Surname	Centre Number	Candidate Number
Other Names		2

GCE AS – NEW

B480U10-1

S18-B480U10-1

GEOLOGY – AS component 1
Geological Enquiries

MONDAY, 14 MAY 2018 – MORNING

1 hour 30 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**7**	
2.	**12**	
3.	**7**	
4.	**7**	
5.	**3**	
6.	**7**	
7.	**13**	
8.	**4**	
Total	**60**	

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ADDITIONAL MATERIALS

In addition to this examination paper, you will need:

- the Resource Sheet
- **Specimens A, C, D** and **H**
- 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, **A, C, D** 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 **2**.

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

Study **Map 1** on the Resource Sheet carefully before answering **Questions 1-8**.

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

(a) It has been suggested that **Rock Unit D** forms a pluton. Study **Map 1** and **Specimen D**. Give **one** piece of **map** evidence and **one** piece of evidence from **Specimen D** to support this suggestion. [2]

	Evidence
Map 1	•
Specimen D	•

(b) Refer to **Photograph 1** showing **Mineral J** found in **Rock Unit D**:

- state the mineral property that is highlighted by the red lines
- suggest the most likely name for **Mineral J**.

You should refer to the Mineral Data Sheet. [2]

Mineral property .....

Name of **Mineral J** .....

(c) Using evidence from **Specimen D** and **Photograph 1** only, name the rock forming **Specimen D**. Give **two** reasons for your answer. [3]

Name of **Specimen D** .....

Reason 1 .....

.....

Reason 2 .....

.....

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

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

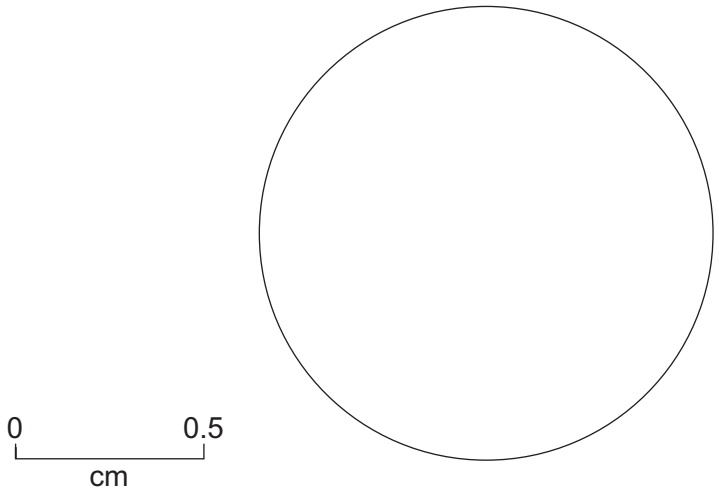

Figure 2

(b) **Specimen C** has been correctly interpreted as having been deposited in a fluvial environment. Explain **three** pieces of evidence for this interpretation. [3]

1. .....

.....

2. .....

.....

3. .....

.....

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(c) A student suggested that "***Rock Unit C*** *is a sedimentary rock formed as a result of the weathering and erosion of* ***Rock Unit D***".

Evaluate this statement with reference to: [6 QER]

- **Map 1**
- **Specimen D**
- **Specimen C**

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3. A student investigated the density of a mineral using the equipment shown in **Figure 3**.

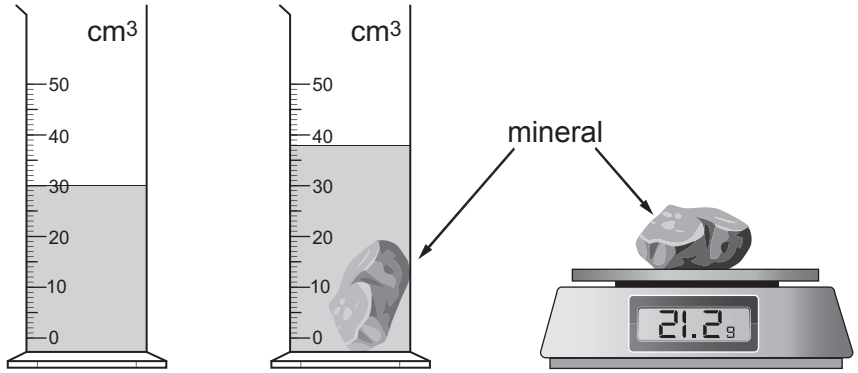

Figure 3

(a) Use the data in **Figure 3** and your knowledge to calculate the density of the mineral. Show your working. [2]

Answer	Units
•	•

(b) Suggest **two** steps that the student should have taken to minimise any errors that could occur using the equipment shown in **Figure 3**. [2]

Step 1 .....

.....

Step 2 .....

.....

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(c) **Specimen H** was collected within the area of **Map 1**.

Complete **Table 3** by:

- describing **one diagnostic** test/observation that will identify **Specimen H**
- stating the **result** of your chosen test/observation
- naming **Specimen H** [3]

Description of test/ observation	Result of the test/ observation described	Name of **Specimen H**
•	•	•

Table 3

7

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4. **Specimen A** is representative of fossils found in **Rock Unit A** on **Map 1**.

(a) (i) Complete **Figure 4** below by drawing **Specimen A** using the scale provided. [3]

(ii) Label **one** *suture line* on your drawing. [1]

Figure 4

(b) **Rock Unit D** has been dated using radiometric dating techniques to be 60Ma. Using evidence from **Map 1** and **Specimen A**:

- state the relative age of **Rock Units A** and **D** by completing **Table 4a**
- state the evidence used from **Map 1** and **Specimen A** by completing **Table 4b** [3]

Statement	Tick (✓) one box only
Rock Unit A is **older** than **Rock Unit D**	
Rock Unit D is **older** than **Rock Unit A**	
Rock Units D and **A** are the **same** age	

Table 4a

Evidence from **Map 1**	•
Evidence from **Specimen A**	•

Table 4b

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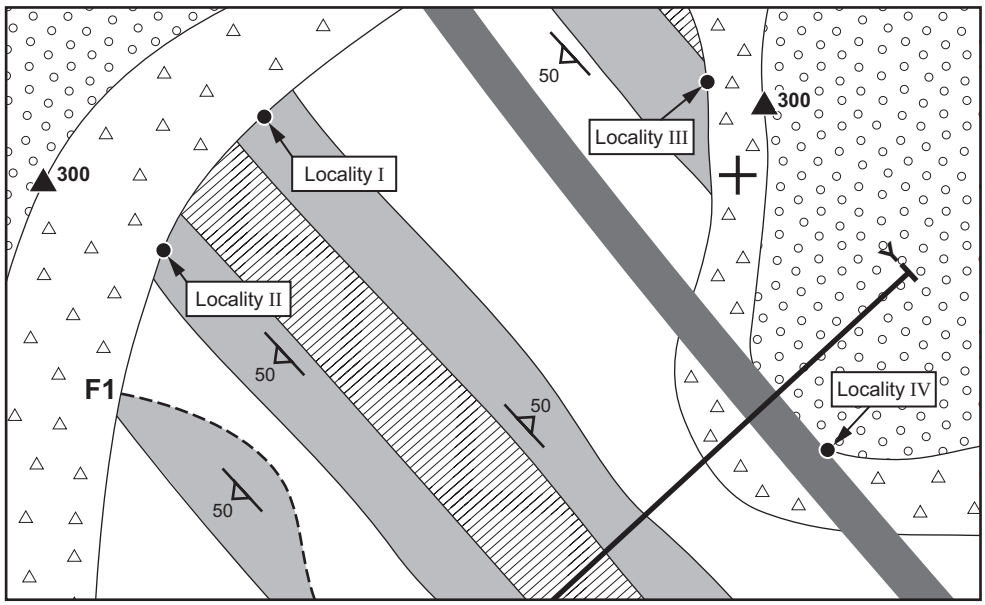
5. **Map 2** below is a reduction of part of **Map 1.** The key for the Rock Units is the same as for **Map 1**.



Map 2

Photograph 2, on **page 4** of the resource sheet, was taken at one of **localities I**, **II**, **III** or **IV** on **Map 2**.

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

Locality I facing towards the **NW** ☐

Locality II facing towards the **NW** ☐

Locality III facing towards the **SW** ☐

Locality IV facing towards the **NW** ☐

(b) **Photograph 2** shows an unconformity. Describe **two** pieces of field evidence, other than **values** of dip and strike, that would support this interpretation. [2]

Evidence

1. .....

.....

2. .....

.....

3

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6. Study **Faults F1** and **F2** on **Map 1**.

(a) Refer to **Map 1**. Complete **Table 6** to compare **Fault F1** and **Fault F2**. [5]

	F1	**F2**
Outcrop pattern	•	•
Angle of dip of fault plane	75°	•
Dip direction of fault plane	north east	N/A
The direction of fault displacement	vertical	horizontal
Fault type [normal, reverse, thrust, strike-slip]	•	•

Table 6

(b) At **Locality V** on **Map 1** there is a change in the trend of **Rock Unit D**.

- Measure and state this change in direction in degrees.
- Suggest the most likely reason for this change. [2]

Change in direction ..... °

Reason .....

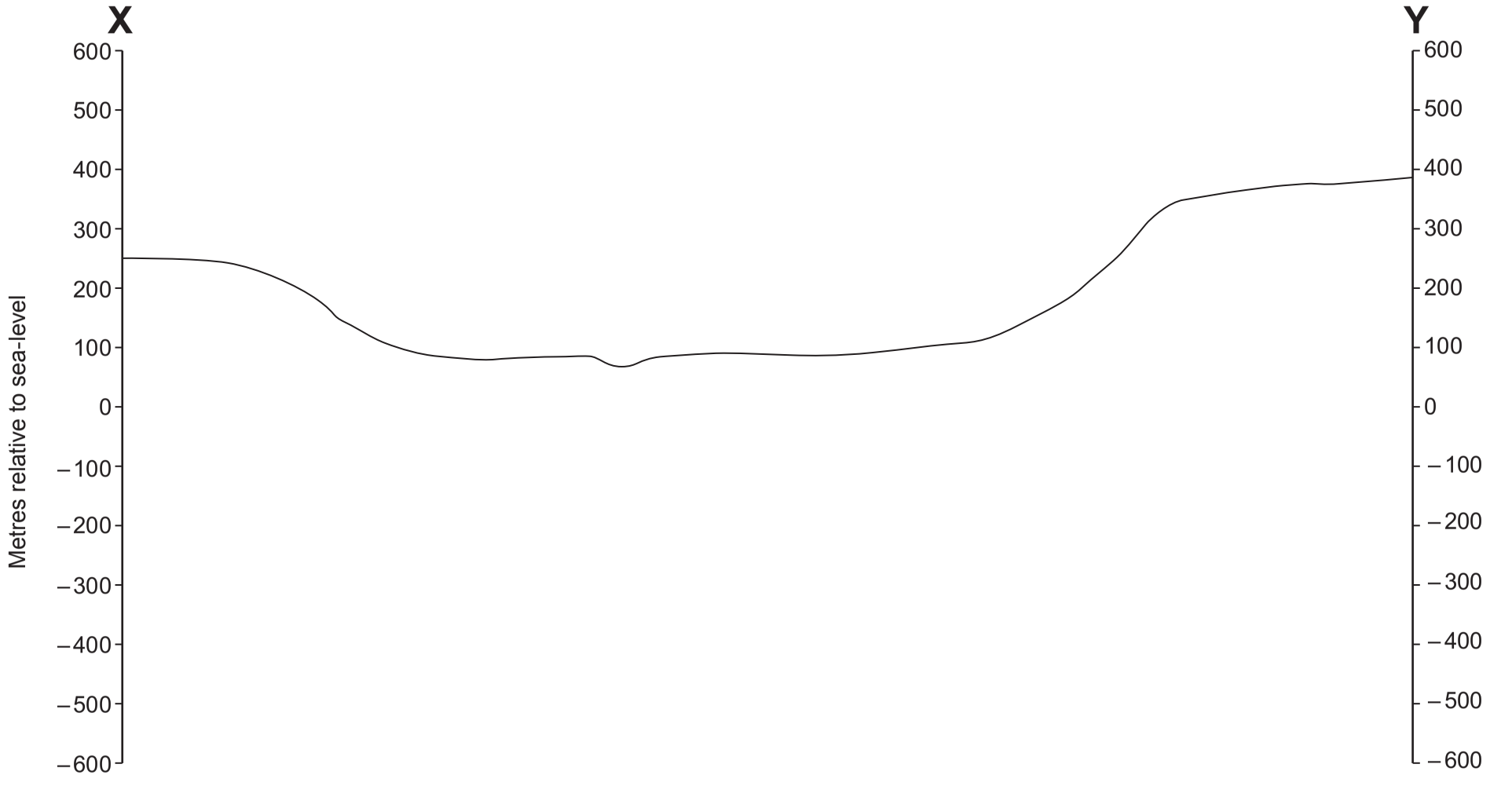
.....

7

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 **arrows** to show the 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. [13]



Examiner only

8. **Photograph 3**, on page 4 of the resource sheet, shows a sedimentary structure within **Rock Unit F** that can be used to determine palaeocurrent direction.

- State the name of the structure.
- Explain how this structure formed.
- Explain how this structure can be used to determine a palaeocurrent direction.

You may wish to use annotated diagram(s) in your answer. [4]

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END OF PAPER