Surname	Centre Number	Candidate Number
First name(s)		2

GCE AS

B480U10-1

O20-B480U10-1

TUESDAY, 6 OCTOBER 2020 – AFTERNOON

GEOLOGY – AS component 1

Geological Enquiries

1 hour 30 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**7**	
2.	**7**	
3.	**10**	
4.	**13**	
5.	**5**	
6.	**5**	
7.	**13**	
Total	**60**	

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ADDITIONAL MATERIALS

In addition to this examination paper, you will need:

- the Resource Sheet
- **Specimens C, D, G** and **H**
- geological equipment for testing specimens
- the Mineral Data Sheet
- a calculator
- a protractor
- a ruler

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The geology is **not** designed to represent any particular area.

The Mineral Data Sheet and **Map 1** and **Photographs 1** and **2** are provided on separate resource sheets.

Strips of plain paper may be obtained from the supervisor on request.

Four specimens, **C, D, G** and **H**, are provided for use.

The number of marks is given in brackets at the end of each question or part-question.

The assessment of the quality of extended response (QER) will take place in question **3***(b)*.

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Answer **all** *questions in the spaces provided.*

Study **Map 1** on the Resource Sheet before answering **Questions 1-7**.

1. **Photograph 1** is representative of **Rock Unit B**, an oolitic limestone on **Map 1**.

(a) Refer to **Photograph 1**.

(i) Describe the texture of **Rock Unit B**. [2]

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(ii) Calculate the actual length of grain **A** between **P** and **Q**. Show your working. [2]

Actual length .....

(b) Describe and explain the evidence that **Rock Unit B** has undergone diagenesis. [3]

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2. **Specimen C** is representative of **Rock Unit C** on **Map 1.**

(a) (i) Complete **Figure 2** by drawing the texture of **Specimen C** to the scale provided. [3]

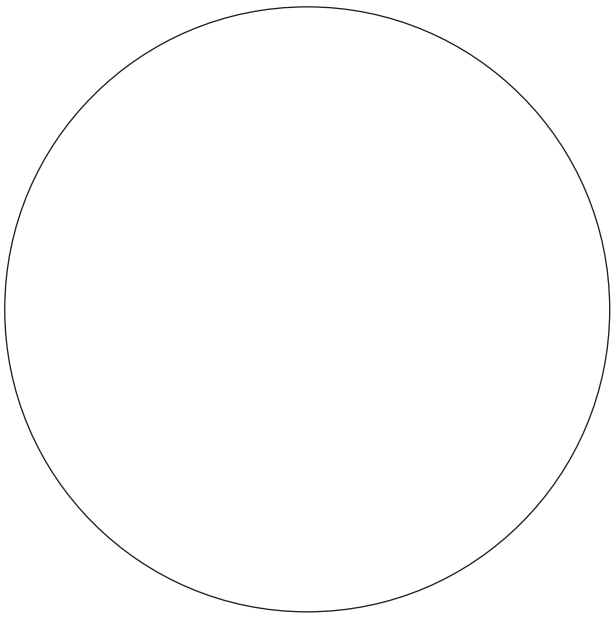

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Figure 2

(ii) State the name of **Specimen C**. [1]

.....

(b) Describe the energy level during transportation of the clasts of **Specimen C**. Give **two** reasons for your answer. [3]

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3. **Specimen H** is a clast found in **Rock Unit C** on **Map 1**. It contains coral.

(a) (i) Draw in **Figure 3** a coral from **Specimen H** to the scale provided. [3]

(ii) Label **one** of the septa on your drawing. [1]

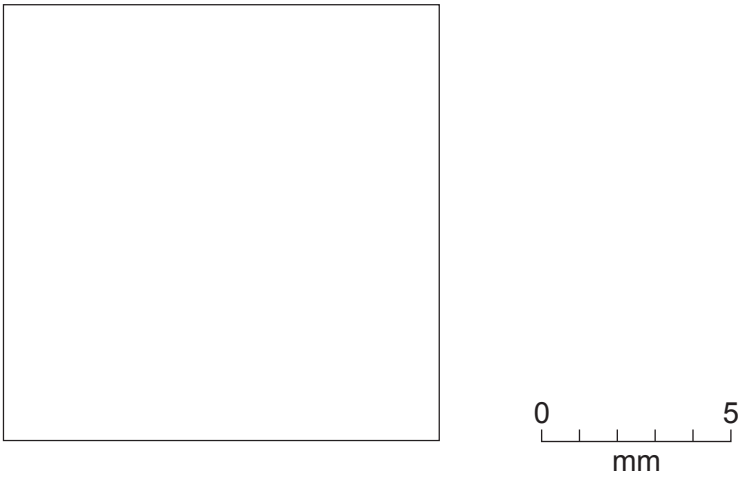

Figure 3

(b) A student suggested that **Specimen H** and **Rock Unit B** were formed in a shallow marine environment and at the same time.

Evaluate this statement with reference to:

- **Photograph 1**
- **Specimen H**
- **Rock Unit C**
- **Map 1**

[6 QER]

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4. **Photograph 2** shows igneous structures found within **Rock Unit D** on **Map 1**.

(a) (i) State the name of the structures shown in **Photograph 2**. [1]

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(ii) Calculate the mean width of the three structures, **X**, **Y** and **Z**, indicated in **Photograph 2**. Show your working. [2]

Mean Width .....

(iii) Draw a sketch of **Photograph 2** in **Figure 4a** below. Use the scale provided. [2]

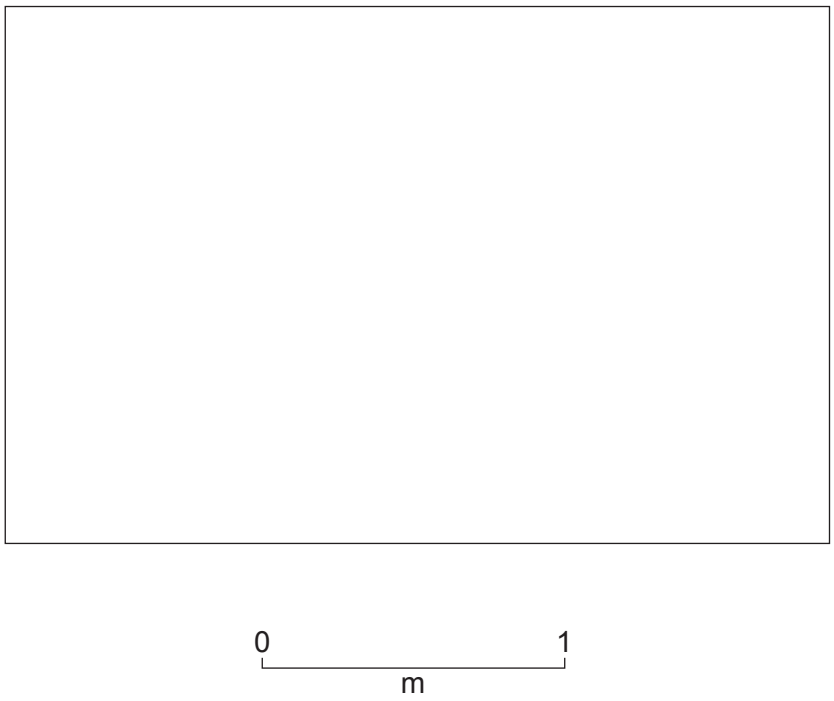

Figure 4a

(iv) Annotate your sketch to explain how the igneous structures in **Photograph 2** formed. [2]

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(b) **Specimen D** is representative of **Rock Unit D**.

(i) State **two** pieces of evidence from **Specimen D** only that enable **Specimen D** to be identified. [2]

1 .....

.....

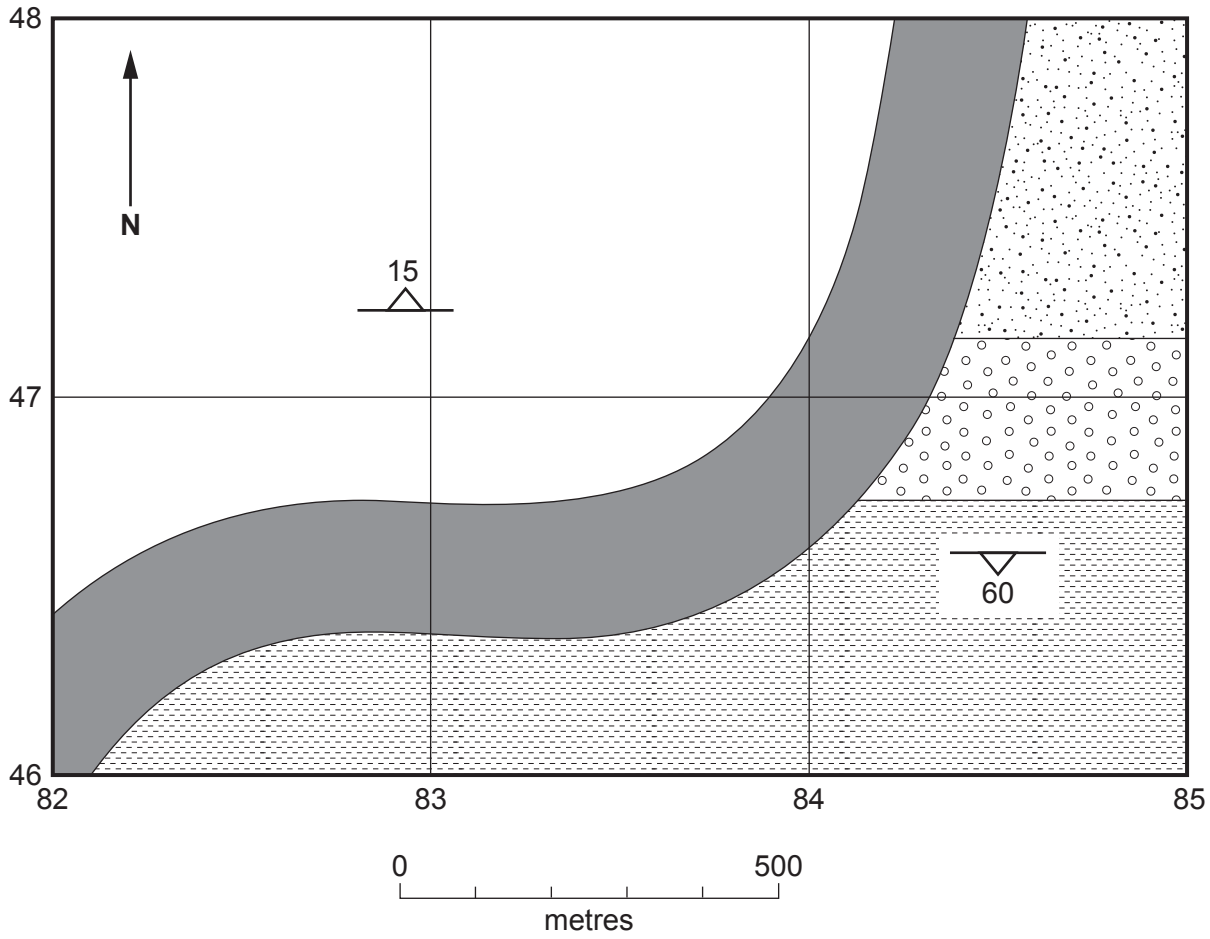
2 .....

.....

(ii) State the name of **Specimen D**. [1]

.....

(c) **Map 2** shows the geology in **Box J** on **Map 1**. The key for the rock units is the same as for **Map 1**.



Map 2

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Figure 4b is a field sketch of an exposure on **Map 2**.

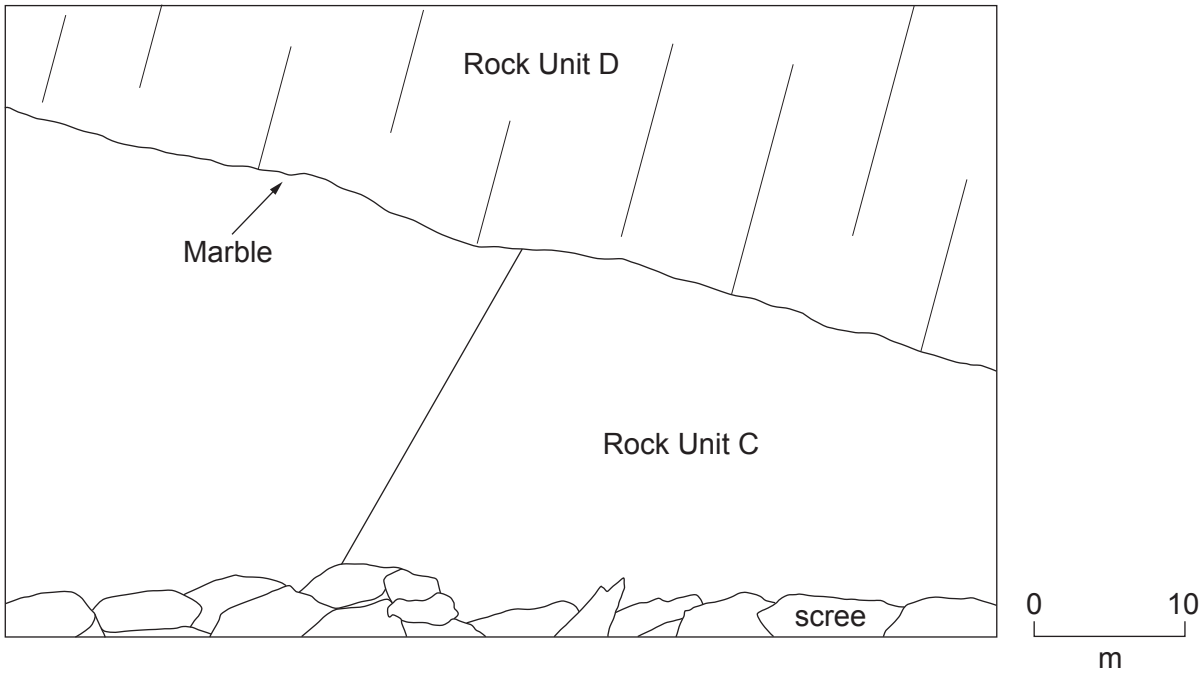

Figure 4b

Using **Map 2** give a six-figure grid reference for the location of the exposure shown in **Figure 4b**. Explain your answer. [3]

Grid Reference .....

Explanation

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13

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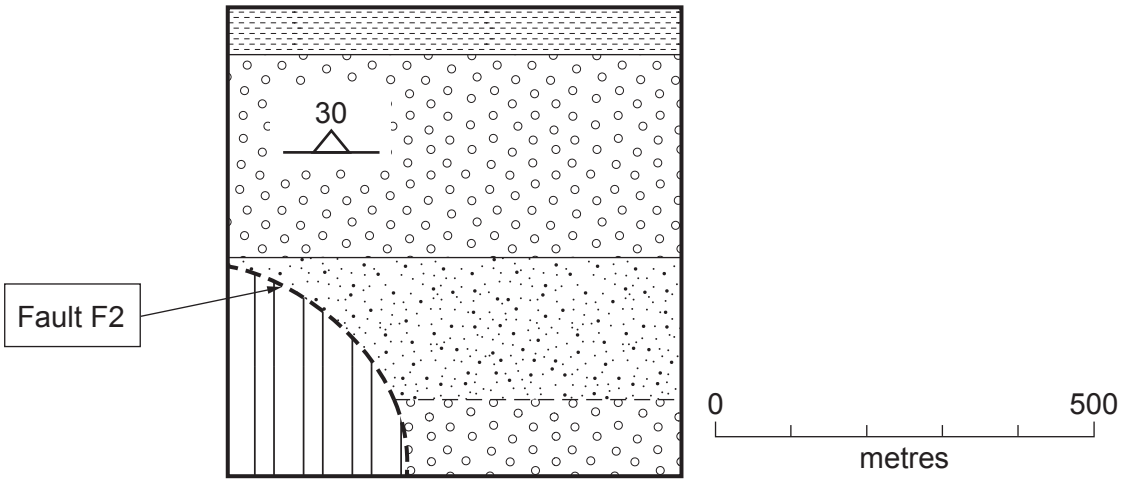
5. **Map 3** shows the geology in **Box K** on **Map 1**. The key for the rock units is the same as for **Map 1**. **Specimen G** is representative of **Rock Unit G**, which is above **Fault F2** on **Map 1**.



Map 3

(a) A student has correctly identified that **Specimen G** is gneiss. State:

- **one** piece of evidence from **Map 1**
- **one** piece of evidence from **Specimen G**

that supports this identification. [2]

Map 1 .....

.....

Specimen G .....

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(b) The student produced the following relative age sequence of the rock units on **Map 3**.

Youngest
G
F
B
Oldest
C

Evaluate this relative age sequence. [3]

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6. Refer to faults **F1**, **F2** and **F3** on **Map 1**.

(a) Complete **Table 6** to compare faults **F1**, **F2** and **F3**. [4]

	F1	F2	F3
Direction of dip		south	west
Relative movement of hanging wall		•	downwards
Estimated dip angle of fault plane	•	20°	78°
Fault type [normal, reverse, thrust, strike-slip]	•	thrust	•

Table 6

(b) State which **one** of the following is correct. Tick (✓) **one** box only. [1]

☐ **F2** is older than the unconformity and **F1**

☐ **F1** is younger than **Rock Unit A** and **F2**

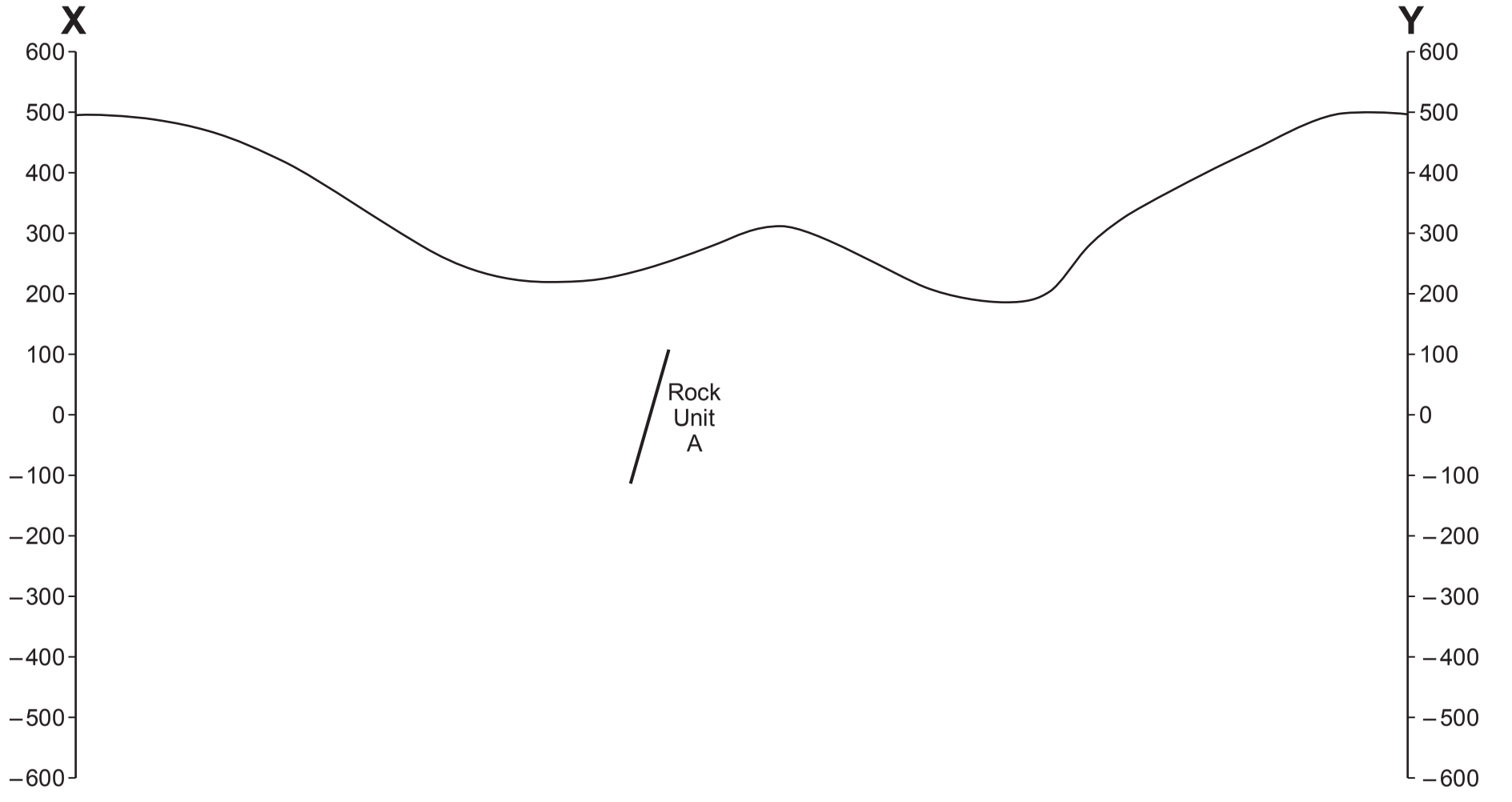
☐ **F1** is younger than **Rock Unit A** and **F3**

☐ **F3** is older than **F1** but younger than **F2**

5

7. The topographic profile below was taken along the line **X-Y** on **Map 1**.
Complete the sketch of the geological cross-section along this line using **Map 1**.

- Draw the rock units. Use similar ornament, or letters, for those as on **Map 1**
- A boundary of **Rock Unit A** has been added
- Draw and label any **fold axes**, with the correct symbol
- Mark on the extent of any metamorphic aureoles
- **Project** the rock units and structures **above** the ground surface to illustrate any cross-cutting relationships. [13]



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13

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