Surname	Centre Number	Candidate Number
First name(s)		2

GCE AS

B480U10-1

S23-B480U10-1

MONDAY, 15 MAY 2023 – MORNING

GEOLOGY – AS component 1
Geological Enquiries

1 hour 30 minutes

ADDITIONAL MATERIALS

In addition to this examination paper, you will need:

- the Resource Sheet
- **Specimens B**, **C**, **L** and **N**
- the Photographs of Specimens Sheet
- geological equipment for testing specimens
- the Mineral Data Sheet
- a calculator
- a protractor
- a ruler

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

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INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid. You may use a pencil for graphs and diagrams only.

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. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

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

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

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

Four specimens, **B**, **C**, **L** and **N**, 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 **5**(c).

Examiner only

Answer **all** questions.

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

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

(a) (i) Complete **Figure 1** by drawing the texture of **Specimen C** to the scale provided. [3]

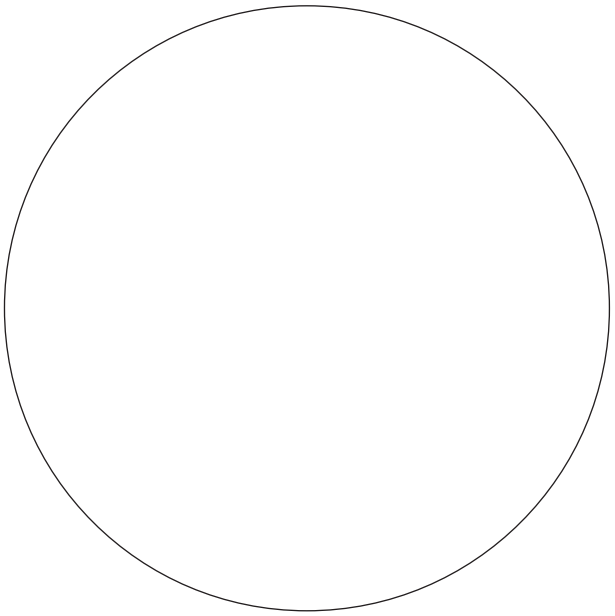

Figure 1

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

.....

(b) Describe the environment of deposition of **Specimen C**. [3]

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

(a) State the name of **Specimen B**. Give **two** pieces of evidence for your answer. [3]

Name .....

Evidence 1 .....

.....

Evidence 2 .....

.....

(b) **Photograph 1** on the resource sheet shows **Rock Unit A**.

A student has concluded that **Rock Unit B** was produced from the same intrusive event as **Rock Unit A**. Using **Specimen B**, **Photograph 1** and **Map 1** evaluate this conclusion. [4]

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3. **Specimen L** is a modern shell representative of bivalve fossils found in **Rock Unit C** on **Map 1**.

(a) (i) Draw in **Figure 3a** the **internal** view of **Specimen L** to the scale provided. [3]

(ii) Label a muscle scar on **Figure 3a**. [1]

(iii) Label the pallial sinus on **Figure 3a**. [1]

Figure 3a

(b) The length of fifteen bivalve fossils found in **Rock Unit C** was measured. These measurements are given in **Table 1**.

Length (cm)	Tally
$0 < x \leqslant 3$	III
$3 < x \leqslant 6$	𝍸 IIII
$6 < x \leqslant 9$	II
$9 < x \leqslant 12$	I

Table 1

Examiner only

(i) Draw a histogram on **Figure 3b** using the data in **Table 1**. [2]

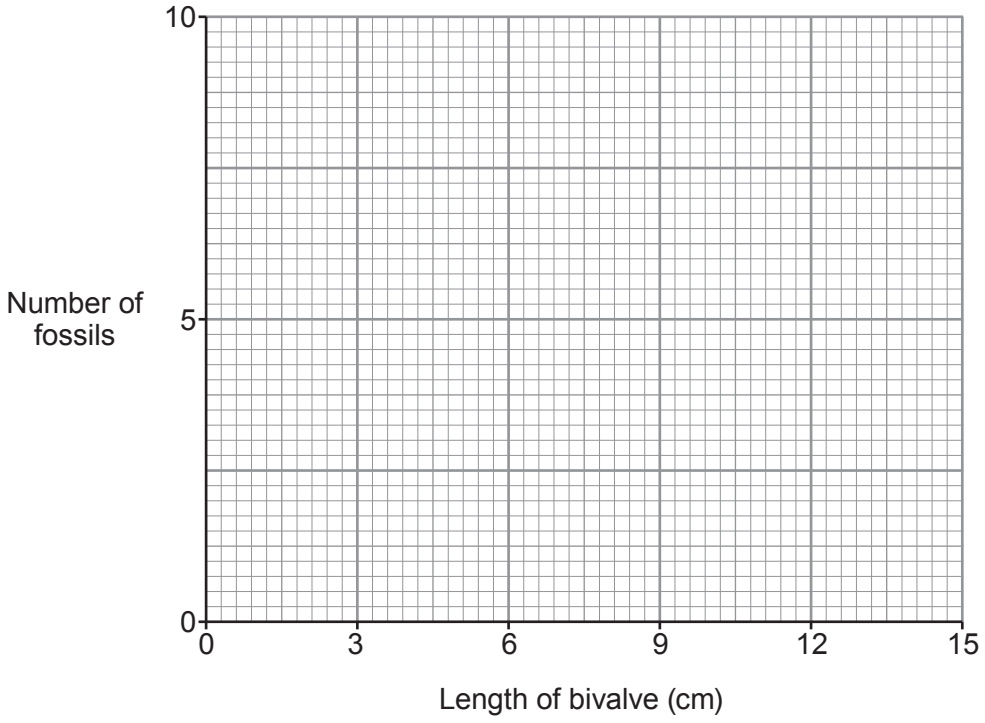

Figure 3b

(ii) State the modal group of the data in **Table 1**. [1]

.....

(iii) A student has concluded that the fossil bivalves form a life assemblage. Evaluate the reliability of this conclusion given the data provided. [4]

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4. **Specimen N** was collected from a vein within **Rock Unit D**.

(a) **Specimen N** can be identified by diagnostic tests. Complete **Table 2** by:

- describing the result of the hardness test
- 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
Scratch **Specimen N** with a copper coin	•
•	•

Table 2

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

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4

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5. **Figure 5** shows the variation in mean crystal size along transect **P–Q** on **Map 1**.

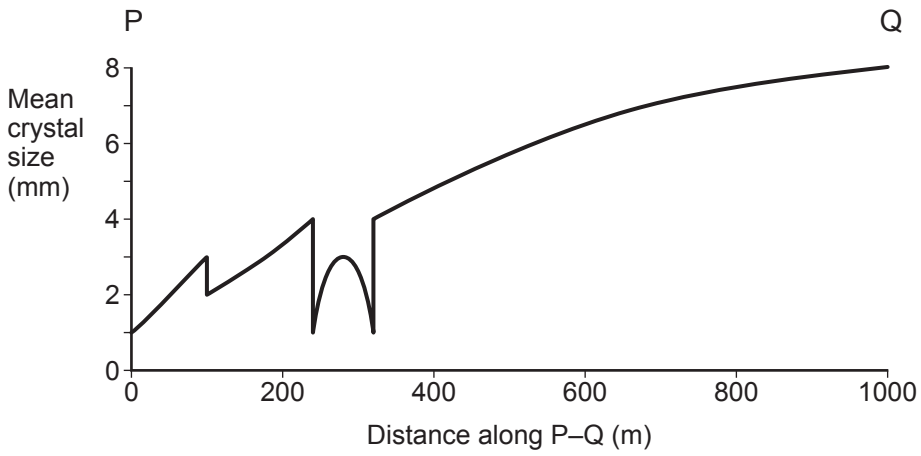

Figure 5

Refer to **Figure 5.**

(a) Describe the change in mean crystal size along transect **P–Q**. [3]

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(b) With reference to sampling methods, explain how the data may have been collected. [3]

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(c) Explain the change in mean crystal size along the transect **P–Q** on **Figure 5** and **Map 1**. [6 QER]

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6. Refer to **Fault F1** and **Fault F2** on **Map 1**.

(a) Complete **Table 3** to compare **Fault F1** and **Fault F2**. [4]

	Fault F1	Fault F2
Direction of dip of fault plane	northwest	
Relative movement of hanging wall	•	
Estimated dip angle of fault plane	70°	•
Fault type [normal, reverse, thrust, strike-slip]	•	•

Table 3

(b) Calculate the displacement of **Fault F2** in kilometres. Show your working. [2]

..... km

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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**
- Draw and label any **fold axes**, with the correct symbol
- Draw and label 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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END OF PAPER

Turn over.

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

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