

**ADVANCED GCE  
 GEOLOGY**

Palaeontology

**MONDAY 9 JUNE 2008**

**2834**

Morning  
 Time: 1 hour 30 minutes

Candidates answer on the question paper  
**Additional materials (enclosed):** None

**Additional materials (required):**

Ruler  
 Electronic calculator



Candidate  
 Forename

Candidate  
 Surname

Centre  
 Number

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Candidate  
 Number

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**INSTRUCTIONS TO CANDIDATES**

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

**INFORMATION FOR CANDIDATES**

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **90**.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

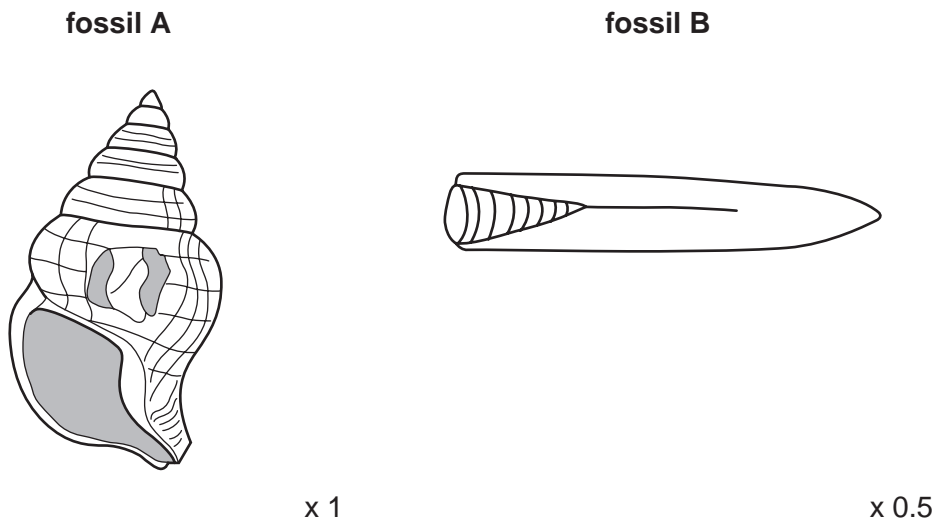
**FOR EXAMINER'S USE**

Qu.	Max.	Mark
1	17	
2	15	
3	19	
4	14	
5	25	
<b>TOTAL</b>	<b>90</b>	

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

Answer **all** the questions.

1 (a) Fossils **A** and **B** are shown below.



(i) Fossils **A** and **B** belong to the same phylum. Name the phylum.

..... [1]

(ii) Name the groups to which fossils **A** and **B** belong.

fossil	fossil group
A	
B	

[2]

(iii) Label the following morphological features on the correct fossil, **A** or **B**.

**guard      apical angle      columella**

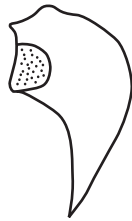
[3]

(iv) Describe the mode of life of fossil **B**.

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

(b) Fossils C, D and E are fragments from a trilobite.

fossil C



x 2

fossil D



x 2

fossil E



x 2

(i) Identify the fossil fragments C, D and E.

C .....

D .....

E ..... [3]

(ii) Explain why trilobite fossils are often found as fragments.

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

(iii) Describe and explain **two** features of trilobites that enabled them to live on the sea floor.

1 .....

.....

.....

.....

.....

2 .....

.....

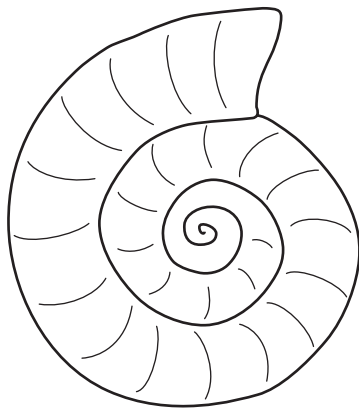
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..... [4]

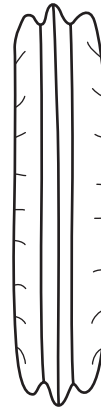
[Total: 17]

2 Fossil F is an ammonite. Two views are shown below.

fossil F



x 1



x 1

(a) (i) Label the following morphological features on the relevant view of fossil F.

**umbilicus      keel      sulcus**




[3]

(ii) Label **one other** morphological feature on fossil F.

[1]

(b) The table below shows information about different cephalopods throughout geological time.

(i) Complete the table by inserting the missing suture types, geological ranges and a sketch diagram of a suture.

suture type	geological range	suture diagram
nautiloid	Cambrian to Recent	
goniatitic	Devonian to .....	
	Carboniferous to Triassic	
	Permian to .....	

[5]

(ii) Give **one** possible reason why these sutures became more complex over time.

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

(c) (i) Ammonites are often found in black shales and may be pyritised. Explain why.

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

(ii) Ammonites may be found as derived fossils. Explain how derived fossils are formed.

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

(iii) What problem do derived fossils cause when dating rocks?

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

[Total: 15]

3 This question is about bivalves and brachiopods.

(a) The table below shows features that may be found in either **brachiopods** or **bivalves**, or **both**.

Complete the table by circling the correct option in each case. The first one has been done for you.

features	options		
composed of calcium carbonate	brachiopods	bivalves	both
has a pedicle foramen	brachiopods	bivalves	both
line of symmetry is normally along the hinge line, between the two valves	brachiopods	bivalves	both
has a lophophore to feed	brachiopods	bivalves	both
has growth lines and ribbing	brachiopods	bivalves	both
usually has two valves of similar size	brachiopods	bivalves	both

[5]

(b) (i) Draw a labelled diagram in the space below to illustrate the internal morphology of a burrowing bivalve.

[4]

(ii) Describe how bivalves burrow into sediment.

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

(iii) Describe how bivalves feed whilst inside a burrow.

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

(c) (i) Explain how an epifaunal bivalve has adapted to live on a soft substrate (unconsolidated sediment). Use a labelled diagram to illustrate your answer.

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

(ii) Explain how an epifaunal bivalve has adapted to live on a hard substrate (rock). Use a labelled diagram to illustrate your answer.

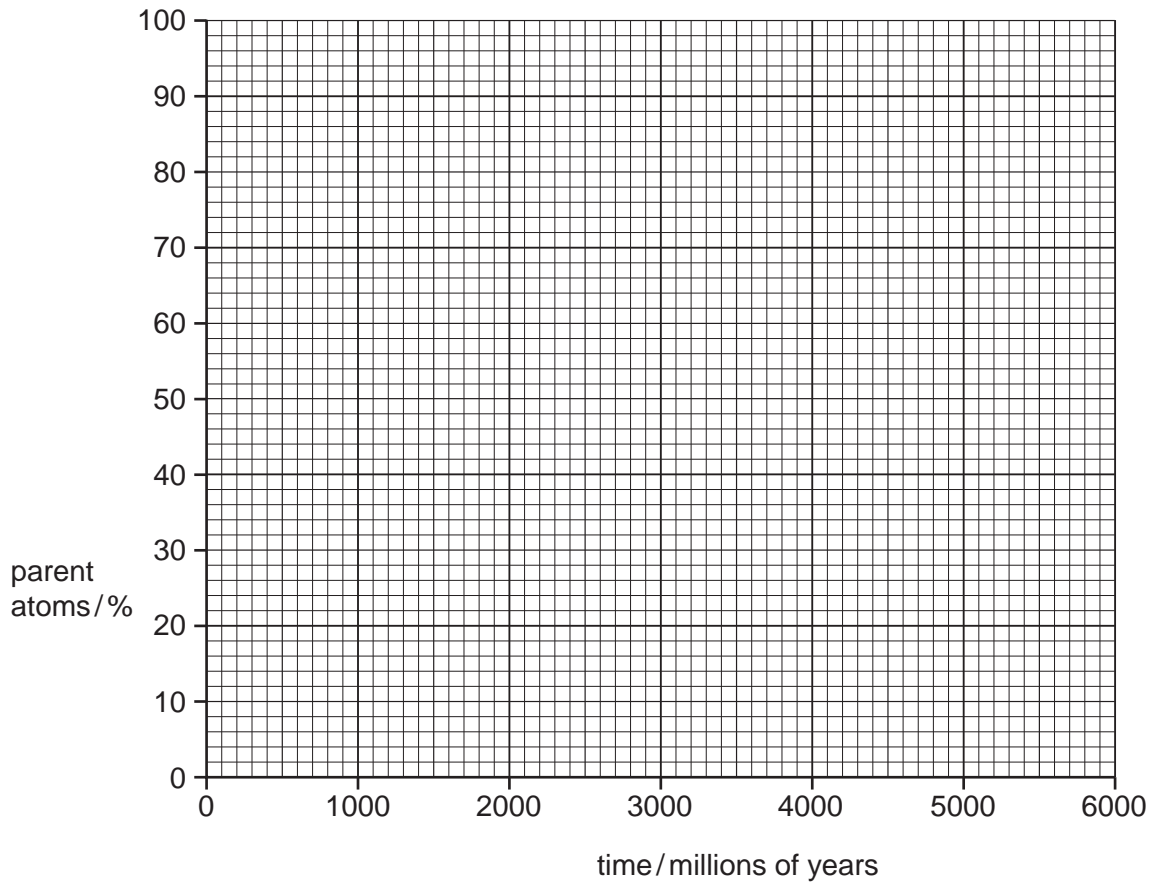
.....  
.....  
.....[3]

[Total: 19]

[Turn over

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

(i) The radioactive isotope  $^{40}\text{K}$  decays to  $^{40}\text{Ar}$ , and has a half-life of 1 250 million years. Plot the radioactive decay curve for this isotope, showing 4 half-lives.



[3]

(ii) If 80% of the parent material remained, what would be the age of the rock?

..... [1]

(iii) Explain the term *half-life*.

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

(iv) Name **one** other radioactive isotope and decay product that can be used for absolute dating of rocks.

..... [1]



(b) (i) Describe the differences between absolute and relative dating.

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

(ii) Describe how volcanic ash can be used to date rocks.

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

(c) Describe and explain **two** possible reasons for the occurrence of mass extinctions.

1 .....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

[Total: 14]





