



ADVANCED GCE
GEOLOGY
 Environmental Geology

F794

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:

- Ruler (cm/mm)

Thursday 24 June 2010
Morning
 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 clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

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 (a) Define the terms *porosity* and *permeability*.

porosity

.....

permeability

..... [2]

(b) Draw labelled diagrams to explain the difference between a confined and an unconfined aquifer.

confined aquifer	unconfined aquifer

[3]

(c) A well is dug into a confined aquifer.

(i) What name is given to this type of well?



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

..... [1]

(ii) Describe and explain what will happen to the groundwater in this type of well.

.....

.....

.....

..... [2]

(d) Draw a labelled diagram to explain the effect that extracting water from a well has on the water table.



[2]

(e) (i) Describe how water in an aquifer can be replaced.

.....
.....
.....
..... [2]

(ii) State **one** possible source of groundwater pollution.

.....
..... [1]

(iii) Why are unconfined aquifers more at risk from groundwater pollution than confined aquifers?

.....
..... [1]

[Total: 14]

2 (a) Granite is used as a building stone in the British Isles.

(i) Describe the properties of granite that make it suitable for building.

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.....
..... [2]

(ii) Describe how granite is quarried by opencast methods.

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..... [2]

(iii) State **one** environmental problem caused by quarrying.

.....
..... [1]

(iv) Granite is also quarried for aggregate. Define the term *aggregate*.

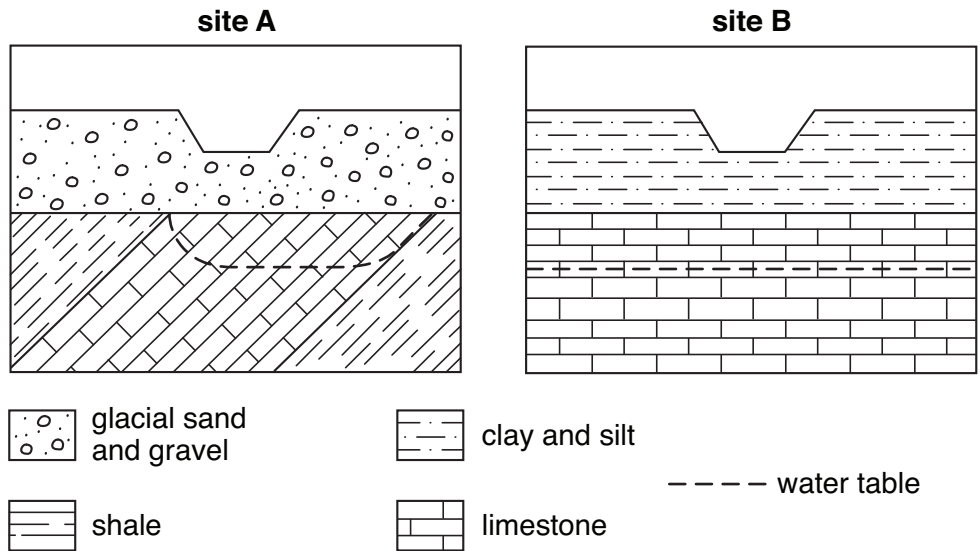
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..... [1]

(b) Describe the geological materials used in the manufacture of bricks.

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.....
..... [2]

(c) Abandoned quarries and brick pits may be used for landfill waste disposal.

The diagrams below show two abandoned quarries that are being considered for landfill waste disposal.



Evaluate the two sites to suggest which one would be the **most** suitable choice for a landfill waste disposal site. Explain your answer.

.....

.....

.....

.....

.....

.....

..... [3]

(d) (i) Define the term *leachate*.

.....

..... [1]

(ii) Describe **one** method that can be used to prevent leachate escaping from landfill sites.

.....

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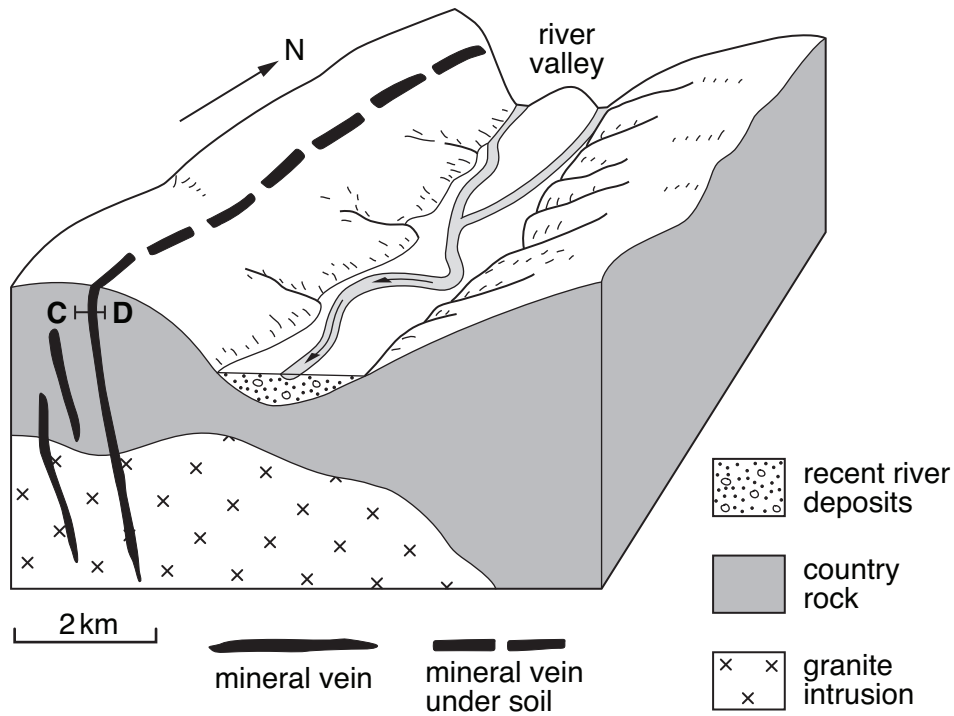
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..... [2]

[Total: 14]

Turn over

- 3 The block diagram below shows the geology of an area where there are metallic mineral deposits of cassiterite, galena, gold and sphalerite.



- (a) Name and describe the igneous process that formed the mineral veins in and around the granite intrusion.



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

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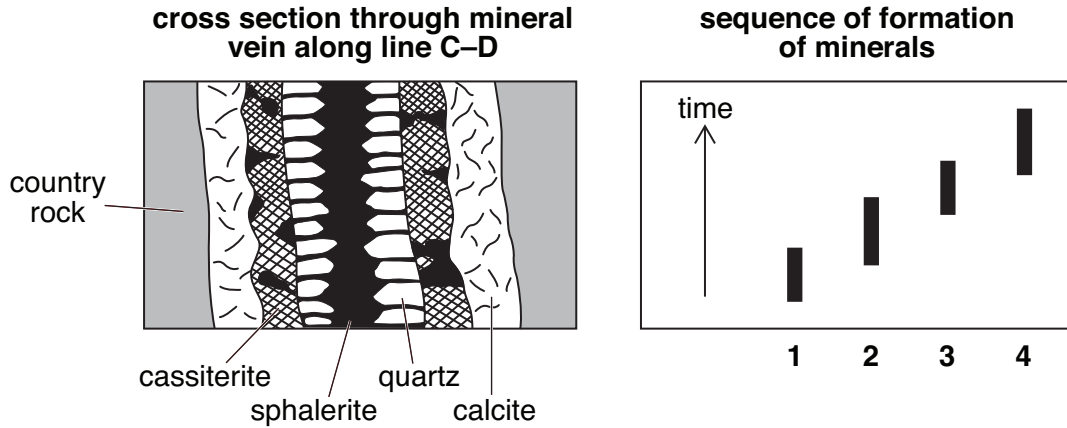
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[3]

(b) The diagrams below show a magnified cross section through one of the mineral veins along line C–D shown on the block diagram and the sequence of formation of the minerals in the vein.



(i) Match the minerals in the vein to their correct time of formation 1, 2, 3 and 4.

- 1
- 2
- 3
- 4

[1]

(ii) Give reasons for the pattern of the minerals in the vein.

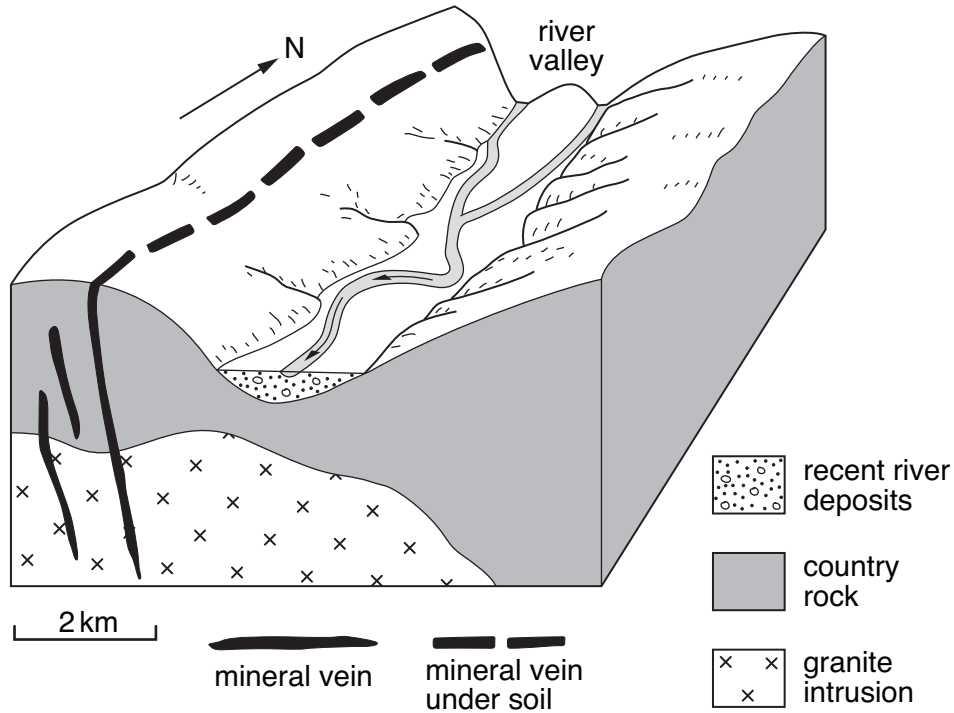
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 [2]

(iii) Calcite and quartz are gangue minerals. What does this mean?

.....
 [1]

The block diagram below shows the geology of the area where there are metallic mineral deposits of cassiterite, galena, gold and sphalerite.



(c) There are placer deposits in the river sediments shown on the block diagram above.

- (i) Clearly label with crosses (X) on the block diagram **two** different sites along the river course where placer deposits may be found. [2]
- (ii) Explain the processes that result in the exposed mineral veins being the source of the minerals in the placer deposits.

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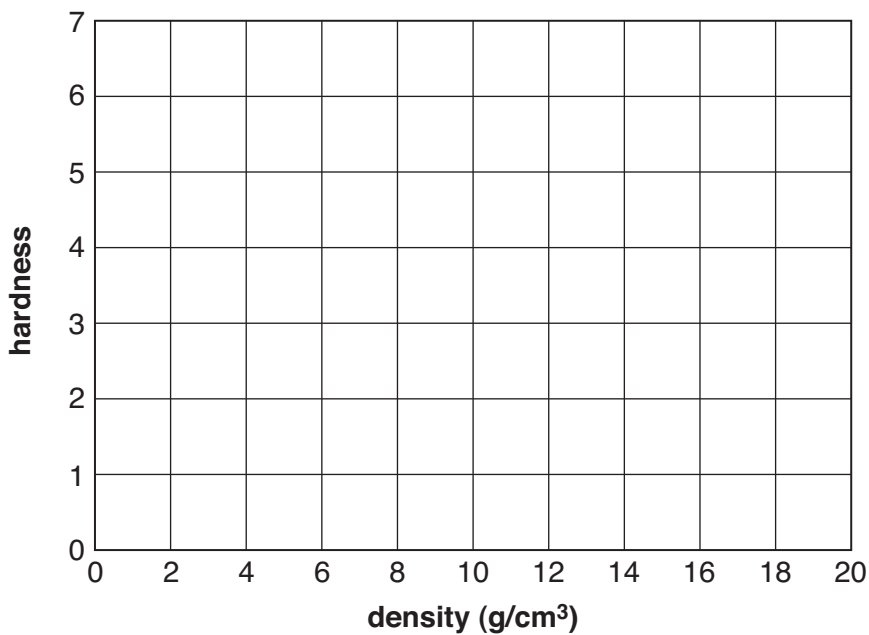
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(d) The table below shows some of the properties of the ore minerals found in the exposed mineral veins.

mineral	cleavage	density (g/cm ³)	hardness
cassiterite	poor	7.0	6.5
galena	3 at 90°	7.5	2.5
gold	none	19.3	3.0
sphalerite	6 at 60°	4.1	3.5

(i) Using the data from the table, plot a scatter graph of hardness against density for the minerals.



[2]

(ii) Analyse the data in the table and on your graph for **each** mineral to suggest whether or not you would expect to find it concentrated in a placer deposit. Give reasons for your answers.

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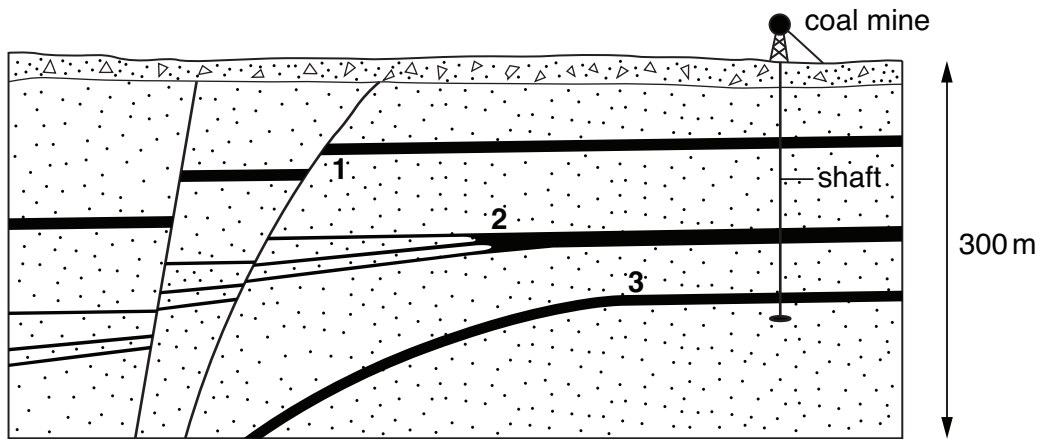
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
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[Total: 16]

Turn over

4 (a) (i) The diagram shows a cross section through part of a coalfield.

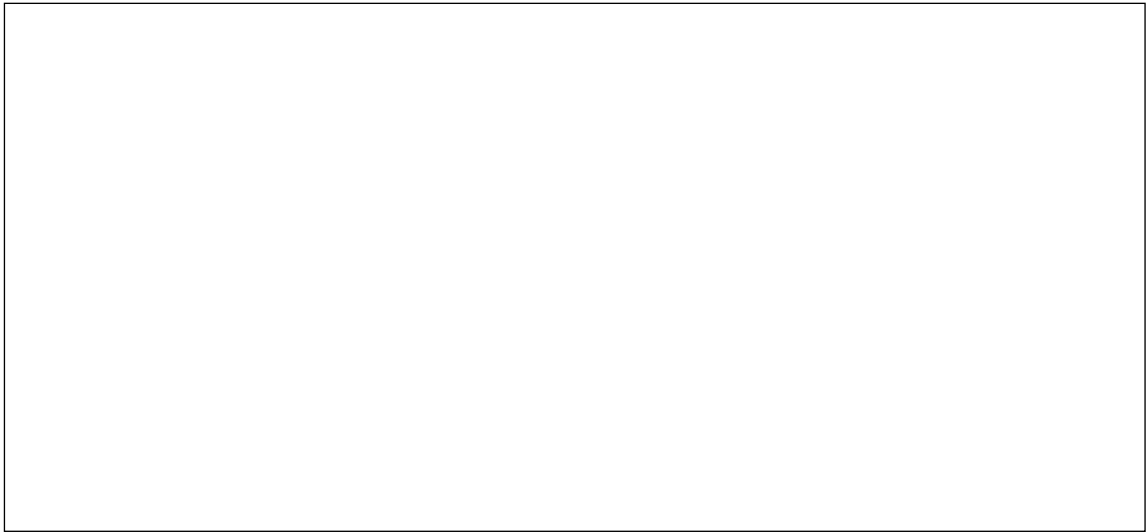


	unconsolidated surface deposits		sedimentary rocks, mainly sandstone
	coal seam		fault

Three coal seams have been worked from the mine shaft as far as locations **1**, **2** and **3**. For each location describe the geological problem that would make it difficult to mine any further along the coal seam.

- 1**
-
- 2**
-
- 3**
- [3]

(ii) Draw a labelled diagram of a washout affecting a coal seam.



[2]

(b) Describe how coal is extracted by long-wall retreat mining.

.....
.....
.....
.....
..... [2]

(c) Outline **one** safety issue of underground coal mining.

.....
..... [1]

[Total: 8]

14
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