

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced Subsidiary GCE

GEOLOGY

2832

The Rock Cycle – Processes and Products

Tuesday

24 MAY 2005

Afternoon

1 hour

Candidates answer on the question paper.

Additional materials:

Electronic calculator

Ruler (cm/mm)

Candidate Name	Centre Number	Candidate Number												
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TIME 1 hour

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers in the spaces provided on the question paper.
- Read each question carefully and make sure you know what you have to do before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- You will be awarded marks for the quality of written communication where this is indicated in the question.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	17	
2	18	
3	15	
4	10	
TOTAL	60	

This question paper consists of 11 printed pages and 1 blank page.

Answer **all** the questions.

- 1 Six different rock samples were collected and their characteristic features recorded in the table below.

	rock samples					
features	A	B	C	D	E	F
crystalline	✓		✓			✓
slatey cleavage			✓			
shows bedding		✓		✓		
fossils present				✓		
sugary texture						✓
vesicular texture	✓					
fragmental texture		✓		✓		
glassy texture					✓	

- (a) (i) Which **two** samples in the table are igneous rocks?

.....[1]

- (ii) Give reasons to explain your choices.

.....

[2]

- (iii) In the space below, draw a fully labelled diagram of an igneous rock showing a porphyritic texture. Explain how this texture forms.

.....

[3]

(b) (i) Which **two** samples in the table are metamorphic rocks?

.....[1]

(ii) Give reasons to explain your choices.

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

(c) (i) Which **two** samples in the table are sedimentary rocks?

.....[1]

(ii) Give reasons to explain your choices.

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

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

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

(ii) Describe the process of compaction.

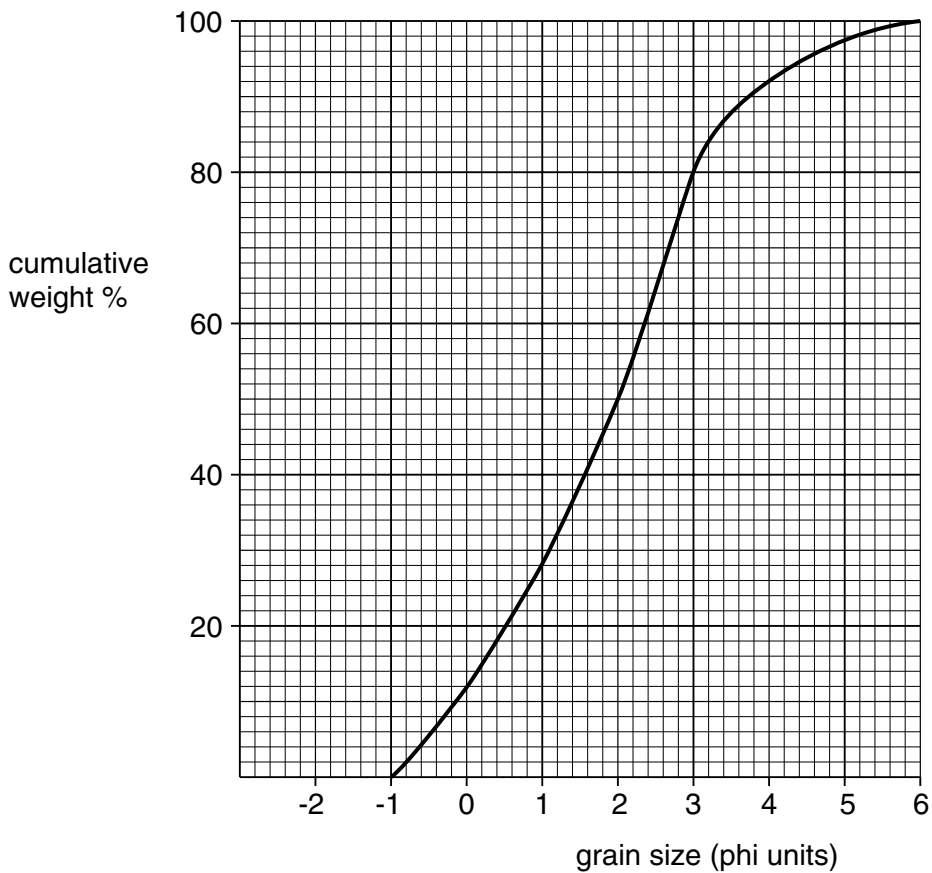
.....
.....
.....
.....[2]

(iii) Describe the process of cementation.

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

[Total: 17]

2 The graph below shows a cumulative frequency curve for an unknown sediment.



(a) (i) Define the term *sorting*.

.....

.....

.....

.....[2]

(ii) Using the cumulative frequency graph and the information below, calculate the coefficient of sorting.

$$\text{Coefficient of sorting} = \frac{\phi_{84} - \phi_{16}}{2}$$

(Where ϕ_{84} is the grain size of the cumulative weight of 84% of the sample and ϕ_{16} is the grain size of the cumulative weight of 16% of the sample.)

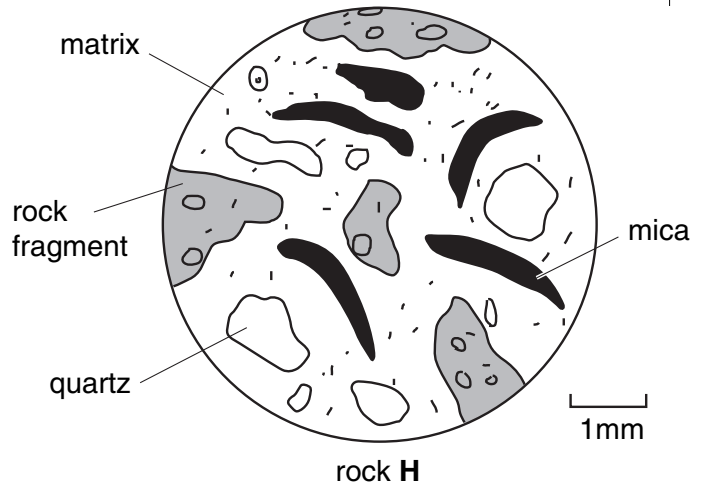
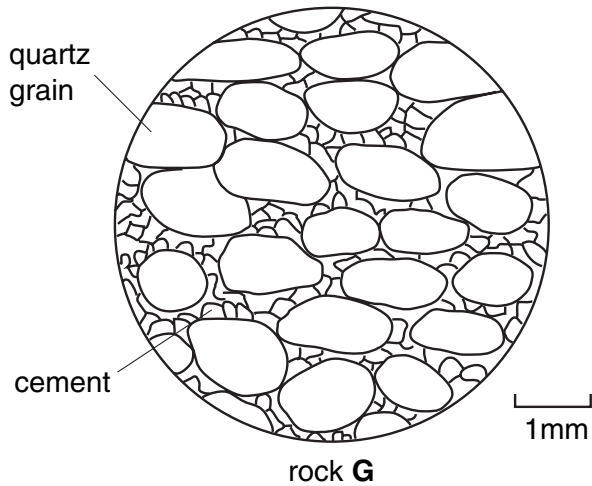
coefficient of sorting	< 0.50	well sorted
	0.50 – 1.00	moderately sorted
	> 1.00	poorly sorted

coefficient of sorting =[2]

(iii) What degree of sorting is shown by this sediment?

.....[1]

(b) Refer to the thin section diagrams of rocks **G** and **H** shown below.



(i) State the degree of sorting shown by

rock **G**

rock **H** [2]

(ii) Describe the grain shape shown by

rock **G**

rock **H** [2]

(iii) Explain how size and shape of the grains are controlled by degree of transport.

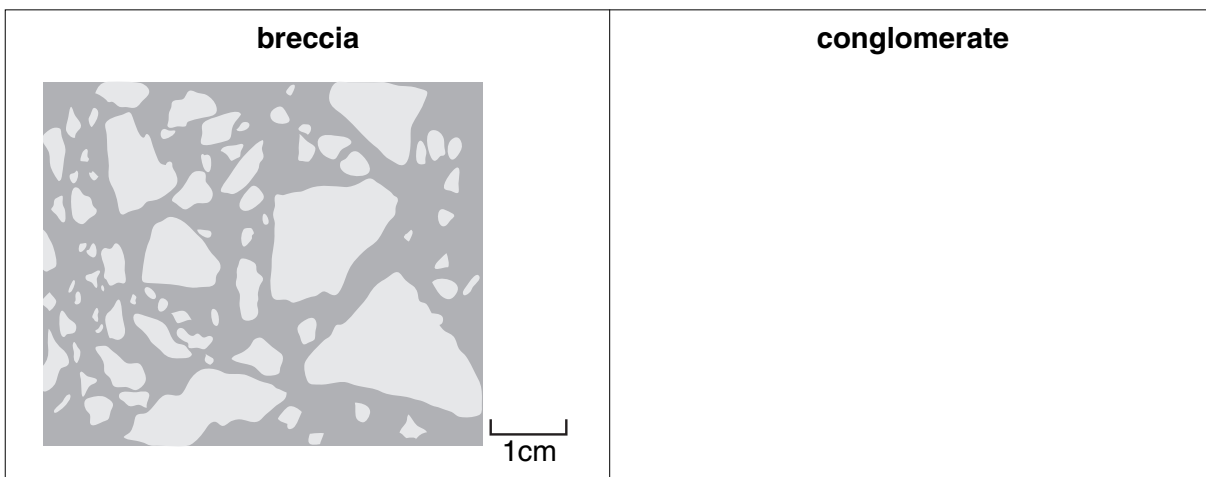
.....

.....

.....

..... [3]

(c) Draw a labelled diagram to show the difference between the breccia shown below and a conglomerate.



[2]

- (d) Complete the table below by writing down the correct number from the list in each of the spaces.

type of weathering	definition
exfoliation	
	Addition of water to the mineral lattice.
carbonation	
	Expansion of water on freezing, in pores or cracks in rock.
oxidation	
	Minerals break down by reacting with water. Under acidic conditions feldspar breaks down to kaolin (clay minerals).

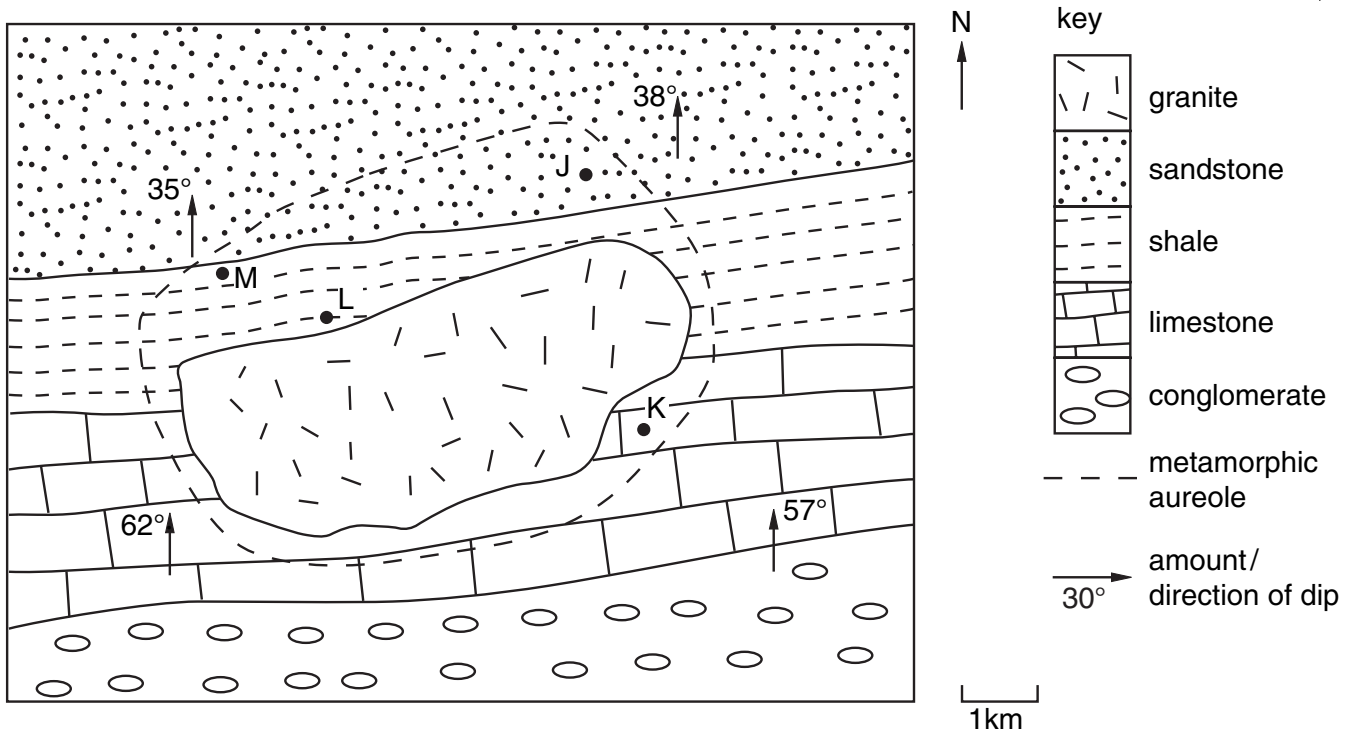
list

1	hydrolysis
2	hydration
3	solution
4	frost shattering
5	Breakdown of rocks due to different expansion and contraction rates.
6	When minerals combine with oxygen. A red-brown weathering crust develops on iron-containing minerals.
7	Reaction of minerals with carbonic acid produced by the solution of carbon dioxide in water.
8	New minerals grow in rock spaces forcing rock apart.

[4]

[Total: 18]

3 The map below shows an igneous intrusion and its surrounding country rocks.



(a) (i) Define the term *metamorphic aureole*.

.....

 [2]

(ii) Suggest **two** reasons why the width of the metamorphic aureole is greater in the north than in the south.

.....

 [2]

(iii) Name the metamorphic rocks that would be found at

J **K**
L **M** [4]

(iv) Explain why all these metamorphic rocks are unfoliated.

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

(b) The igneous intrusion is discordant with the surrounding country rock.

(i) Define the term *discordant*.

.....[1]

(ii) On the map, shade the area of the intrusion where the crystal grain size is fine (<1 mm). [1]

(iii) What name is given to this area?

.....[1]

(iv) Account for the variations in crystal grain size within the intrusion.

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

[Total: 15]

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