

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**Advanced GCE**

**GEOLOGY**

**2834**

Palaeontology

Tuesday

**14 JUNE 2005**

Morning

1 hour 30 minutes

Candidates answer on the question paper.

Additional materials:

Ruler (cm/mm)

Candidate Name	Centre Number	Candidate Number												
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**TIME** 1 hour 30 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 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.

<b>FOR EXAMINER'S USE</b>		
<b>Qu.</b>	<b>Max.</b>	<b>Mark</b>
<b>1</b>	<b>15</b>	
<b>2</b>	<b>17</b>	
<b>3</b>	<b>17</b>	
<b>4</b>	<b>16</b>	
<b>5</b>	<b>25</b>	
<b>TOTAL</b>	<b>90</b>	

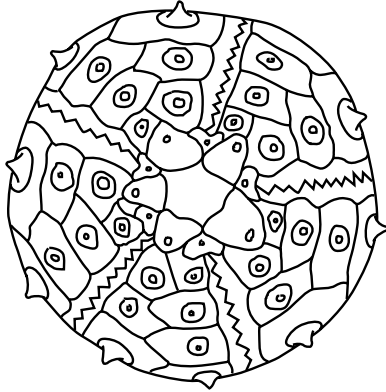
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**This question paper consists of 12 printed pages.**

Answer **all** the questions.

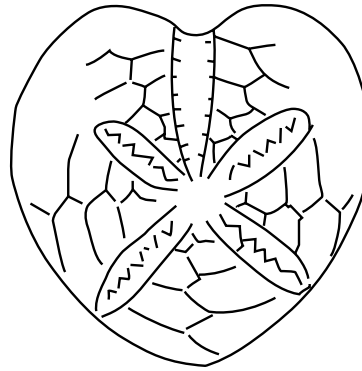
1 Fossils **A** and **B** are echinoids.

**fossil A**



× 1

**fossil B**



× 1

(a) (i) Label the following morphological features on either fossil **A** or **B** as appropriate.

- anterior groove
- anus
- tubercle
- petaloid ambulacra

[4]

(ii) Shade **one** interambulacral plate, on one of the fossils **A** or **B**.

[1]

(iii) Describe a function of the following features, found in echinoids.

- tube feet .....
  - plastron .....
- .....[2]

(b) Fossil **A** had large spines attached in life.

(i) To what morphological feature of the echinoid were spines attached?

.....[1]

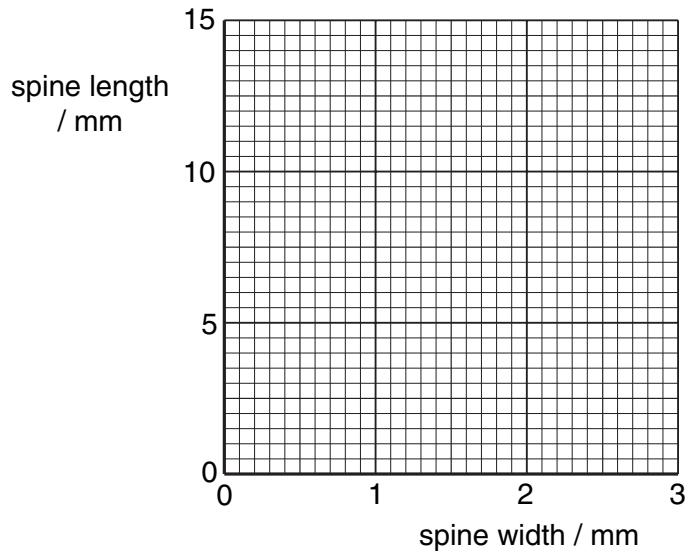
(ii) Explain why the spines rarely remain attached to the echinoid after death.

.....[1]

(c) The length and width of 12 spines were recorded at one geological horizon. The results are shown in the table below.

spine number	length (mm)	width (mm)	spine number	length (mm)	width (mm)
1	10.5	2.4	7	13.0	1.5
2	12.0	2.6	8	12.0	1.5
3	11.5	3.0	9	11.8	1.2
4	12.0	2.3	10	14.0	1.3
5	11.8	2.5	11	14.0	1.0
6	11.0	2.5	12	15.0	1.5

(i) Plot the data below as a scatter graph.



[3]

(ii) Describe and explain the patterns shown on your scatter graph.

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

(d) What environment do regular echinoids inhabit?

..... [1]

[Total: 15]

2 (a) (i) Explain how fossil moulds and casts may be formed. Use diagrams to illustrate your answer.

.....  
.....  
.....  
.....[4]

(ii) Preservation of fossils varies enormously. State **two** factors that would affect the quality of preservation of fossil remains.

1 .....

.....

2 .....

.....[2]

(iii) Over time, some shelly fossils have their calcareous skeletons replaced with calcite. State the name of the original mineral that is replaced.

.....[1]

(iv) Describe and explain how silicification may occur in some fossils.

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

**(b)** Occasionally fossils may be exceptionally preserved.

**(i)** Describe **two** factors that allow exceptional preservation to occur in marine sediments such as the Burgess Shale.

1 .....

.....

2 .....

.....[2]

**(ii)** Describe how an insect may become preserved in amber.

.....

.....

.....

.....[2]

**(c) (i)** Define the term *trace fossil*.

.....

.....

.....

.....[2]

**(ii)** Explain how trace fossils can give us information about the organisms that made them. Use diagrams to illustrate your answer.

.....

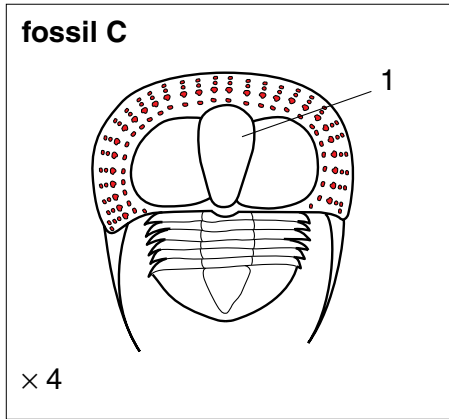
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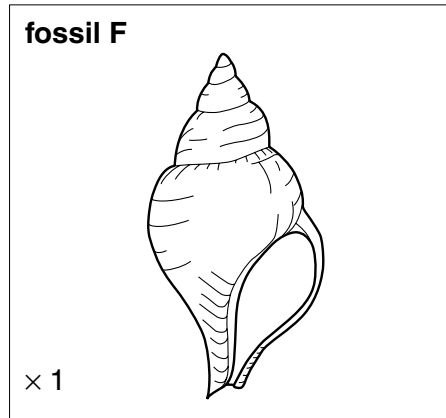
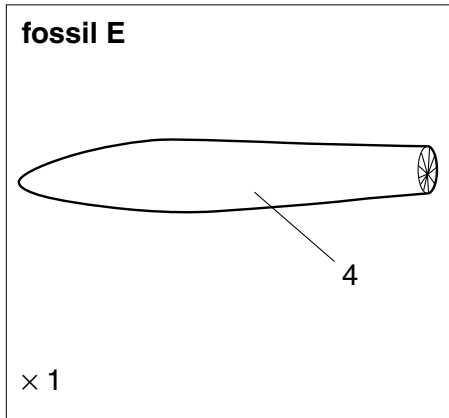
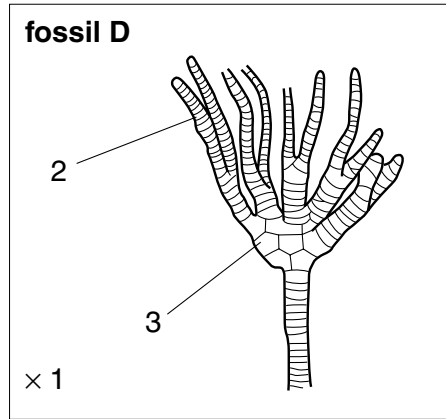
.....[2]

[Total: 17]

3



6



(a) (i) Identify the fossil phylum and group for each of the fossils above.

fossil	phylum	group
C		
D		
E		
F		

[4]

(ii) Name the morphological features shown on the diagrams of fossils C, D and E.

- 1 .....
- 2 .....
- 3 .....
- 4 ..... [4]

(iii) Clearly label **two** morphological features on fossil **F**. [2]

(iv) Describe the form of coiling shown by fossil **F**.  
.....[1]

(v) Which of the fossils shown is sessile?  
.....[1]

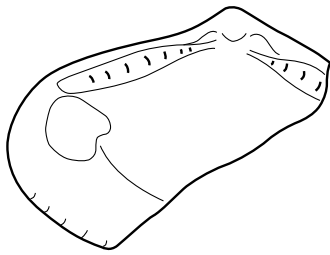
(b) Fully describe the environment in which fossil **C** lived.  
.....  
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.....  
.....  
.....[3]

(c) Describe how some fossil invertebrate skeletons can contribute to the formation of limestone.  
.....  
.....  
.....  
.....[2]

[Total: 17]

4 Fossils **J** and **K** were found as fragments in mudstones from the Ordovician period.

**fossil J**



× 1

**fossil K**



× 5

(a) (i) Identify the fossils **J** and **K**.

**J** .....

**K** .....

[2]

(ii) Explain why fossil **K** is rarely found whole.

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

(b) Define the following terms.

• *derived fossil* .....

• *death assemblage* .....

[4]



(c) The information below describes three brachiopods, **X** to **Z**.

	shell type	ornament	hinge type	functional pedicle
<b>X</b>	thick shelled	coarse ribbing	short	yes
<b>Y</b>	thin shelled	fine ribbing	long	no
<b>Z</b>	very thin shelled	no ornament	long	no

(i) Which brachiopod (**X** to **Z**) shows adaptations for a high-energy continental shelf environment?

.....[1]

(ii) Using technical terms, describe the hinge line of fossil **Y**.

.....[1]

(iii) Draw a labelled diagram of a pedically attached brachiopod.

[3]

(d) Using labelled diagrams, explain how fossil brachiopods can be distinguished from bivalves.

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

[Total: 16]

- 5 In this question, two marks are available for the quality of written communication. You may use diagrams to illustrate your answer.

Answer **both** parts of this question.

- (a) Describe how radiometric dating has allowed us to establish absolute ages of rocks. Explain the problems of radiometric dating.

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Dotted lines for writing.

.....[12]

Quality of Written Communication [2]

[Total: 25]

END OF QUESTION PAPER

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