

Candidate forename						Candidate surname					
Centre number						Candidate number					

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
A2 GCE
F794
GEOLOGY
Environmental Geology

THURSDAY 14 JUNE 2012: Afternoon
DURATION: 1 hour
plus your additional time allowance
MODIFIED ENLARGED

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:


Electronic calculator
Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes on the first page. 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 at the end of this booklet. The question number(s) must be clearly shown.

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.

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Answer ALL the questions.

1 Coal is an important energy resource used in the British Isles.

(a) (i) Define the term rank.

_____ [1]

(ii) Complete the flow diagram below to show the coal series of increasing rank.



[2]

(iii) Describe and explain the process that causes the rank to increase.

_____ [2]

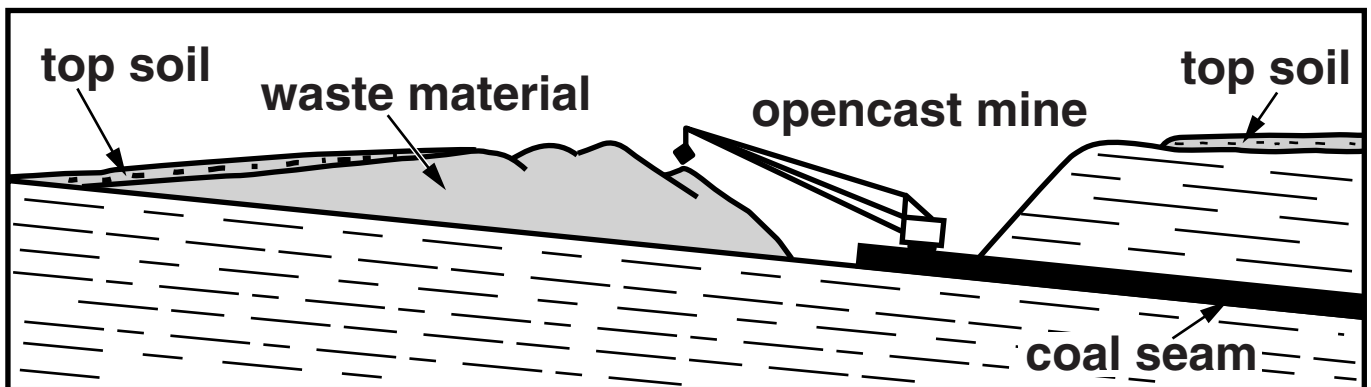
- (iv) Describe the physical and chemical properties of bituminous coal.

[2]

- (v) Suggest a common impurity found in coal.

[1]

- (b) The diagram below shows an opencast coal mining operation.



- (i) The depth of material that has to be removed to reach the coal seam is an important consideration in this type of mining. What name is given to this material?



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

[1]

- (ii) Evaluate THREE other geological factors that need to be taken into consideration during opencast coal mining.**

[3]

- (iii) Describe ONE environmental consequence of opencast coal mining.**

[1]

(c) Describe how former opencast coal mining sites can be restored.

[2]

[Total: 15]

2 The cross section opposite shows a silicic igneous intrusion and the surrounding country rocks which contain metal ore deposits.

(a) (i) What name is given to the part of the intrusion labelled A?



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

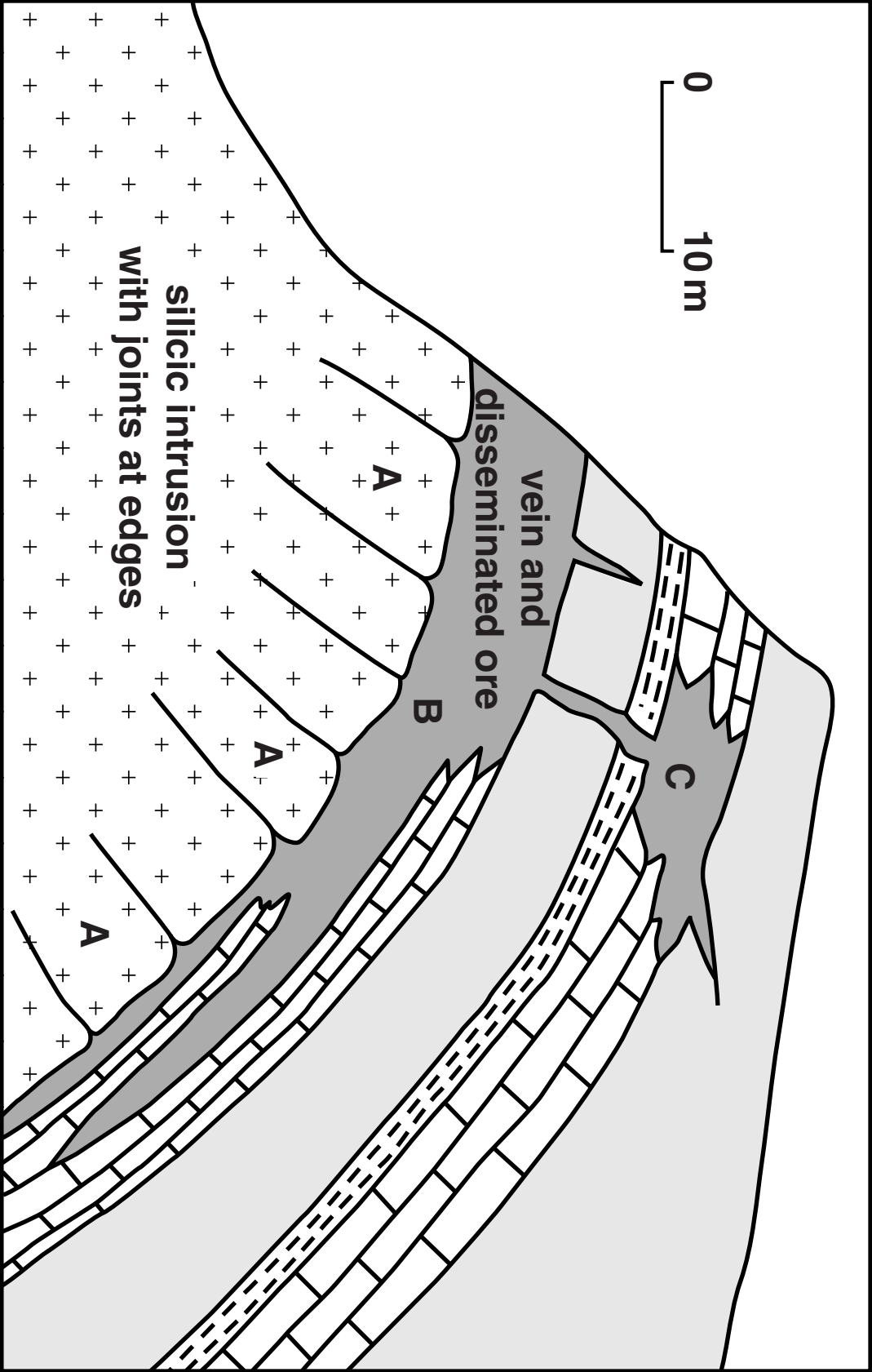
_____ **[1]**

(ii) How did the jointing at the edges of the intrusion form?

_____ **[2]**

(iii) What is the significance of this jointing in relation to the formation of the ore deposits?

_____ **[2]**



(b) (i) Describe and explain why the ore formed mainly in the limestone.

[2]

(ii) Suggest why the sandstones and shales are poorly mineralised.

[1]

(iii) Name the ore minerals likely to be found in the limestone at B and at C. Explain why these minerals are different.

at B _____ at C _____

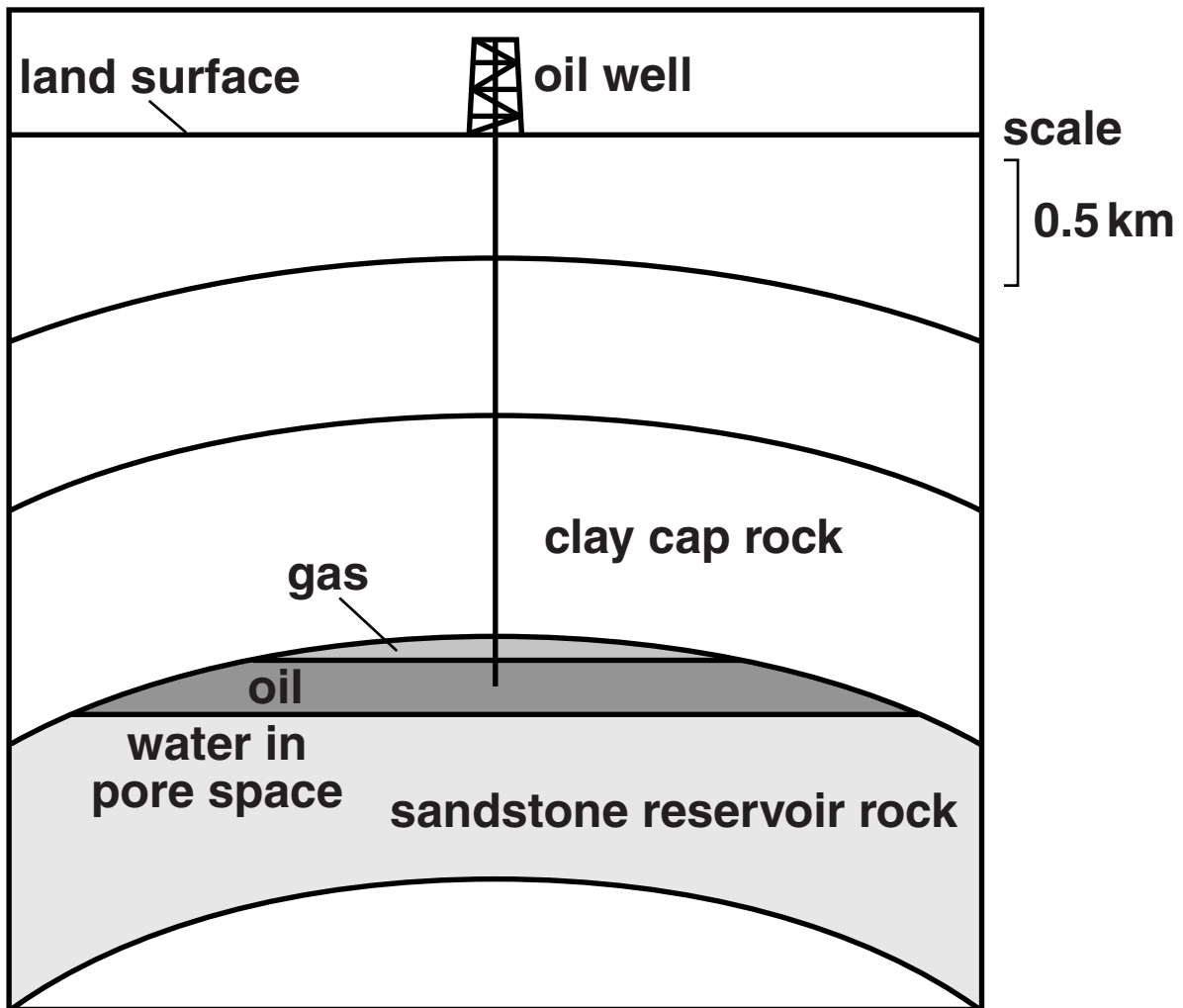
[2]

(c) Describe TWO geophysical methods that could be used to determine the extent of these ore deposits.

[3]

[Total: 13]

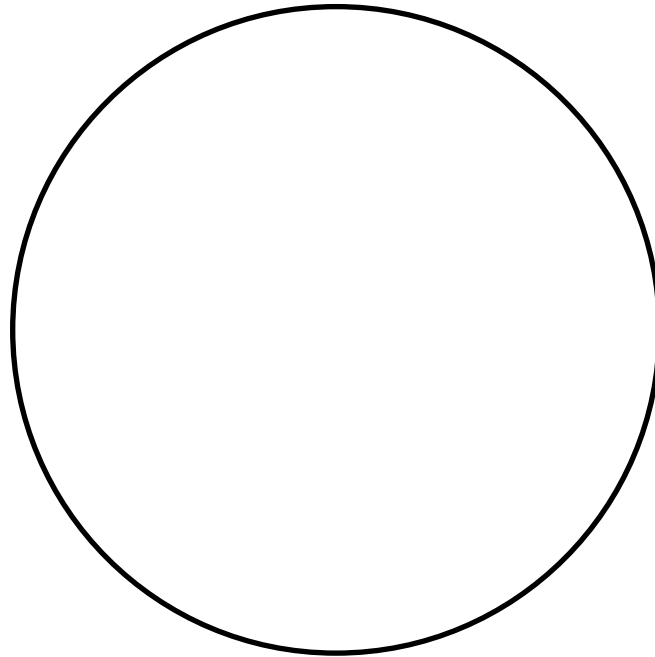
- 3 The cross section diagram below shows a reservoir of oil and gas within a sandstone formation.



- (a) (i) Explain why the gas and oil are always found at the top of the reservoir rock.

_____ [1]

- (ii) Describe the characteristics of a good reservoir rock for oil. You may use a fully labelled thin section diagram of the sandstone to help you make your description.**



[3]

(b) (i) The pressure in the rocks increases by 200 atmospheres per kilometre. Use information from the cross section diagram to determine the pressure at:

- the top of the gas field**

_____ atmospheres

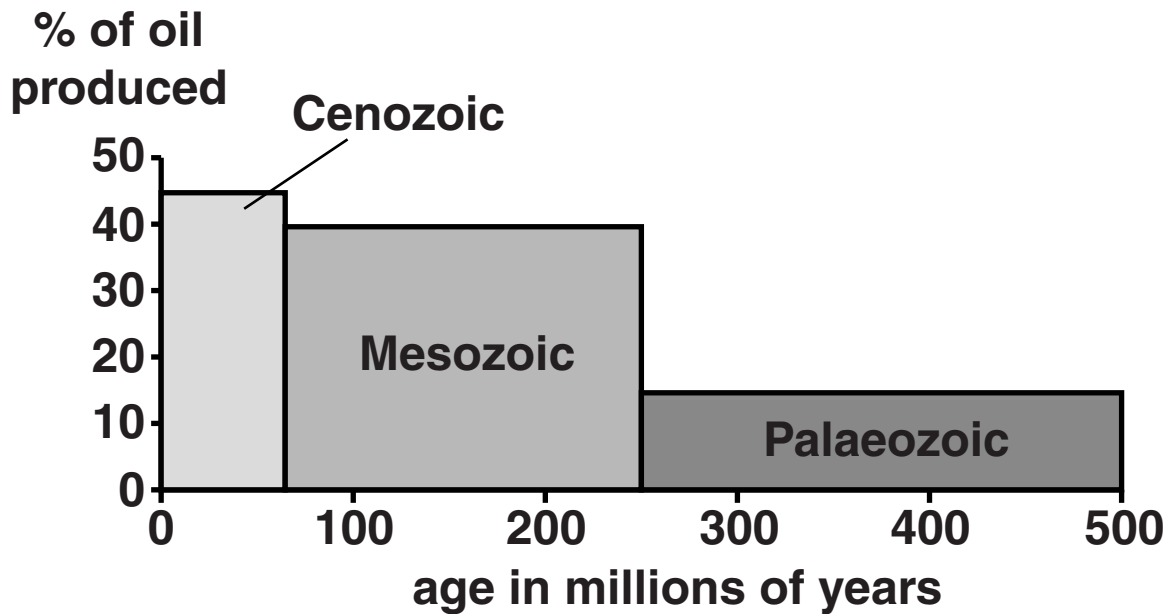
- the base of the sandstone directly beneath the oil well.**

_____ atmospheres [2]

(ii) Explain the significance of this pressure difference in relation to primary and secondary recovery of oil.

[3]

(c) The graph below shows the percentage of oil produced from rocks of different ages.



Suggest reasons for the pattern of oil production shown on the graph.

[3]

[Total: 12]

4 Groundwater and surface water are the two main sources of useable fresh water.

(a) Explain why drinking water in the northwest of Britain mainly comes from surface water supplies but in the southeast of England it mainly comes from groundwater supplies.

[2]

(b) (i) Define the term aquifer.

[1]

(ii) What condition is required for an aquifer to be artesian?

[1]

(c) (i) Give TWO situations where a groundwater spring could result from a change in lithology.

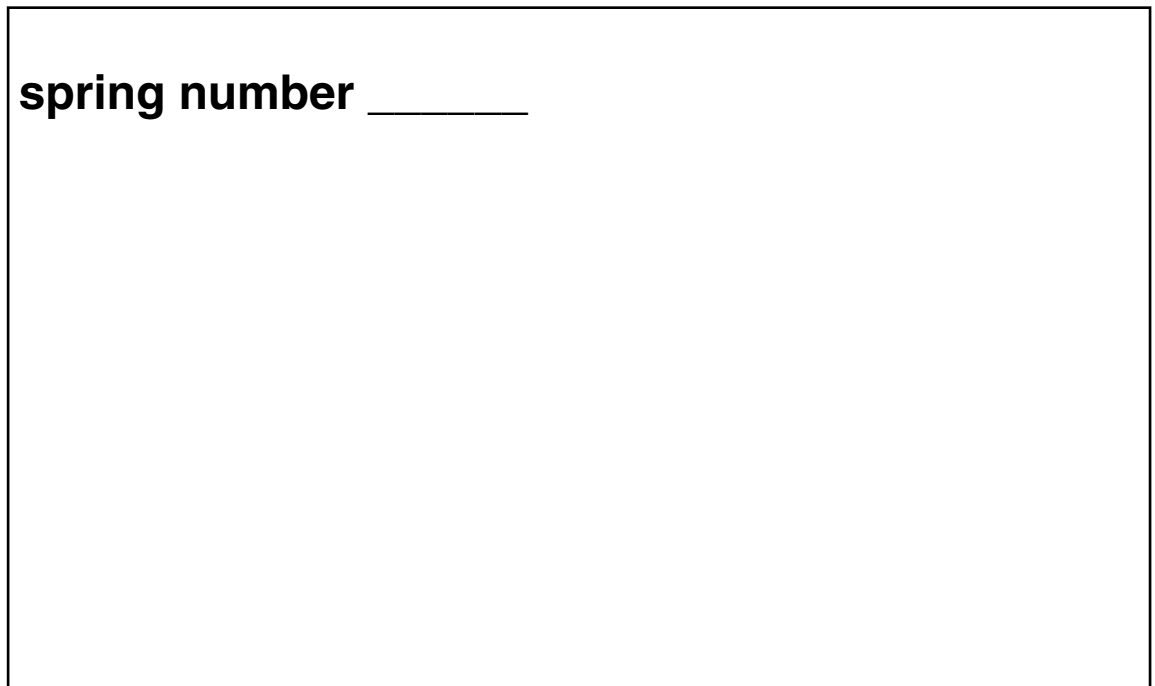
1

2

[1]

- (ii) Describe clearly how one of these springs forms. You may use a fully labelled diagram to help you make your description.**

spring number _____



[2]

- (d) (i) State ONE important use for a dam and reservoir other than for drinking water supply.**

_____ **[1]**

- (ii) Describe TWO environmental consequences of dams and reservoirs.**

_____ **[2]**

(iii) Explain why there may be an increase in seismic activity as reservoirs fill with water.

[2]

[Total: 12]

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TURN OVER FOR QUESTION 5

5 Describe and explain how rock type and geological structures affect the siting and construction of dams and reservoirs.

You may use diagrams to illustrate your answer.

[illegible]

[8]

[Total: 8]

END OF QUESTION PAPER

ADDITIONAL PAGE

IF ADDITIONAL SPACE IS REQUIRED, YOU SHOULD USE THE LINED PAGE BELOW. THE QUESTION NUMBER(S) MUST BE SHOWN CLEARLY.

[illegible]

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