Surname	Centre Number	Candidate Number
Other Names		2

GCE AS – NEW

B480U10-1

S19-B480U10-1

GEOLOGY – AS component 1
Geological Enquiries

MONDAY, 13 MAY 2019 – MORNING

1 hour 30 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**10**	
2.	**13**	
3.	**5**	
4.	**4**	
5.	**10**	
6.	**6**	
7.	**12**	
Total	**60**	

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ADDITIONAL MATERIALS

In addition to this examination paper, you will need:

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

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, 2** and **3** are provided on separate resource sheets.

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

Four specimens, **B, C, G** and **K,** 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 **2**.

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

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

1. **Photograph 1** is an included fragment of a crystalline rock within **Rock Unit D** on **Map 1**. It is not representative of **Rock Unit D**.

(a) Refer to **Photograph 1**. [2]

(i)
- state the name of **Mineral H**
- state **one** mineral property other than those labelled on **Photograph 1** used to identify **Mineral H**.

You should refer to the Mineral Data Sheet.

Name .....

Mineral property .....

(ii) **Mineral H** covers 23.8 cm^2 of **Photograph 1**. Calculate the percentage area of **Mineral H** shown in **Photograph 1**. Show your working. [2]

..... %

(iii) State the name of the rock in **Photograph 1**. [1]

.....

(b) Explain why the crystals in **Photograph 1** indicate that the rock formed from one rate of cooling, deep underground. [2]

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(c) A student suggested that the black mineral in **Photograph 1** could be either biotite mica or augite. Using the Mineral Data Sheet complete **Table 1** by:

- stating how the observation of cleavage would distinguish between both minerals
- describing **one** other test that could distinguish between both minerals
- stating how this second test would distinguish between both minerals. [3]

Description of test	Result of test to show how you would distinguish between biotite mica and augite
• observation of cleavage	•
•	•

Table 1

10

Turn over.

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2. **Table 2** is a description of the beds found within a cliff exposure of **Rock Unit B** at **Locality I** on **Map 1.**

Specimen B, **Specimen K**, **Photograph 2** and **Photograph 3** are all features within the cliff exposure.

	Description
Bed 5	25 cm of mudstone, containing the fossils shown in **Photograph 2**
Bed 4	75 cm of sandstone with structures shown in **Photograph 3**
Bed 3	150 cm of cross-bedded sandstone, coarsening to a well-rounded conglomerate at the top
Bed 2	50 cm of **Specimen B** containing **Specimen K**
Bed 1	50 cm of coal

Table 2

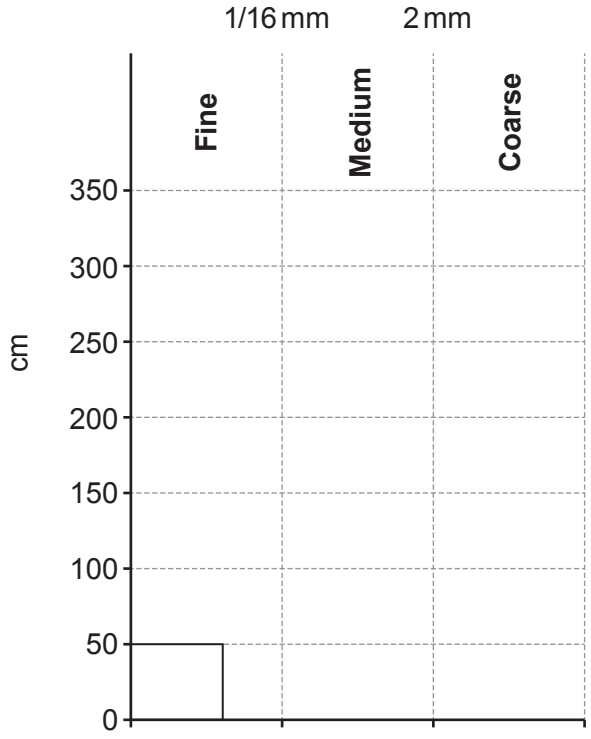

Figure 2

(a) (i) **Figure 2** is a partly completed sedimentary log of **locality I**. Complete the log using the information from **Table 2**. [4]

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

.....

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(b) **Specimen K** is a fossil of the same age as **Rock Unit B**.

State the fossil group represented by **Specimen K**. Give a reason for your answer. [2]

Tick **(✓) one** box only.

goniatite	ammonite	ceratite	brachiopod
☐	☐	☐	☐

Reason .....

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(c) A student correctly concluded that the information in **Table 2** indicates that **Rock Unit B** was deposited in a marine delta. Explain how the information supports this conclusion. [6 QER]

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3. **Photograph 2** is a fossil found in **Rock Unit B** on **Map 1.**

(a) Complete **Figure 3** by drawing the part of the fossil shown within the box on **Photograph 2** using the scale provided. [3]

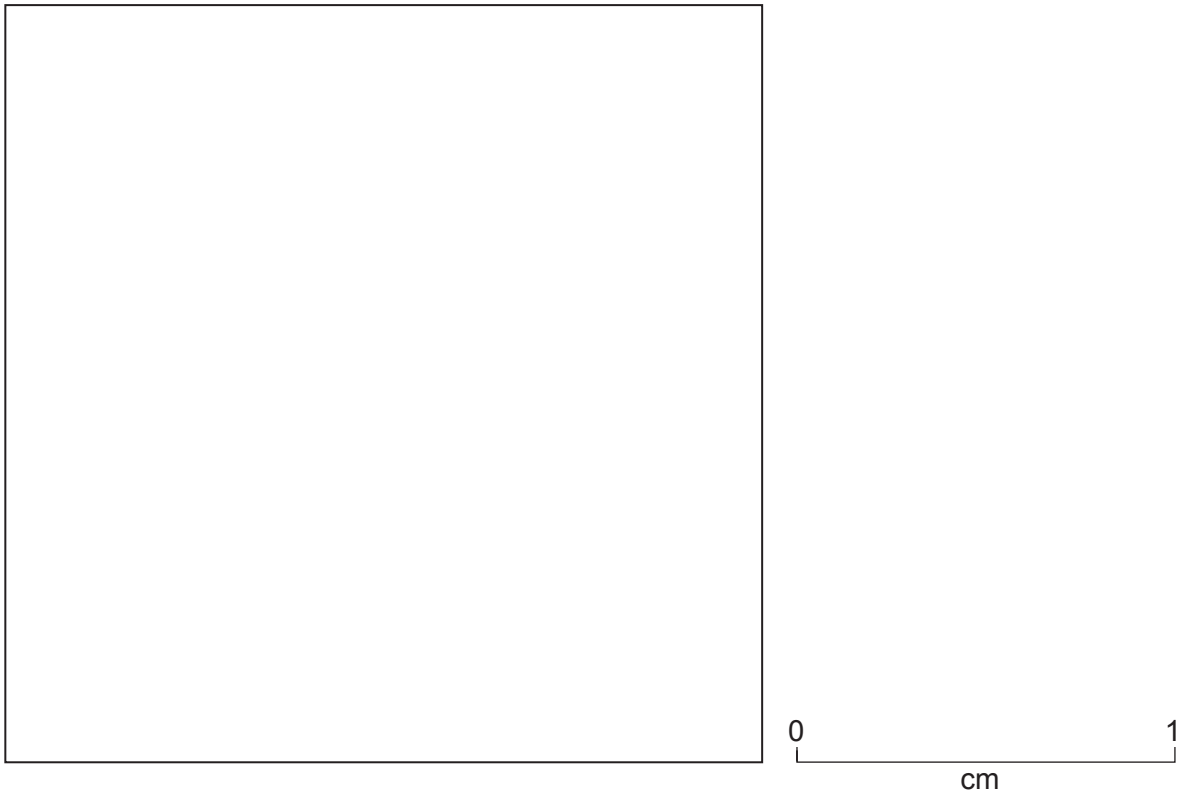

Figure 3

(b) Calculate the magnification used for **Figure 3**. Show your working. [2]

magnification .....

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4. **Rock Unit C** on **Map 1** is sandstone. **Specimen C** was collected from a layer within **Rock Unit C**.

(a) **Specimen C** can be identified by diagnostic tests. Complete **Table 4** by:

- describing the test for which the result is given
- describing **one** other test/observation which is a useful property for diagnosis and stating the result. [3]

Description of test/observation	Result of the test/observation described
•	• salty taste
•	•

Table 4

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

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4

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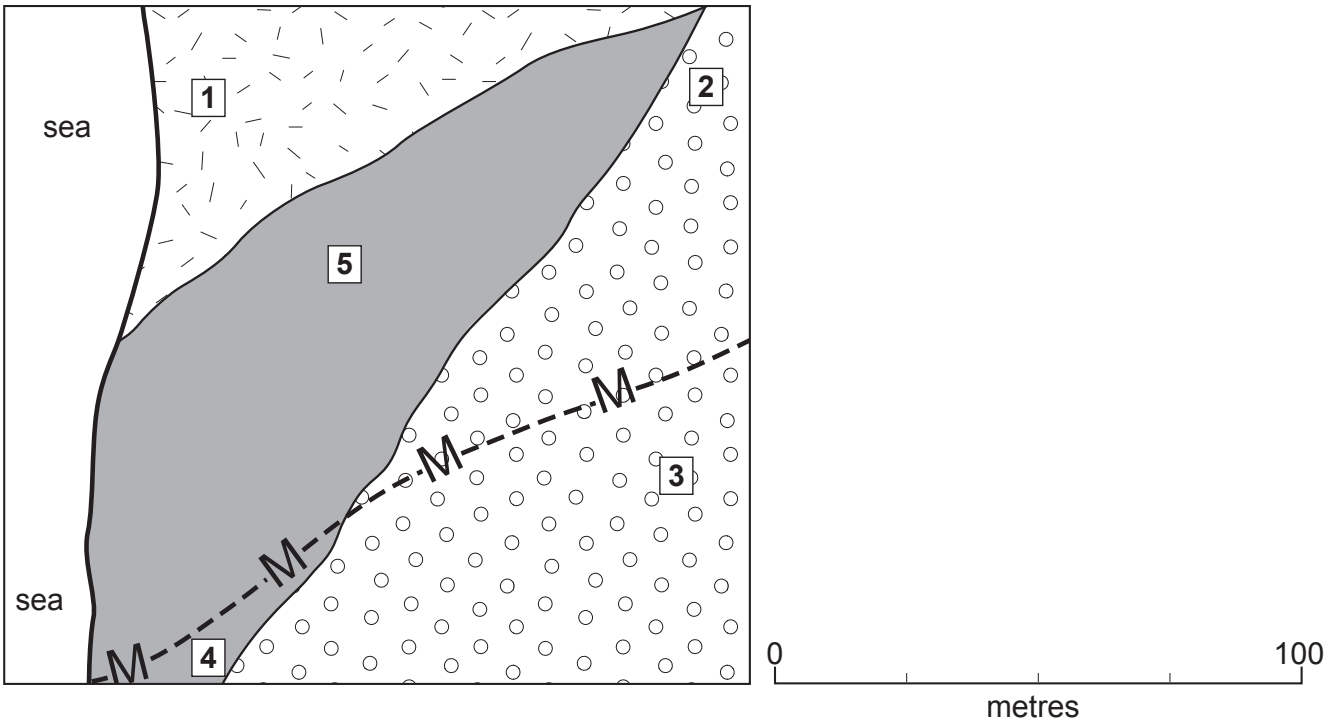
5. **Map 2** shows the geology in **box A** on **Map 1**. The key for the rock units is the same as for **Map 1. Specimen G** was collected from one of the sites **(1-5)** shown on **Map 2.**



Map 2

(a) Complete **Figure 5** by drawing the texture of **Specimen G** to the scale provided. [3]

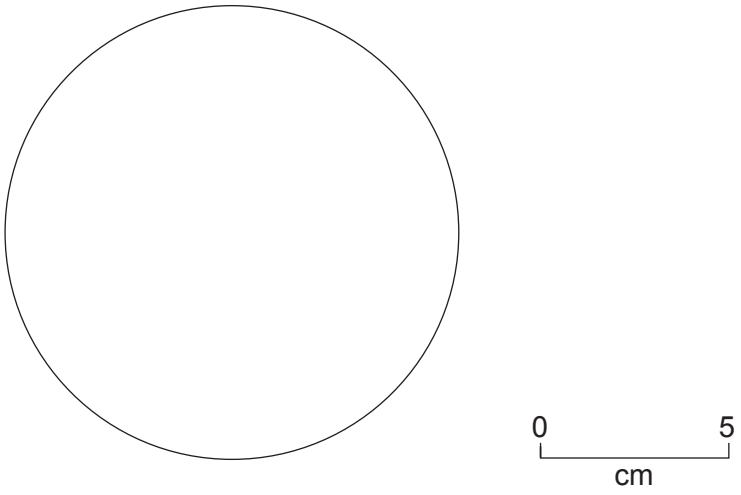


Figure 5

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(b) State the most likely site (**1-5**) on **Map 2** at which **Specimen G** was collected. Give reasons for your answer. [3]

Site

Reasons .....

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.....

(c) A student is planning a field survey of the metamorphic aureole continuously exposed on the coastline on **Map 2** to investigate how metamorphic rocks change with distance from the intrusion.
Design an appropriate sampling method for investigating the change in metamorphic rocks within the aureole. You may wish to annotate **Map 2** to explain your answer. [4]

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6. **Fault F1** and **Fault F2** are dip-slip faults on **Map 1**.

(a) Refer to **Map 1**. Complete **Table 6** to compare **Fault F1** and **Fault F2**. [4]

	F1	F2
direction of dip	northwest	southeast
relative movement of hanging wall	•	upwards
estimated dip angle of fault plane	•	50°
fault type [normal, reverse, thrust, strike-slip]	•	•

Table 6

(b) State which **two** of the following statements are correct. Tick **(✓) two** boxes only. [2]

☐ **F2** is older than the unconformity but younger than **Specimen K**

☐ **F2** is older than the unconformity and **Specimen K**

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

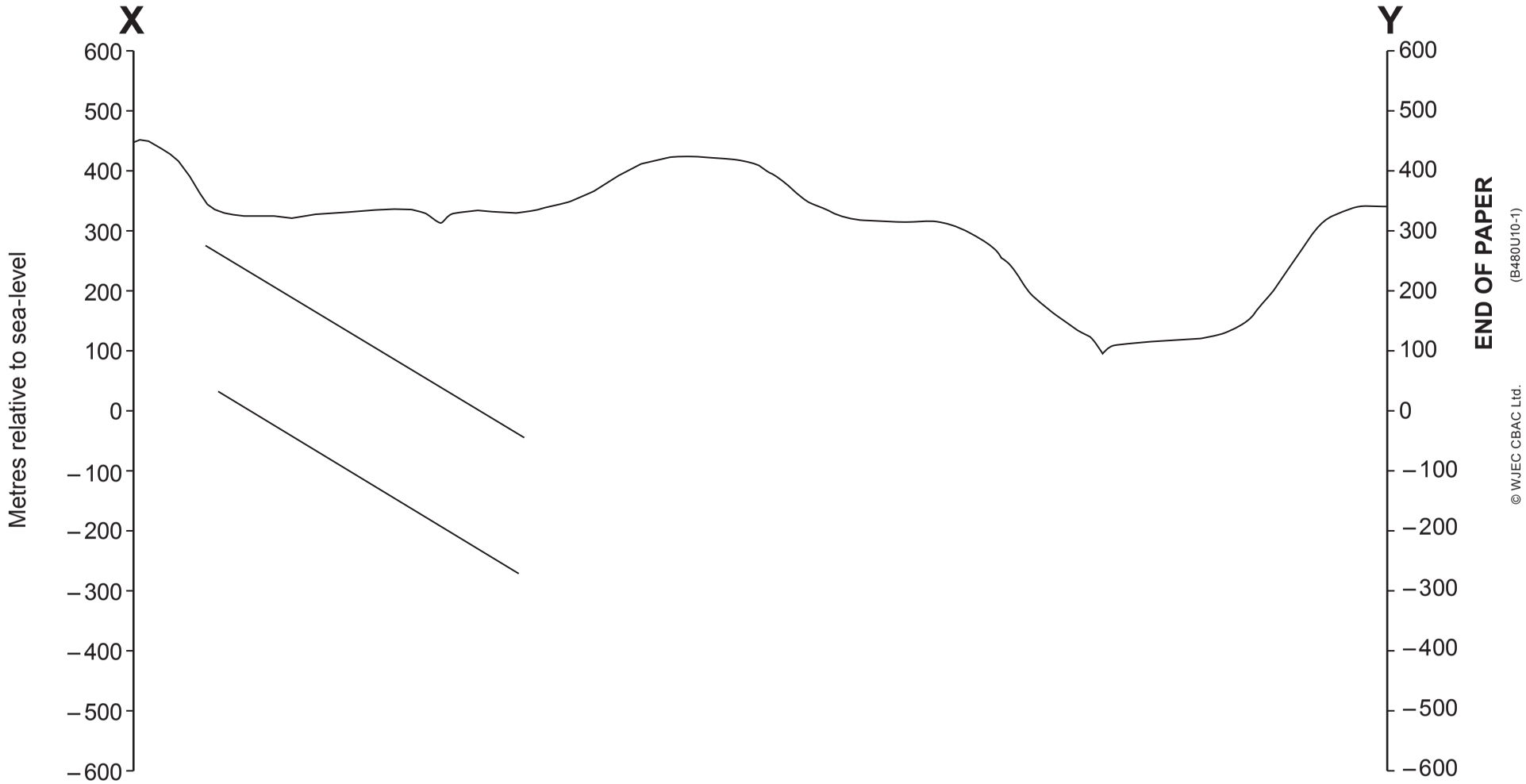
☐ **F1** is older than **F2** but younger than the unconformity

6

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**.
- the top and base of **Rock Unit B** has been added.
- draw and label any **fold axes**, with the correct symbol.
- draw **arrows** to show the relative movement of any faults.
- mark on the extent of any metamorphic aureoles.
- **project** the rock units and structures **above** the ground surface to illustrate any cross-cutting relationships. [12]



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