

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**Advanced GCE**

**GEOLOGY**

Geological Skills

**2836/01**

Tuesday

**20 JUNE 2006**

Afternoon

1 hour 15 minutes

Candidates answer on the question paper.

Additional materials:

Protractor

Ruler (cm/mm)

Candidate Name	Centre Number	Candidate Number										
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>						<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>					

**TIME** 1 hour 15 minutes

**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 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	14	
2	14	
3	13	
4	9	
5	10	
<b>TOTAL</b>	<b>60</b>	

**This question paper consists of 12 printed pages.**

Answer all the questions.

- 1 The geological map below shows an area after erosion has produced a flat surface.



- (a) (i) Draw in the axial plane trace for the fold. [1]

- (ii) The dip at A is  $40^\circ$ . Estimate the dip at B.

..... [1]

- (iii) Describe the fold in detail, giving dip directions and using technical terms.

.....

.....

.....[2]

**(b)** Describe the sequence of events that produced the geology shown on the map. Start with the earliest events.

[9]

[Total: 14]

- 2 Outcrops of granite, marble, shale, spotted slate, hornfels and limestone have been mapped in an area that is mainly covered in vegetation, making mapping difficult.

- (a) (i) The outcrops are shown on the geological map below. Complete the map by drawing the inferred positions of the rock boundaries.



[4]

- (ii) Draw and label the edge of the metamorphic aureole.

[1]

- (b) (i) Describe one characteristic feature of hornfels.

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

- (ii) Describe how the spots in spotted slate form.

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

- (c) (i) The photograph below shows a dark feature within the granite. Name the feature.

[1]



- (ii) Explain how this feature in the granite formed.

.....

.....

.....

.....[2]

- (d) (i) Suggest a mineral likely to form the white crystals visible in the granite.

.....[1]

- (ii) Describe the likely conditions of formation of a granite batholith.

.....

.....

.....

.....[2]

[Total: 14]

- 3 A number of fossils have been found in a Carboniferous Coal Measures deposit in a coal mine.



- (a) (i) Complete the grid below to show the two groups to which the fossils belong.

fossils	name of fossil group

[2]

- (ii) Are these fossils suitable for use as zone fossils for the Carboniferous Coal Measures? Give reasons for your answer.

.....

.....

.....

.....

.....

.....[3]

- (b) A 1 m thick coal seam is dipping west. Four boreholes, 10 m apart, are drilled to the west of the coal seam's outcrop through the same coal seam. There are no faults or folds in the area.

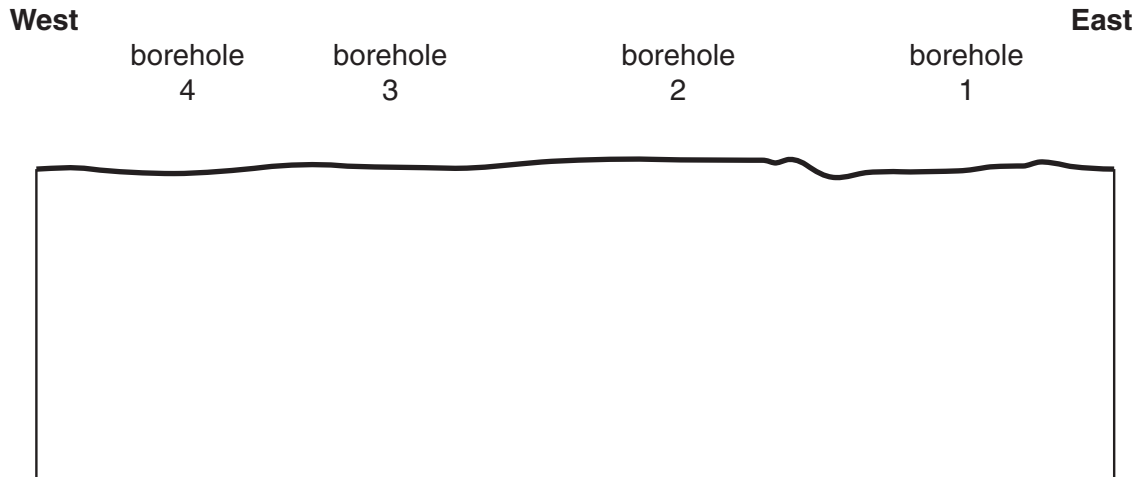
borehole 1: one coal seam 1 m thick

borehole 2: no coal but a fluvial sandstone instead

borehole 3: two seams each 0.5 m thick

borehole 4: several thin seams of coal

- (i) Draw a labelled cross sectional diagram below to show the differences between the boreholes.



[4]

- (ii) Describe how the fluvial sandstone in borehole 2 could have formed.

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

- (c) Describe **three** problems that are encountered in mining coal in an area where the coal seams have been affected by folding and faulting.

.....  
 .....  
 .....  
 .....  
 .....  
 .....[3]

[Total: 13]

- 4 The photograph below shows structural features.

**A photograph has been removed due to third party copyright restrictions**

Details:

A photograph showing structural features in a piece of rock

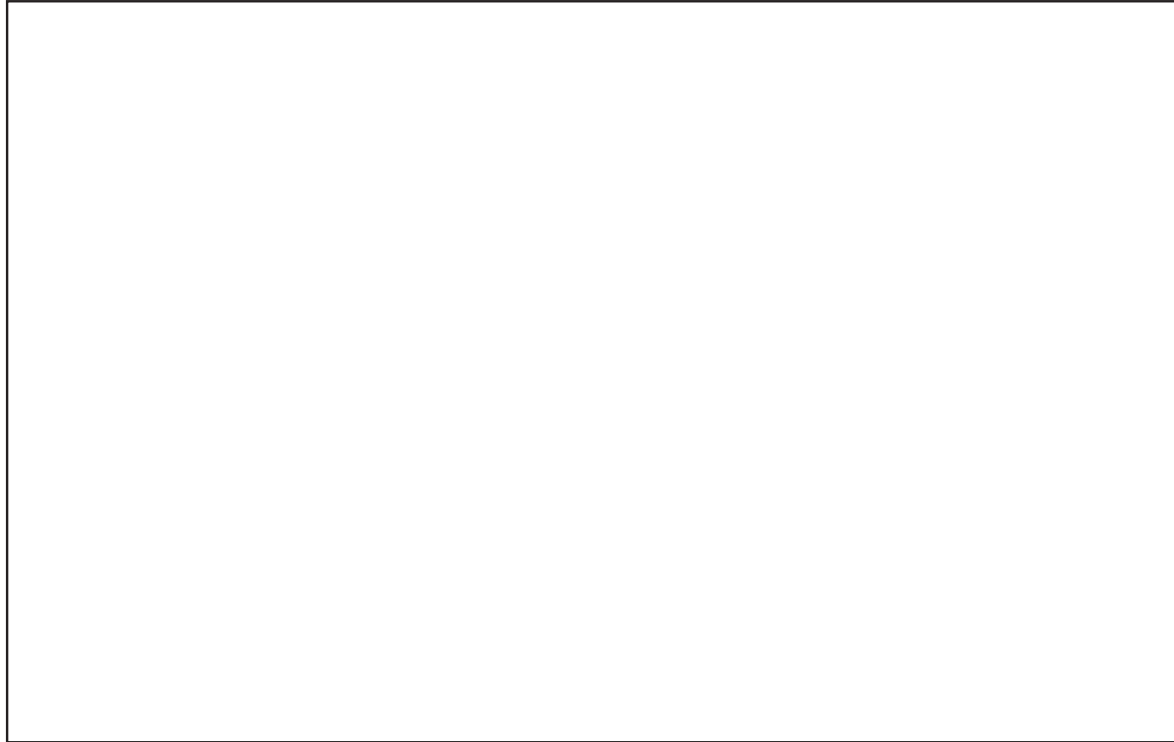


In this question, one mark is available for the quality of written communication.

With the help of a fully labelled sketch describe the structural features shown on the photograph.

North

South



0 300 cm

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[8]

Quality of Written Communication [1]

[Total: 9]

5 (a) (i) Complete the rock identification table below.

rock	description	rock name
<b>A</b>	<ul style="list-style-type: none"> <li>grain size average 1 mm</li> <li>sub rounded grains</li> <li>moderately sorted</li> <li>composed of quartz and muscovite</li> <li>contains cross bedding</li> </ul>	
<b>B</b>	<ul style="list-style-type: none"> <li>very fine grain size &lt; 0.003 mm</li> <li>black colour</li> <li>fissile</li> <li>graptolites on bedding surfaces</li> </ul>	
<b>C</b>	<ul style="list-style-type: none"> <li>grain size from 2–0.05 mm</li> <li>sub angular grains</li> <li>poorly sorted</li> <li>composed of clay matrix, quartz and rock fragments</li> <li>shows graded bedding</li> </ul>	

[3]

(ii) Describe the environment of deposition for each of the rock types.

**A** .....

.....

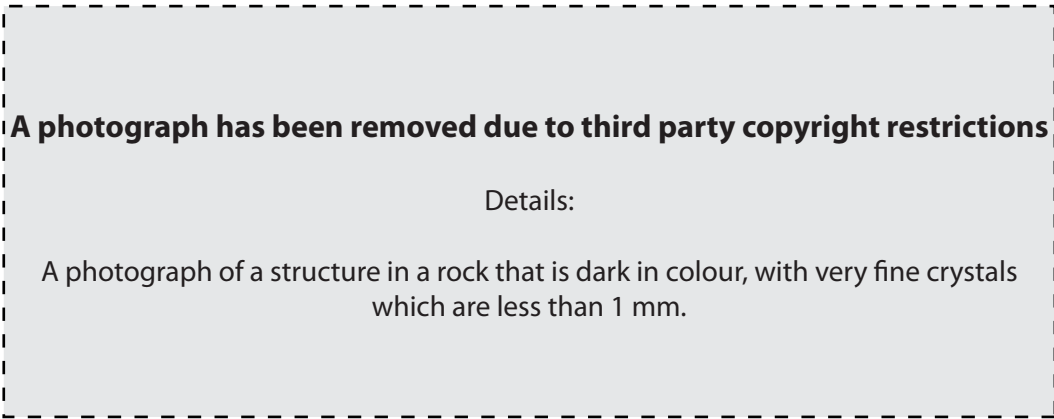
**B** .....

.....

**C** .....

.....[3]

- (b) The photograph below shows structures in a rock that is dark in colour, with very fine crystals less than 1 mm.



- (i) Identify the rock.

.....[1]

- (ii) Identify the structure.

.....[1]

- (iii) Describe how this structure forms.

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

[Total: 10]

END OF QUESTION PAPER

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