



Oxford Cambridge and RSA

Tuesday 5 June 2018 – Afternoon

A2 GCE GEOLOGY

F794/01 Environmental Geology

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

- Electronic calculator
- Ruler (cm/mm)

Duration: 1 hour




Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

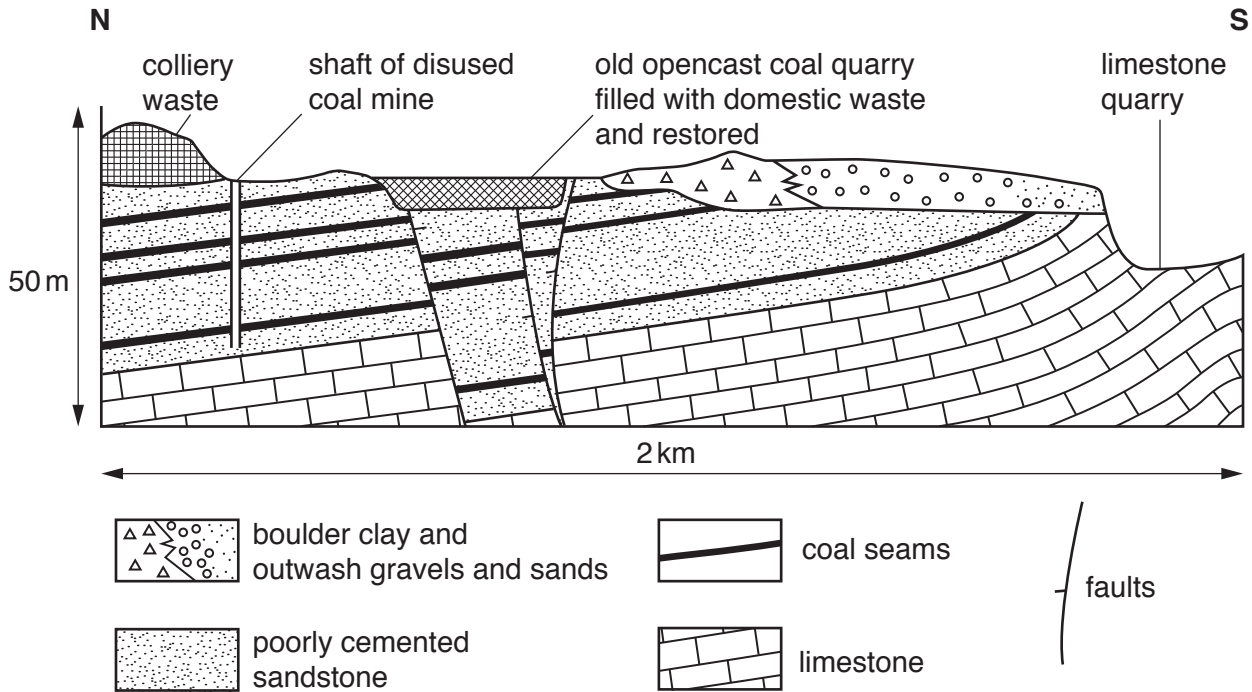
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the barcodes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
-  Where you see this icon you will be awarded marks for the quality of written communication in your answer.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

- 1 The cross-section below shows the geology of a former coal mining area which has been used for landfill waste disposal.



- (a) (i) Describe **two** geological problems that would have been encountered when opencast coal mining took place in the old quarry.

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..... [2]

- (ii) The deep coal mine used long-wall mining techniques. Describe this method of coal mining.

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- (iii) Explain the advantages of opencast coal mining compared to underground mining.

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- (b) (i) The old opencast coal quarry has been used for domestic landfill waste disposal. Explain the danger this could pose to groundwater supplies.

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- (ii) Describe and explain **one** other long-term environmental problem that waste in the landfill site could cause.

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- (c) Evaluate the suitability of the limestone quarry as another potential site for landfill waste disposal.

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- (d) Describe methods of land restoration that can be used in areas where opencast coal mining has taken place.

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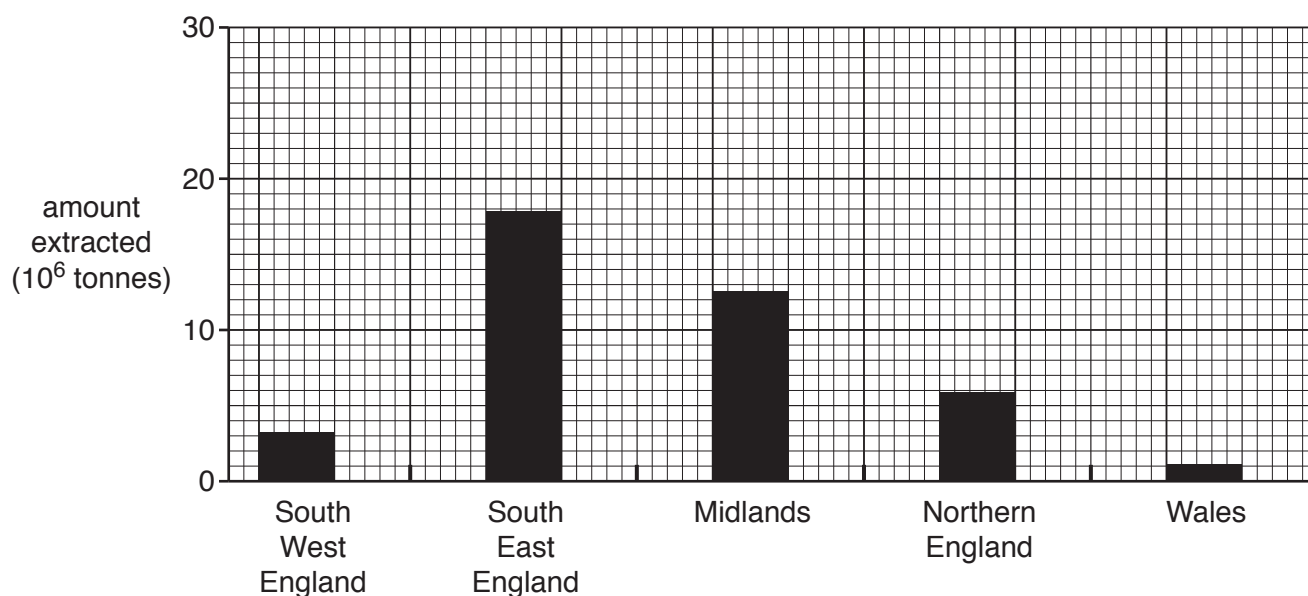
[Total:14]

Turn over

- 2 (a) The table below shows the quantity of sand and gravel and crushed rock aggregate extracted in and around England and Wales in 2014.

Region	Sand and gravel aggregate (10^6 tonnes)	Crushed rock aggregate (10^6 tonnes)
South West England	3.3	21.4
South East England	17.8	2.4
Midlands	12.5	27.6
Northern England	5.8	19.1
Wales	1.1	12.0
Marine (offshore)	14.0	—

- (i) The bar graph below shows the amount of sand and gravel extracted from each land (onshore) region in 2014. Complete the graph by adding bars to show the quantity of crushed rock aggregate extracted from each land (onshore) region.



[2]

- (ii) Referring to the data above, use your geological knowledge to describe and explain the variations in the total amounts and proportions of sand and gravel and crushed rock aggregate extracted from the land (onshore) regions.

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[3]

- (iii) Use data from the table to calculate the amount of sand and gravel aggregate that was extracted from marine sources as a percentage of the total amount of sand and gravel extracted in 2014.

..... % [1]

- (iv) State the method by which marine aggregates are usually extracted.



In your answer, you should use the appropriate technical term, spelled correctly.

..... [1]

- (v) Describe and explain **two** possible environmental consequences of extracting marine aggregates from offshore areas.

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 [2]

- (b) Super-quarries are one source of rocks used for construction purposes.

- (i) Explain why super-quarries are often located on the coast.

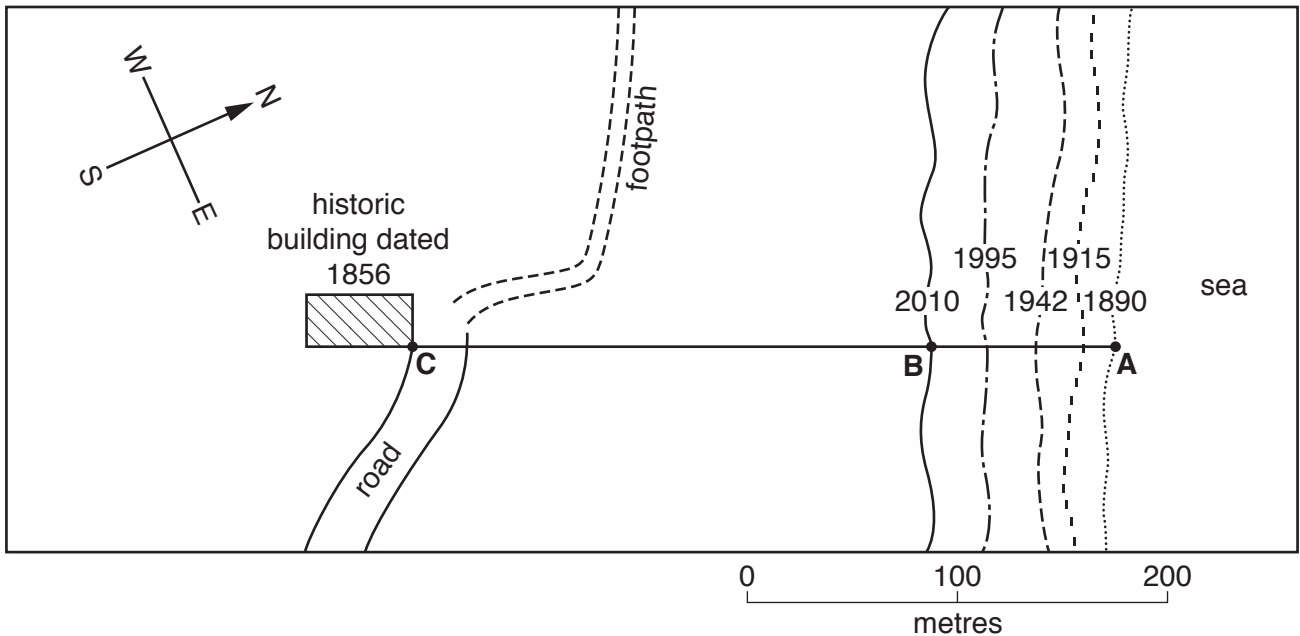
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 [1]

- (ii) Describe and explain **one** environmental consequence of extracting rocks from super-quarries.

.....
 [1]

[Total: 11]

- 3 The map below shows part of a beach that is affected by coastal erosion. Positions of the coastline between 1890 and 2010 are shown.



- (a) (i) Calculate the average rate of erosion of the coastline between 1890 and 2010 along the line **A–B**. Give your answer in centimetres per year.

..... cm / year [1]

- (ii) Assuming the rate of erosion remains constant, calculate how many more years it will take for the coastline to be eroded to point **C** on the corner of the historic building.

..... years [1]

(b) The local council has decided to take action to reduce further erosion of the beach. One option the council is considering is to construct a rip rap revetment made of imported blocks of gneiss.

- (i) Use your knowledge of the characteristics of gneiss to evaluate its suitability for this purpose.

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- (ii) Explain how the rip rap revetment would reduce erosion of the beach.

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..... [1]

- (iii) Describe **one** environmental consequence of constructing the rip rap revetment.

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- (iv) Describe and explain **two** different methods that could be used to reduce erosion of the beach.

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..... [2]

[Total: 8]

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4 Metallic mineral and oil and gas deposits are important natural resources.

(a) Define the term *resource*.

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..... [1]

(b) (i) Discuss **one** factor that influences world supply and **one** factor that influences world demand for metallic minerals.

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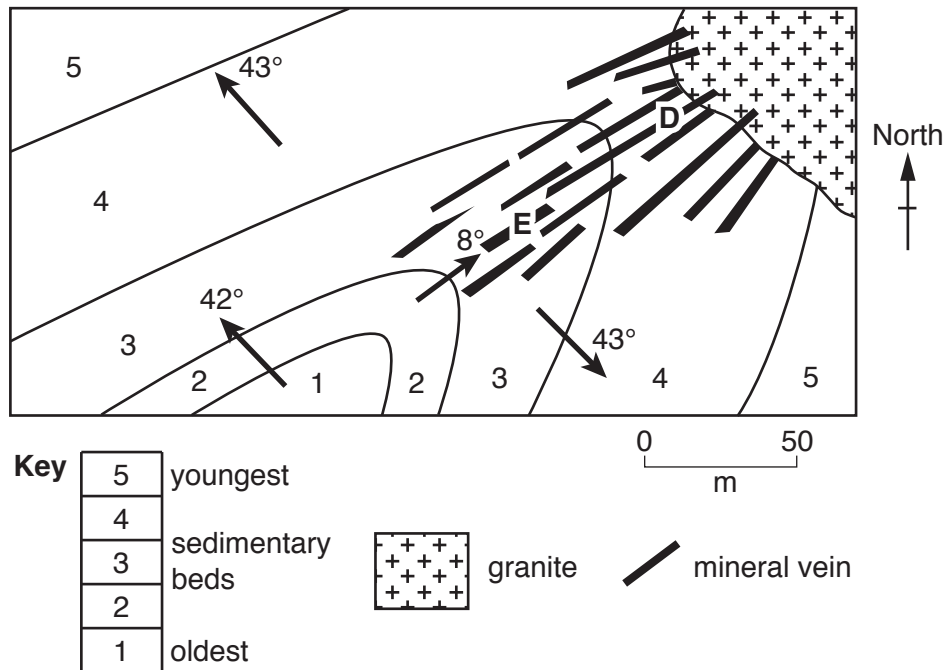
(ii) Explain why metal mining is an example of unsustainable resource exploitation on a global scale.

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..... [2]

(c) Explain the difference between the terms *ore*, *ore mineral* and *gangue mineral*. Use named examples of **one** ore mineral and **one** gangue mineral to support your answer.

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..... [3]

- (d) The geological map below shows an area where there are mineral veins of economic significance.



- (i) Name the process that formed the mineral veins shown on the map **and** explain why the minerals found in the veins at **D** are likely to be different from those found at **E**.



In your answer, you should use the appropriate technical term, spelled correctly.

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- (ii) Identify and describe the type of fold shown on the map.

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- (iii) Describe and explain the distribution of the mineral veins in relation to the fold shown on the map.

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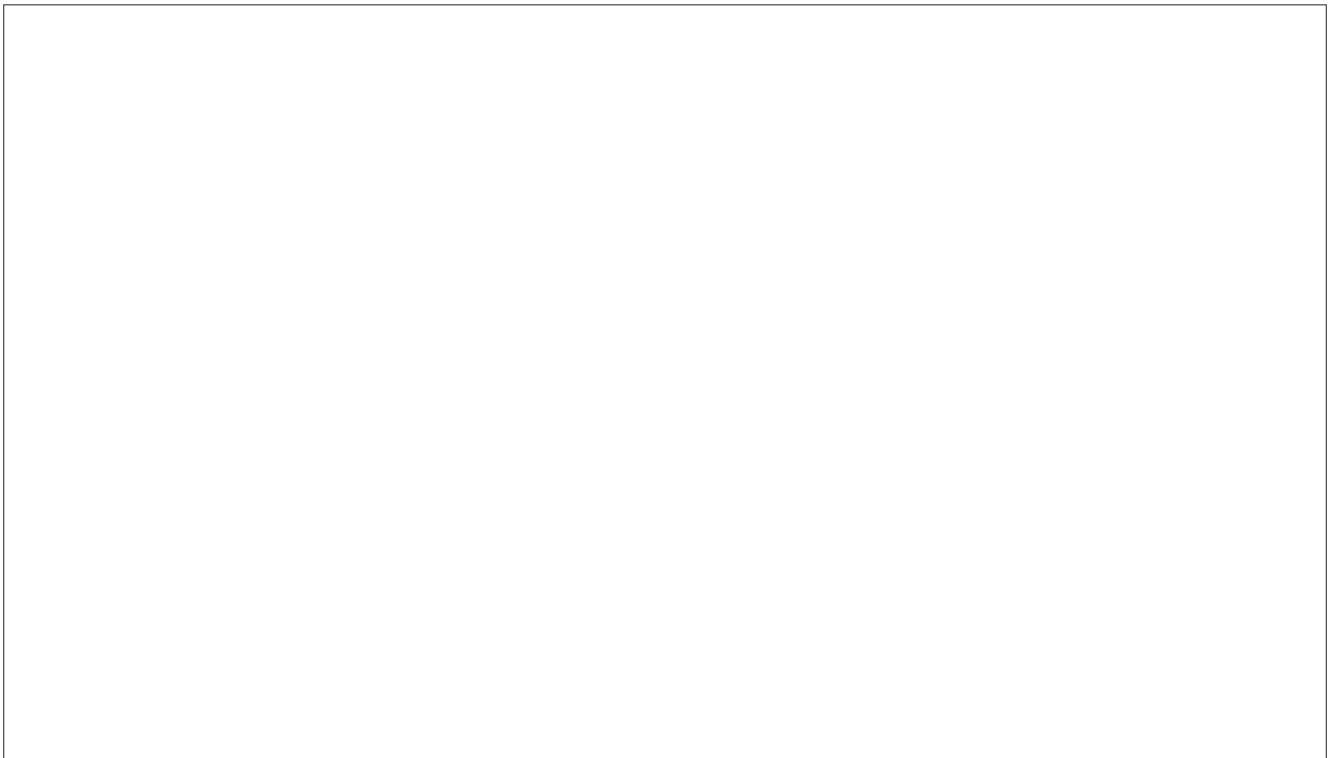
- (e) Oil and natural gas deposits are found in traps.

- (i) Define the term *trap*.

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..... [1]

- (ii) Draw a fully labelled diagram to show a salt dome trap containing oil and gas.



[2]

- (iii) Explain how a salt dome trap forms.

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..... [2]

[Total: 19]

Turn over

- 5** Describe how geophysical exploration techniques and exploration drilling could be used to find a salt dome trap containing oil and gas.

You may use diagrams to illustrate your answer.

[8]

[Total: 8]

END OF QUESTION PAPER

This image shows a blank sheet of white paper designed for writing. It features a series of evenly spaced horizontal blue lines across its entire width. A single vertical red line runs down the left side, creating a narrow margin. The paper is otherwise completely empty, with no text or markings.

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