

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**Advanced GCE**

**GEOLOGY**

Palaeontology

**2834**

Monday **24 JANUARY 2005** Afternoon 1 hour 30 minutes

Candidates answer on the question paper.

Additional materials:

Ruler (cm/mm)

Candidate Name	Centre Number	Candidate Number												
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> </tr> </table>							<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> <td style="width: 15px; height: 15px;"></td> </tr> </table>						

**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>18</b>	
<b>2</b>	<b>15</b>	
<b>3</b>	<b>15</b>	
<b>4</b>	<b>17</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 (a) (i) A number of fossil types are described in the table below. Complete the table.

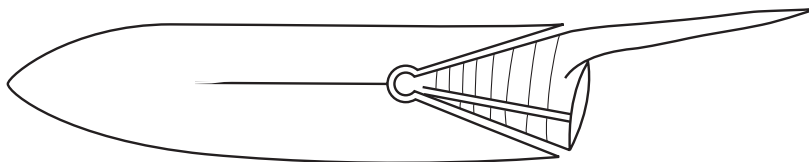
fossil	description	fossil group
<b>A</b>	has two narrow, elongate valves of equal size	
<b>B</b>	has an unchambered, spiral-shaped shell	
<b>C</b>	has two valves of unequal sizes and a pedicle foramen	
<b>D</b>	has a holdfast and many arms divided into segments	
<b>E</b>	has a chambered shell, coiled in a plane	

[5]

- (ii) Draw a labelled diagram to show the morphological features of fossil **D**.

[3]

- (b) The diagram below shows a section through fossil **F**, a belemnite.



- (i) Clearly label the following morphological features.

- siphuncle
- guard
- phragmocone
- septa

[4]

- (ii) Outline the position of the soft tissue on the diagram of fossil **F**.

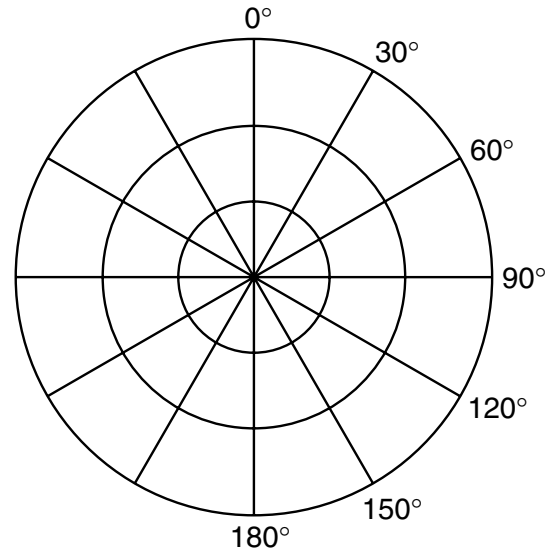
[1]

(c) Specimens of fossil **F** are sometimes found concentrated at specific horizons. Orientations of 15 specimens were recorded from a single bedding plane. The results are shown below.

specimen number	orientation	specimen number	orientation	specimen number	orientation
1	021°	6	330°	11	060°
2	065°	7	040°	12	103°
3	212°	8	055°	13	132°
4	035°	9	040°	14	235°
5	220°	10	005°	15	056°

(i) Complete the tally chart below using the data supplied. Plot the rose diagram.

orientation		tallied number of specimens
000 – 030°	181 – 210°	
031 – 060°	211 – 240°	
061 – 090°	241 – 270°	
091 – 120°	271 – 300°	
121 – 150°	301 – 330°	
151 – 180°	331 – 360°	



[3]

(ii) Describe and explain the distribution of the data you have plotted.

.....

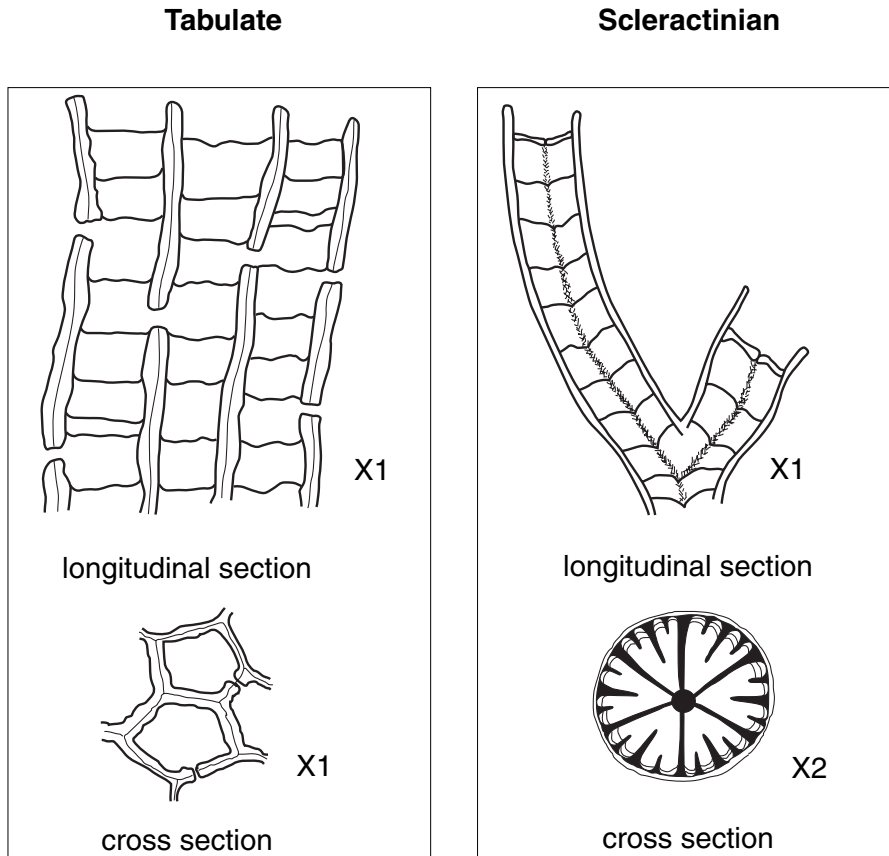
.....

.....

.....[2]

[Total: 18]

2 The fossils below are simplified diagrams of two fossil coral groups.



(a) (i) Using information from the diagram only, use a tick to indicate the presence of the structure in the table below.

	tabulate	scleractinian
tabulae		
septa		
columella		
dissepiments		

[4]

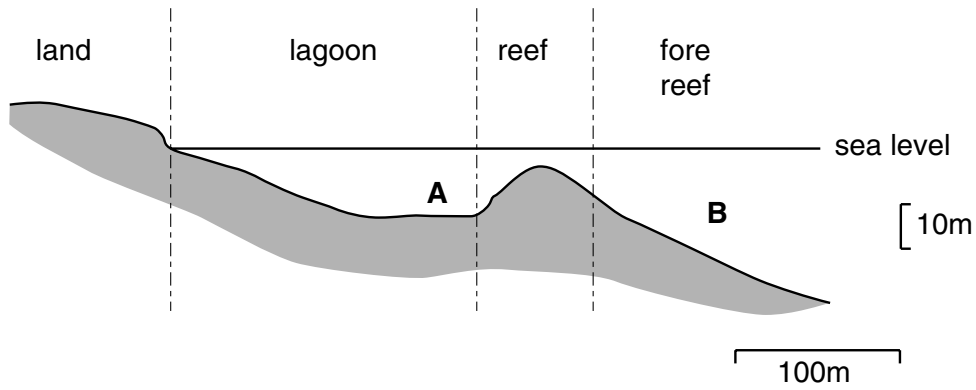
(ii) Describe how you can distinguish between tabulate and rugose corals.

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

(iii) Which of the three coral groups (tabulate, scleractinian and rugose) is

- common in the Carboniferous Period.....
- alive today? .....[2]

(b) The diagram below shows a modern reef system in cross section.



Describe how complete any fossils are likely to be (preservation potential) at localities **A** and **B**.

**A** .....

.....

.....

.....

**B** .....

.....

.....

.....

.....[4]

(c) Describe and explain **two** factors needed for good coral growth.

**1** .....

.....

.....

**2** .....

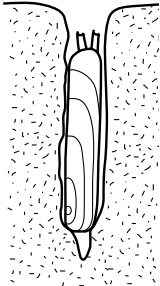
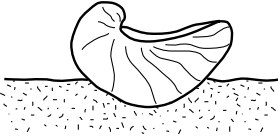
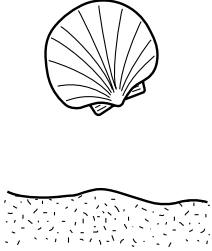
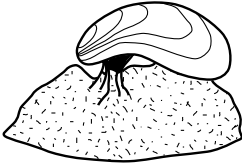
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.....[4]

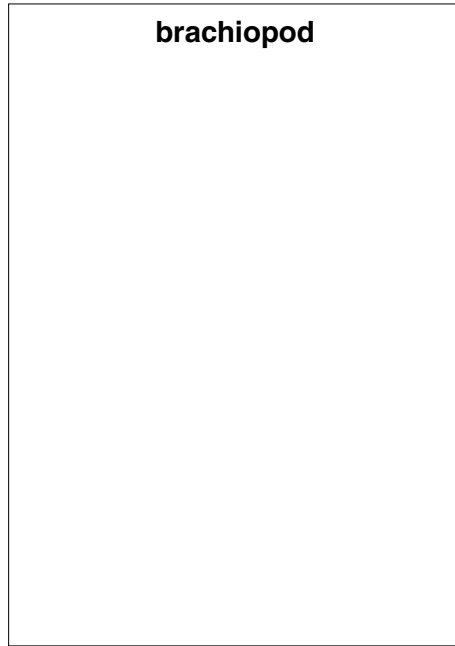
[Total: 15]

3 As a result of evolution, bivalves show adaptations enabling them to live in different environments. Fossils **W** to **Z** illustrate the bivalves' mode of life when they were alive.

(a) Complete the table below stating **one** morphological adaptation for each fossil (**W** to **Z**) and give a reason for this adaptation.

fossil bivalve	morphological adaptation	reason
<p><b>fossil W</b></p>  <p><b>Solen type</b></p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p><b>fossil X</b></p>  <p><b>Gryphaea type</b></p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p><b>fossil Y</b></p>  <p><b>Pecten type</b></p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p><b>fossil Z</b></p>  <p><b>Mytilus type</b></p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

**(b) (i)** Draw labelled diagrams to show the symmetry and relative valve sizes of bivalves and brachiopods.



[4]

**(ii)** Compare the feeding mechanisms used by bivalves and brachiopods.

.....  
.....  
.....  
.....  
.....  
.....  
.....

[3]

[Total: 15]

- 4 (a) Several definitions are given below for common geological terms. Match the terms to the definitions using the letters given.

definition	term	definition A, B, C, D or E
<b>A</b> Largest time units dividing geological history into four, e.g. Mesozoic.	biostratigraphy	
<b>B</b> In a sequence of rocks, the highest units are the youngest, providing the sequence has not been overturned.	era	
<b>C</b> Determining the age of rocks in millions of years using radiometric techniques.	superposition	
<b>D</b> Dating of rocks using fossil remains.	period	
<b>E</b> Time unit defined by specific rock and fossil types.	absolute dating	

[4]

- (b) (i) Explain how relative ages of rocks can be determined using the following methods. Use diagrams to illustrate your answers.

**way up criteria**

.....

.....

.....

**cross cutting relationships**

.....

.....

.....

[4]



(ii) Explain how varves and volcanic ash can be used in chronostratigraphy.

**varves** .....

.....

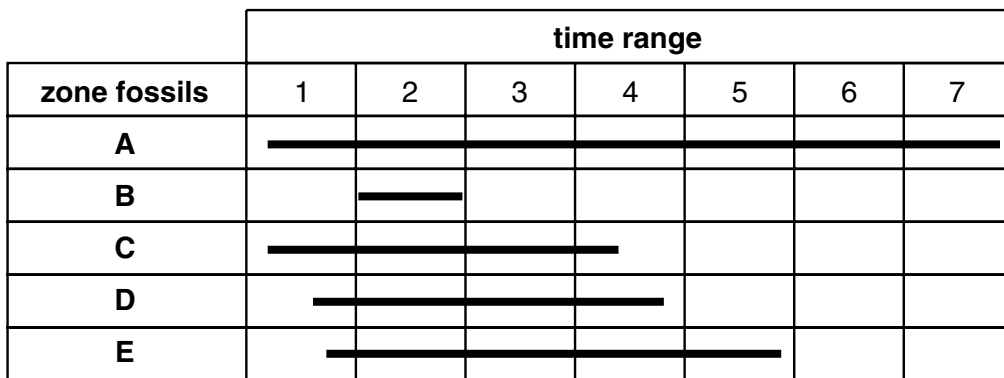
.....

**volcanic ash** .....

.....

.....[4]

(c) The diagram shows the ranges of a number of fossils (A to E) found in a sequence of rocks in the British Isles.



(i) Using the time range diagram, state which is the

- best zone fossil .....
- worst zone fossil .....[1]

(ii) What are the characteristics of a good zone fossil?

.....

.....

.....[2]

(iii) Give **one** example of a commonly used microfossil used to zone the

- Lower Palaeozoic .....
- Mesozoic .....[2]

[Total: 17]





