Surname	Centre Number	Candidate Number
First name(s)		2
GCE AS		

wjec B480U20-1

020-B480U20-1



TUESDAY, 13 OCTOBER 2020 – MORNING

GEOLOGY – AS component 2 Foundation Geology

1 hour 30 minutes

For Examiner's use only			
Question	Maximum Mark	Mark Awarded	
1.	14		
2.	15		
3.	14		
4.	15		
5.	15		
6.	17		
Total	90		

ADDITIONAL MATERIALS

In addition to this examination paper, you will need: the Mineral Data Sheet a calculator 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 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 questions **2** and **3**.

Examiner only Answer all questions in the spaces provided. Figure 1a shows a cross-section through the Earth. Table 1 contains information about the Earth and rocks representative of the crust. Lithosphere Crust 0 - 100 km thick Asthenosphere Mantle Mantle 2,900 km Crust Liquid Core Outer core 5,100 km Solid Inner core Not to scale 6,378 km To scale

Figure 1a

	Mass (g)	Volume (cm ³)	Relative Density
Earth	•	1.08 × 10 ²⁷	5.5
Basalt sample (oceanic crust)	58	•	2.9
Granite sample (continental crust)	135	50	•

Table 1

- Complete Table 1 using the data provided. (a)
- (b) Refer to density values in Table 1. Suggest what these indicate about the relative density of layers beneath the crust. Explain how the data supports your answer. [2]

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1.

[3]

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Table 2 shows the relative densities of two meteorites discovered on Earth. **Figure 1b** is a graph showing variation in density through the Earth. Refer to **Table 1**, **Table 2** and **Figure 1b**.

Meteorite	Density	Type (stony, iron)
x	10.5	•
Y	4.1	•

3

(C)





Figure 1b

- (i) Complete Table 2 by naming the type of meteorite (stony or iron) represented by X and Y.
- (ii) Plot the density of meteorites **X** and **Y** with arrows labelled **X** and **Y** on the line on Figure 1b. [2]
- (iii) Explain how the information from the meteorites provides indirect evidence for the composition of the Earth's interior. [3]

(d)	From your knowledge describe one other piece of evidence for the composition and/or rheological properties of the Earth's interior. [3]	Examiner only

5 |Examiner only Figure 2a is a graph showing the number of graptolite groups over time. Number of graptolite groups 40 Μ 20 Ν 0 500 450 400 Age (Ma) Figure 2a (a) Refer to Figure 2a. State the time at which the number of graptolite groups was at its peak. (i) [1] Ма Calculate the percentage change in the number of graptolite groups between point (ii) M and point N. Show your working. [2] Percentage change Evaluate the statement, "the decline in graptolites from point M to point N was due (iii) to a mass extinction". [3]

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2.

Examiner only Figure 2b shows three graptolites. Figure 2c is a flow chart that can be used to identify the graptolites in Figure 2b. Monograptus 111111111111 CONTRACTOR OF THE PARTY OF THE × 1 $\times 3$ × 1 Tetragraptus Didymograptus Figure 2b **Graptolite 1** Are the thecae complex? **Graptolite 2** Are the **Graptolite 3** stipes Are the IE. pendant? No thecae Does the graptolite complex? **Graptolite 4** have three or more -**Graptolite 5** Are the thecae Vò

complex?

Are the

thecae complex? VO

NO

Graptolite 6

Graptolite 7

Graptolite 8



Are the

stipes

pendant?

Match the graptolites shown in Figure 2b to the correct number (1-8) in Figure 2c. [3]

No

Graptolite	Graptolite number (1-8)
Didymograptus	•
Monograptus	•
Tetragraptus	•

(b)

stipes?

Figure 2d is a cross-section showing the locations from which three graptolites A, B, and C, were recorded.



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3. Figure 3a shows two sediments A and B.





(a) Refer to Figure 3a.
(i) Describe the texture of sediment A. [3]
(ii) State the type of sandstone that would be formed from the lithification of sediment A. [1]
(iii) State the name of mineral C in sediment B. You may wish to refer to the Mineral Data Sheet. [1]

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only

(b) Table 3 shows the range in size of grains in sediments A and B in Figure 3a. Figure 3b shows the cumulative frequency curve for sediment **B**.

	Sediment A		Sedin	nent B
Grain Size (mm)	Frequency	Cumulative frequency	Frequency	Cumulative frequency
0.125 – 0.25	15	15	5	•
0.25 – 0.5	25	40	15	•
0.5 – 1	60	100	30	•
1 - 2	0	100	50	•



- Complete the cumulative frequency column for sediment **B** in **Table 3**. (i)
- (ii) Using the information in Table 3 plot a cumulative frequency curve for sediment A.

[2]



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(ii) State the name of the rock found at location **S** on **Figure 4a**.

Figure 4d

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[1]

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Figure 5b

		17	
) Plot each c	of the data points below or	nto Figure 5b with an X.	[2]
	Focal depth (km)	Distance from plate boundary (km)	
	25	290	
	160	310	
(i) Desc show	ribe the relationship betwe n in Figure 5b .	een focal depth and distance	from the plate boundary [2]
(ii) Expla	ain the relationship shown	in Figure 5b.	[3]
From your I than 700 kr	knowledge explain why ea n.	rthquake foci are rarely found	d to have a depth greater [2]

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	[3]
(ii) Describe the use of one volcanic monitoring technique.	[3]
(ii) Describe the use of one volcanic monitoring technique.	[3]

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Figure 6a is a block diagram showing beds which dip to the East and West. Figure 6b is a 6. sedimentary structure found at location L. West East L 0 km Figure 6a West East 2 0 cm Figure 6b Refer to Figure 6a and Figure 6b. (a) Complete Figure 6a to show the beds in the eastern face of the diagram. [1] (i) (ii) Name and describe the formation of the sedimentary structure found at location L shown in Figure 6b. [3] Name: Formation:

	(iii) 	Explain why the antiforms in Figure 6a can be correctly identified as anticlines.	2]
	(iv)	Describe the folding shown by the anticlines and synclines in Figure 6a .	4]
(b)	Thesdesc	study of folds in the field includes the measurement of dip and strike. Using a diagram cribe how you would take these measurements in the field.	 m, 3]
·····			
			••••

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(c) A student said, *"the structural features shown in Figure 6a were formed by east-west compression". Explain why this is only partially correct. [4]*

END OF PAPER

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Acknowledgements

Figure 1a – USGS

Figure 1b – Gil, Alba. (2015). Seismic structure of the crust beneath the Rif Cordillera.

Figure 3b – Quartz rich seds from https://courses.lumenlearning.com/physicalgeology/chapter/5-3-the-products-of-weathering-and-erosion/

Figure 4b – https://www.virtualmicroscope.org

Table 4 Sources – Sandstone and Mudstone – http://www.jsg.utexas.edu/tyzhu/files/Some-Useful-Numbers

Figure 6b – adapted from https://marlimillerphoto.com/Sed-25.html