

**ADVANCED GCE
GEOLOGY**

Palaeontology

MONDAY 11 JUNE 2007

2834

Morning

Time: 1 hour 30 minutes

Additional materials: Ruler (cm/mm)
Electronic calculator



Candidate
Name

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- **WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.**

INFORMATION FOR CANDIDATES

- The number of marks for each question 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.
- The total number of marks for this paper is 90.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculation.

FOR EXAMINER'S USE

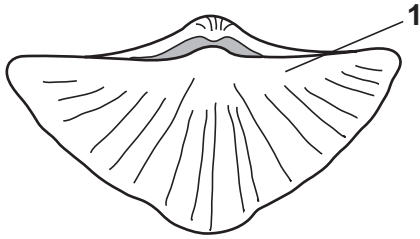
Qu.	Max.	Mark
1	18	
2	17	
3	16	
4	14	
5	25	
TOTAL	90	

This document consists of **12** printed pages.

Answer **all** the questions.

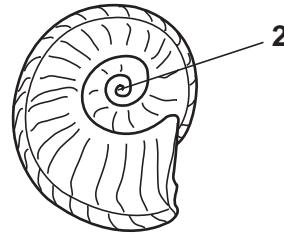
1

fossil A



x 1

fossil B



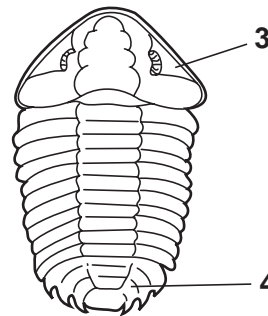
x 0.5

fossil C



x 1

fossil D



x 1

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

fossil	phylum	group
A		
B		
C		
D		

[4]

(ii) Name the morphological features labelled **1** to **4** on fossils **A**, **B** and **D**.

1

2

3

4 [4]

(iii) Using the terms provided, complete the table below to describe the mode of life of fossils **A**, **B**, **C** and **D**. Terms may be used once, more than once or not at all.

benthonic nektonic planktonic sessile

fossil	mode of life
A	
B	
C	
D	

[4]

(b) (i) Explain why fossil **A** is often found as a complete fossil in many types of sediments.

.....

 [2]

(ii) Explain why fossil **C** is often found in large numbers aligned in sediments.

.....

 [2]

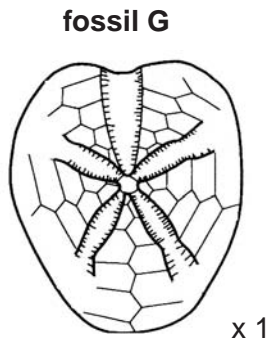
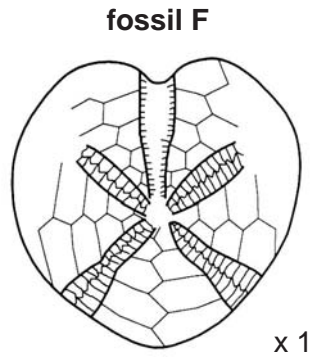
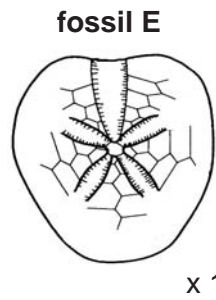
(iii) Explain why fossil **D** is often found as fragments.

.....

 [2]

[Total: 18]

2 Below are three fossil echinoids **E**, **F** and **G**.



(a) (i) Name the group of echinoids to which fossils **E**, **F** and **G** belong.

..... [1]

(ii) Label the following morphological features on fossil **G**.

- petaloid ambulacra
- anterior groove

[2]

(iii) Describe the position **and** explain the function of the following morphological features.

labrum

.....

plastron

.....

 [4]

(b) (i) Describe **and** explain **two** morphological differences between fossils **E** and **G** which can be seen in the diagram.

1

.....

.....

2

.....

..... [4]

(ii) Fossils **E**, **F** and **G** make up an evolutionary sequence. Put these fossils in the correct evolutionary order.

youngest

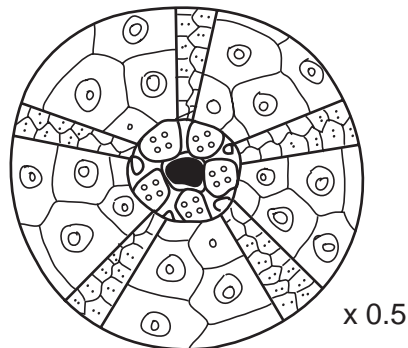
.....

oldest

[2]

(c) Fossil **H** is a sketch of another type of echinoid.

fossil H



(i) Describe **two** morphological differences between fossils **E** and **H**.

1

2 [2]

(ii) Name **and** describe the mode of life of fossil **H**.

name the mode of life

describe the mode of life

..... [2]

[Total: 17]

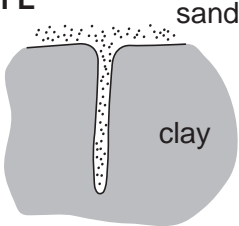


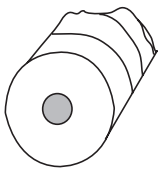
[Turn over

3 Below are diagrams of four fossils; **L**, **M**, **N** and **O**.

(a) Complete the table below to show:

- a description of the fossil or trace fossil [6]
- the energy level and the depth of water in the environment. [3]

The first one has been done for you.

fossil	(i) description	(ii) environment
<p>fossil L</p> 	<p>a trace fossil made by a burrowing worm in soft sediment, infilled by later sediment</p>	<p>energy level</p> <p>low medium <u>high</u></p> <p>water depth</p> <p><u>littoral</u> shallow marine deep marine</p>
<p>fossil M</p>  <p>x 1</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>energy level</p> <p>low medium high</p> <p>water depth</p> <p>littoral shallow marine deep marine</p>
<p>fossil N</p>  <p>x 0.5</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>energy level</p> <p>low medium high</p> <p>water depth</p> <p>littoral shallow marine deep marine</p>
<p>fossil O</p>  <p>x 1</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>energy level</p> <p>low medium high</p> <p>water depth</p> <p>littoral shallow marine deep marine</p>

(b) Coprolites are a type of trace fossil which are interpreted as fossil dung. What can they tell us about palaeoenvironments?

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

(c) (i) Explain how the following methods preserve hard skeletal tissue.

silicification

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

carbonisation

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

(ii) Aragonite alters to calcite over time. Explain why this process occurs.

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

[Total: 16]

4 The decay of radioactive elements occurs at different rates, depending on the isotope.

(a) (i) Explain the term *radioactive decay*.

.....

.....

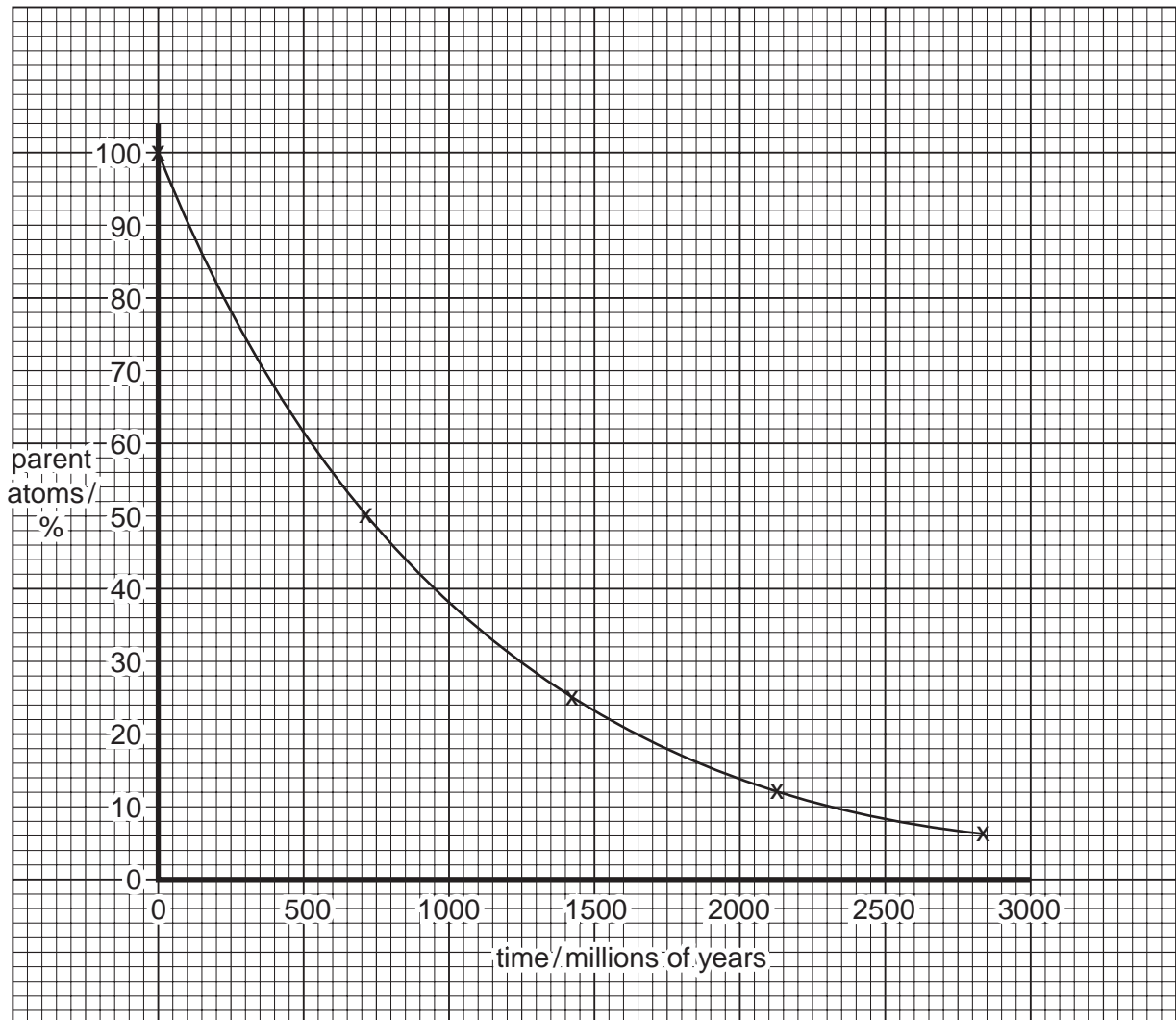
.....

..... [2]

(ii) The radioactive isotope ^{235}U decays to ^{207}Pb , and has a half-life of 710 million years. This decay curve is drawn on the graph below.

The radioactive isotope **X** has a half life of 300 million years.

Plot the decay curve for **X** on the graph below. Plot four half lives.



[3]

(iii) Use ideas about radioactive decay to explain the differences between the curves.

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

(iv) State the percentage of parent atoms remaining after 1000 million years for ^{235}U and isotope **X**.

^{235}U % **X** % [1]

(v) Describe **three** reasons why radiometric dating will **not** always produce an accurate date.

1
.....
2
.....
3
..... [3]

(b) Another radioactive isotope that can be used for dating rocks is ^{40}K .

(i) Name the daughter product formed by the decay of ^{40}K .

..... [1]

(ii) State the half life of ^{40}K .

..... [1]

(iii) Name one mineral in which ^{40}K can be found.

..... [1]

(iv) Name a rock type that may contain this mineral.

..... [1]

[Total: 14]

