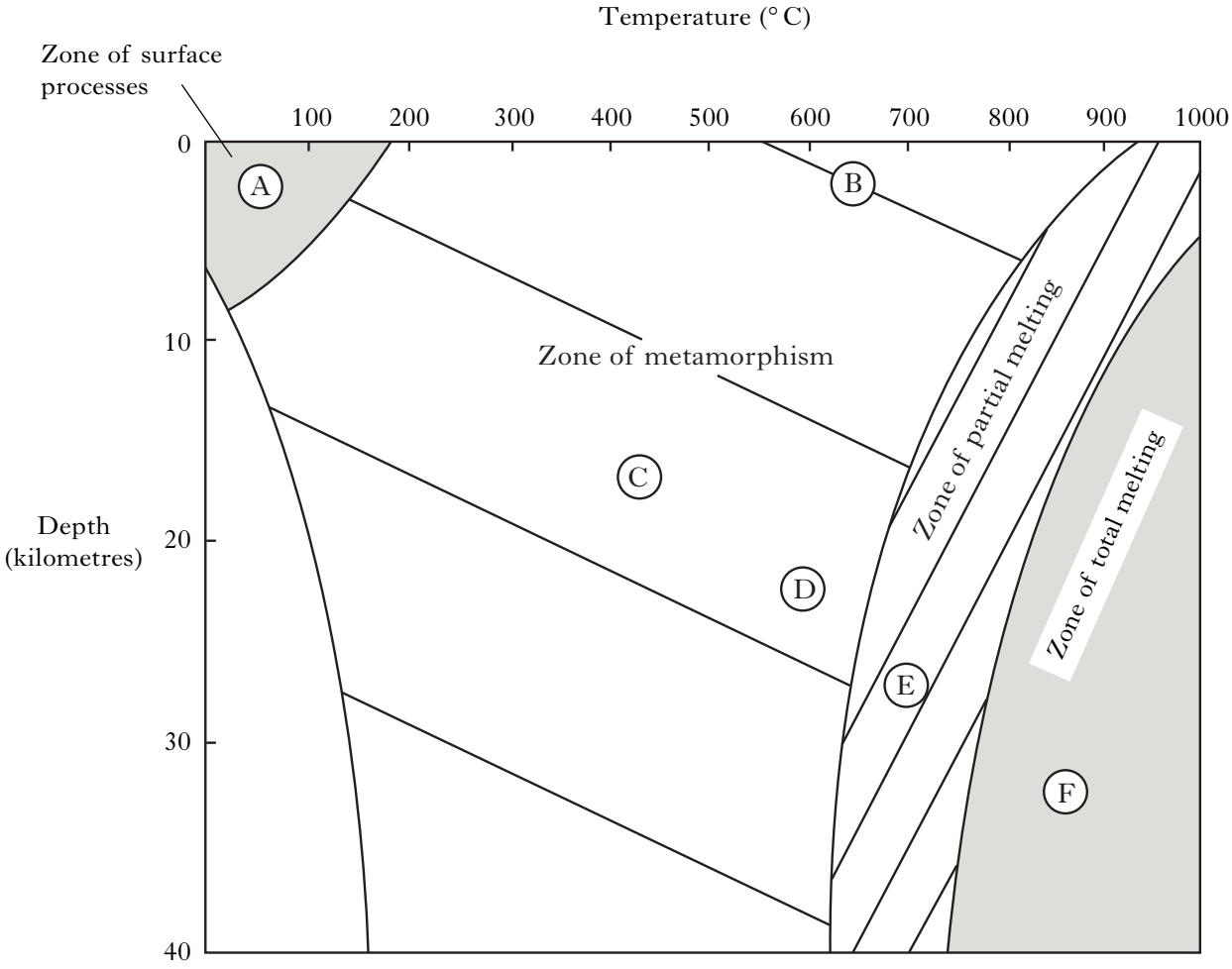
Marks

7. (*a*) The diagram shows the conditions of temperature and depth under which rocks form.



Complete the table below by matching the rocks in the word box to positions A–F on the diagram.

hornfels; gneiss; granite; mudstone; migmatite; schist

Position on diagram	*Rock name from word box*
A	
B	
C	
D	
E	
F	

3

7. (continued)

(*b*) The table shows how temperature changes with distance away from two intrusions surrounded by sandstone.

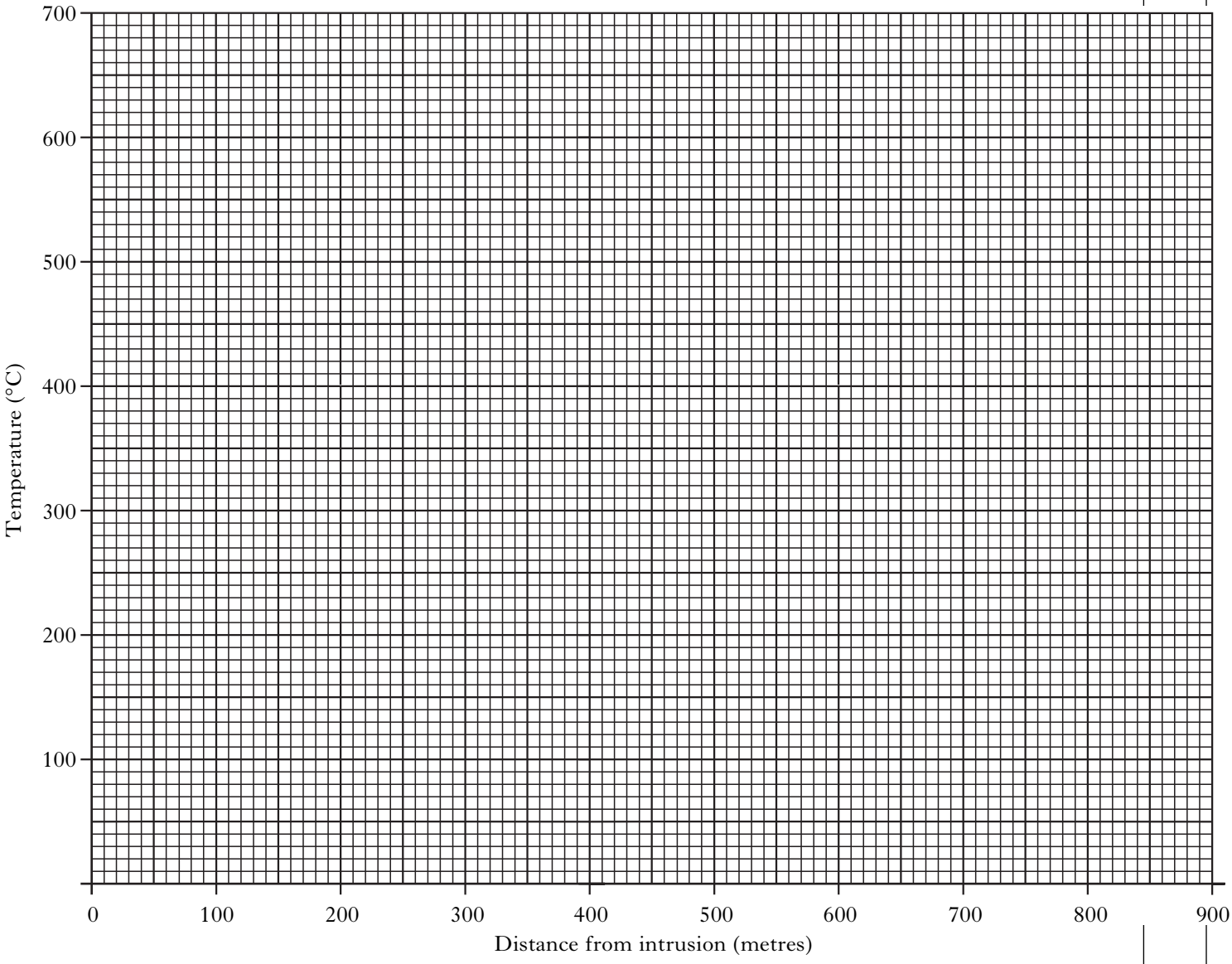
Temperature (° C)	*Distance from intrusion X* (metres)	*Distance from intrusion Y* (metres)
650	0	0
500	65	35
400	115	70
300	200	130
200	400	250
100	700	500
100	800	600
100	900	700

DO NOT WRITE IN THIS MARGIN

Marks

7. (*b*) (continued)

(i) On the graph below, draw line graphs to show how temperature changes away from intrusions X and Y. Label the lines **intrusion X** and **intrusion Y**. **3**



(ii) What general relationship is shown by the line graph for intrusion X?

.....

.....

..... **2**

(iii) What was the temperature of the sandstone before X and Y were intruded?

..... **1**

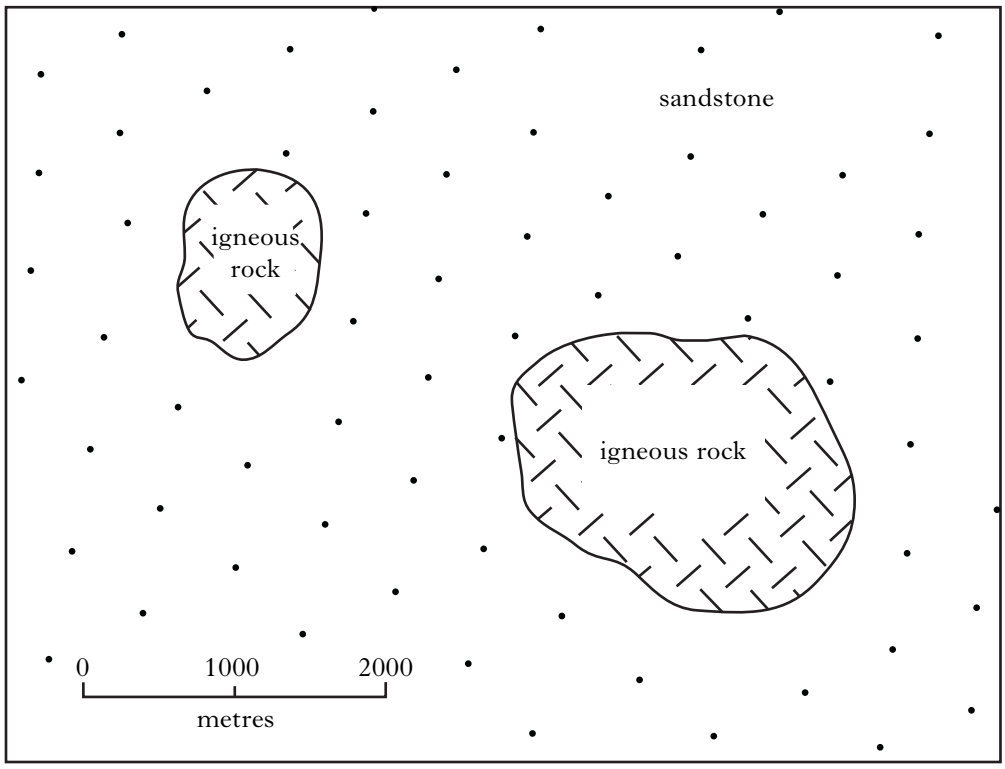
[Turn over

Marks

7. (*b*) (continued)

(iv) On the map below,

- label intrusions X and Y
- using the scale provided, draw a line around each intrusion to show the zones of metamorphism around the intrusions.



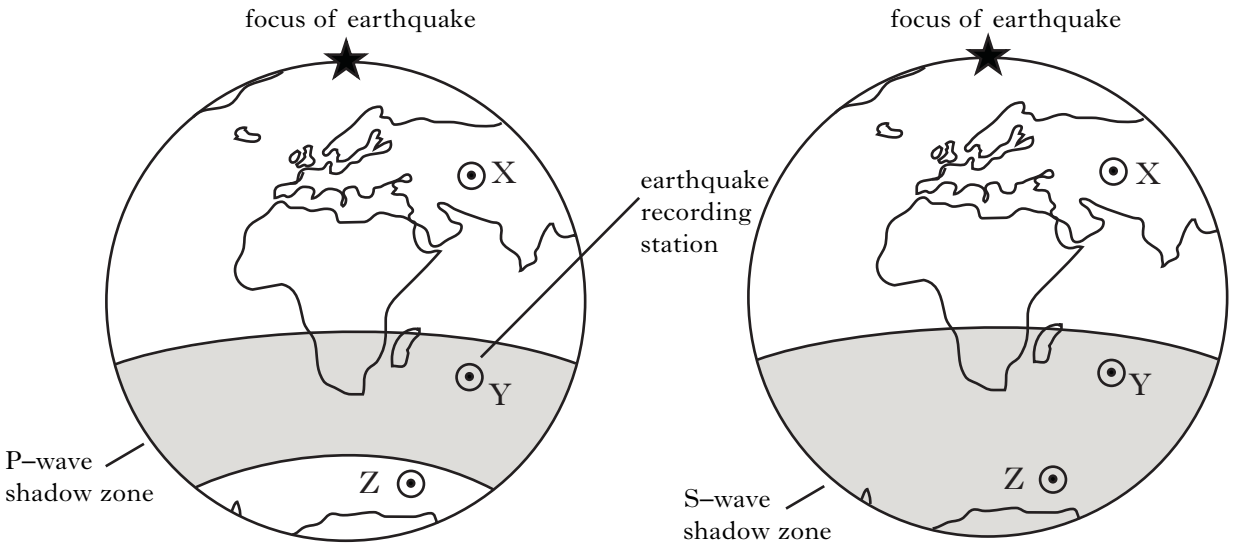
3

[Turn over for Question 8 on *Page twenty-four*

Marks

8. An earthquake took place at the North Pole.

The diagrams show P– and S–wave shadow zones for this earthquake and the positions of recording stations X, Y and Z.



(*a*) Which **two** of the following statements are correct?

A The study of earthquake waves tells us where discontinuities such as the Moho are located inside the Earth.

B The P–wave shadow zone results from the fact that P–waves cannot travel through the solid inner core.

C P–waves travel through the Earth at a constant speed and in a constant direction.

D Scotland has no earthquakes because it is not close to a plate boundary.

E The S–wave shadow zone results from the fact that S–waves cannot travel through the liquid outer core.

F All earthquakes are produced by movements on faults.

Give only the letters: ..... and **2**

Marks

8. (continued)

(*b*) Diagram 1 below shows the earthquake recording made at station X.

Complete Diagrams 2 and 3 to show the recordings you would expect to see at recording stations Y and Z.

Diagram 1

Earthquake recording at station X

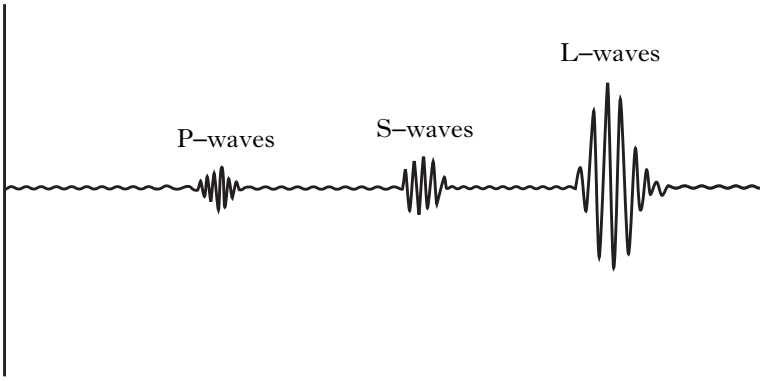


Diagram 2

Earthquake recording at station Y

Diagram 3

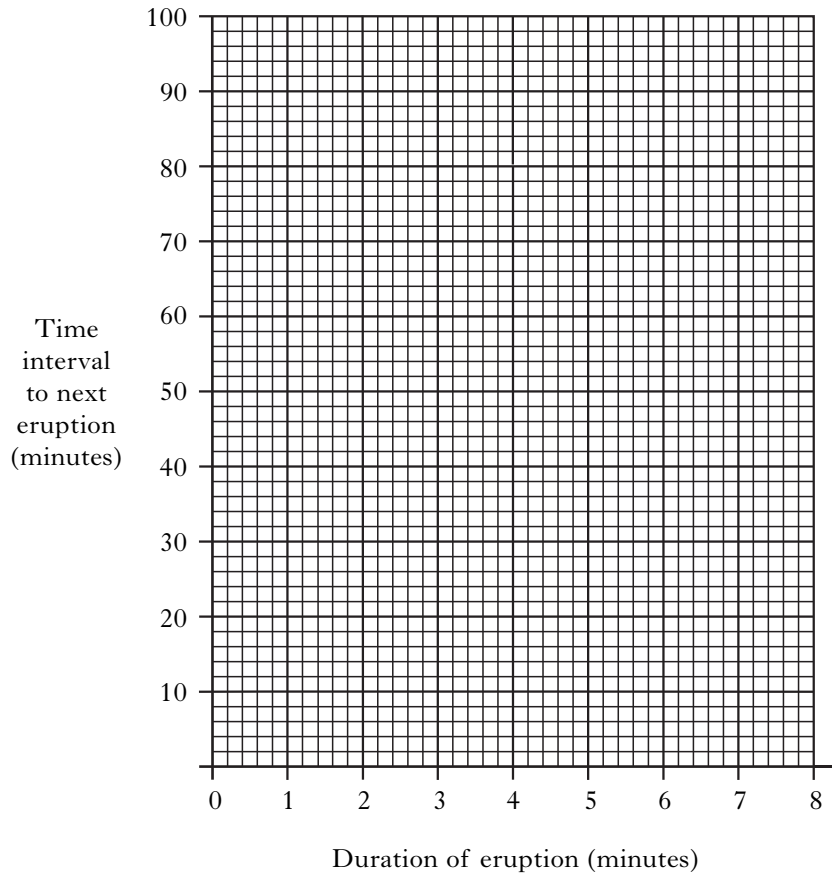
Earthquake recording at station Z

3

9. The table gives information on the eruption of Old Faithful Geyser in Yellowstone National Park, USA.

Duration of eruption (minutes)	*Time interval to next eruption* (minutes)
1·5	45
2·0	52
3·0	65
4·0	75
4·5	80
5·0	84

(*a*) On the graph below, draw a line graph of duration of eruption against time interval to next eruption.



2

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9. (continued) *Marks*

(*b*) (i) What general relationship is shown by the graph?

.....

..... **1**

(ii) Give **one** reason to explain why this relationship exists.

.....

.....

..... **1**

(*c*) (i) If the eruption lasted for seven minutes, how long would it be before the next eruption took place?

..... **1**

(ii) Give **one** reason to explain why you could not make an accurate prediction of the time interval to the next eruption for an eruption which lasts for 15 minutes.

.....

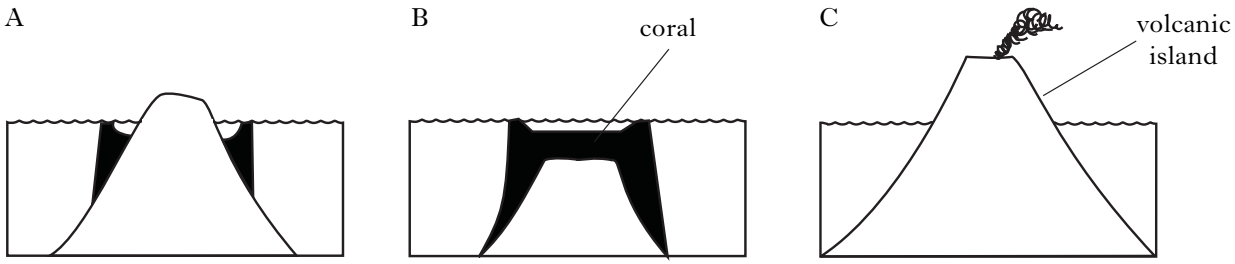
.....

..... **1**

[Turn over

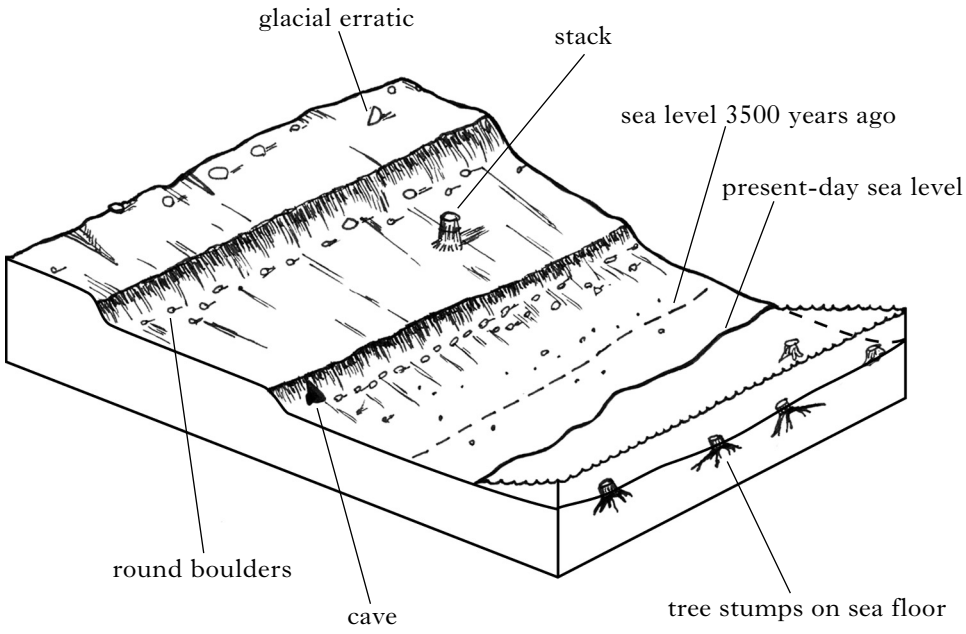
Marks

10. (*a*) Place the stages of atoll formation in order from oldest to youngest.



Give only the letters: ..... → ..... → **1**
oldest youngest

(*b*) The diagram shows features of a British coast. Explain why sea and land levels have changed.



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..... **2**

11. The diagram shows a plate boundary.

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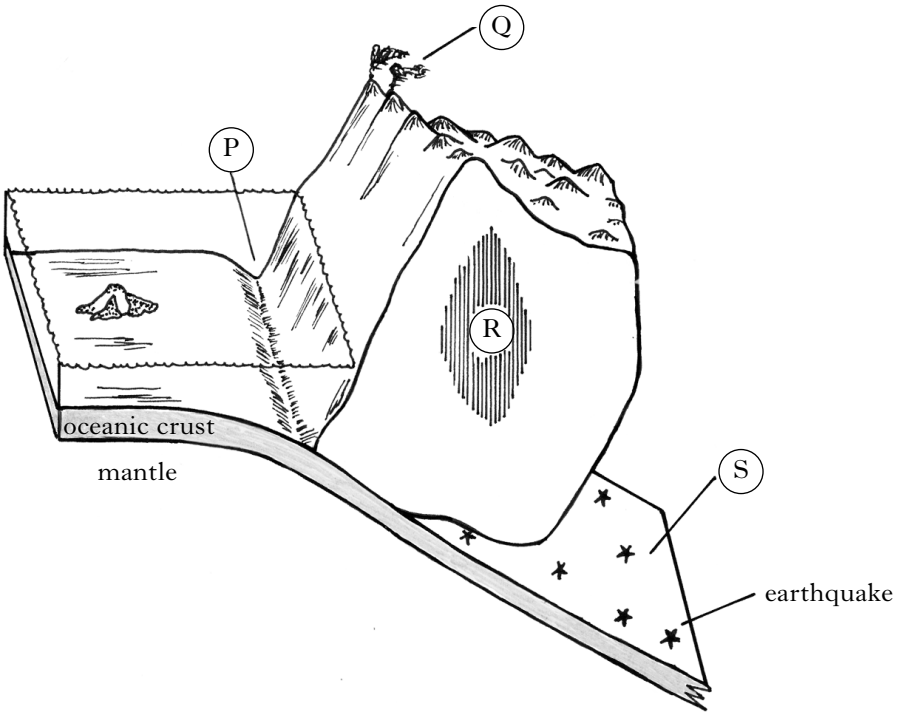
Marks



(*a*) What type of plate boundary is shown?

..... **1**

(*b*) Use **four** of the terms in the word box to name features P–S.

Site of andesite eruption
Rift valley
Wadati-Benioff Zone
Site of basalt eruption
Oceanic trench
Site of regional metamorphism

Name of feature P .....

Name of feature Q .....

Name of feature R .....

Name of feature S **2**

(*c*) Give **one** reason to explain why the oceanic crust sinks into the mantle.

.....

.....

..... **1**

[*END OF QUESTION PAPER*]

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