

**ADVANCED GCE  
 GEOLOGY**

Palaeontology

**MONDAY 21 JANUARY 2008**

**2834**

Afternoon  
 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.
- Do **not** write outside the box bordering each page.
- 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**

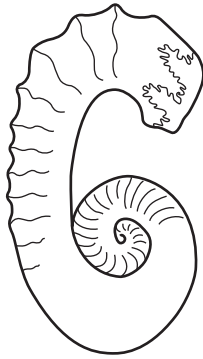
Qu.	Max.	Mark
1	19	
2	13	
3	16	
4	17	
5	25	
<b>TOTAL</b>	<b>90</b>	

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

Answer **all** the questions.

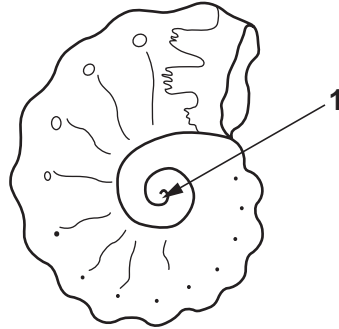
1 (a) Fossils **A**, **B**, **C** and **D** are shown below.

**fossil A**



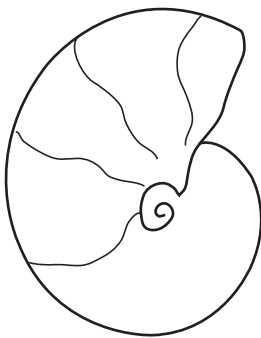
x 0.5

**fossil B**



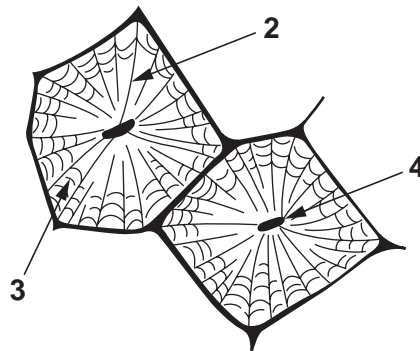
x 1

**fossil C**



x 0.5

**fossil D**



x 1

(i) Identify fossils **A**, **B**, **C** and **D**.

**A** .....

**B** .....

**C** .....

**D** ..... [4]

(ii) Identify the morphological features **1** to **4**.

**1** .....

**2** .....

**3** .....

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

- (iii) Fossil **D** required specific conditions to live. Use the table below to suggest the best conditions for growth. Circle the best values.

temperature of water (°C)	20	27	33
salinity (parts per thousand)	35	45	55
water depth (m)	15	75	150

[3]

- (iv) Explain why a change in temperature would have affected the growth of fossil **D**.

.....

.....

.....

..... [2]

- (v) State the climatic zone in which fossil **D** was most likely to have lived.

..... [1]

- (b) Limestone can accumulate on the sea floor at a rate of 1.50 mm per year. What is the possible thickness in metres that could accumulate in 100 000 years? Show your working.

Answer ..... metres [2]

- (c) Fossil **C** is found as an external mould. With the aid of diagrams explain how an external mould is formed.

.....

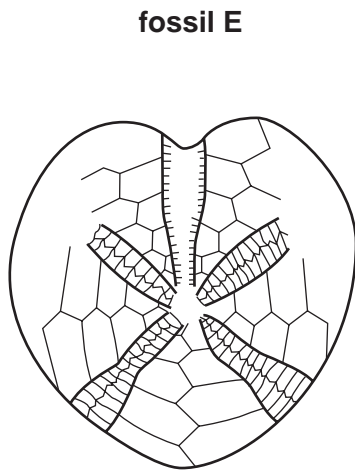
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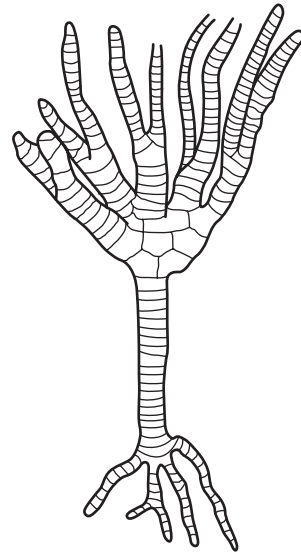
..... [3]

[Total: 19]

2 Fossils **E** and **F**, shown below, belong to the same phylum.



x 1



x 0.5

(a) (i) State the phylum to which fossils **E** and **F** belong.

..... [1]

(ii) Give **two** reasons why fossils **E** and **F** belong to the same phylum.

1 .....

.....

2 .....

..... [2]

(b) The table opposite shows information about morphological features that can be found in either fossil **E**, or fossil **F**, or **both**.

Complete the first column of the table opposite by matching the correct morphological feature to its function. Choose terms from the list below.

- columnals**      **holdfast**      **labrum**      **peristome**      **tubercle**

morphological feature	description or function
	for attachment of spines
	supports the animal
	lip that protrudes underneath the mouth
	for attachment to the sea floor

[4]

(c) (i) Draw and label a typical gastropod in the space below.

[4]

(ii) Describe the form of coiling you have drawn, using technical terms.

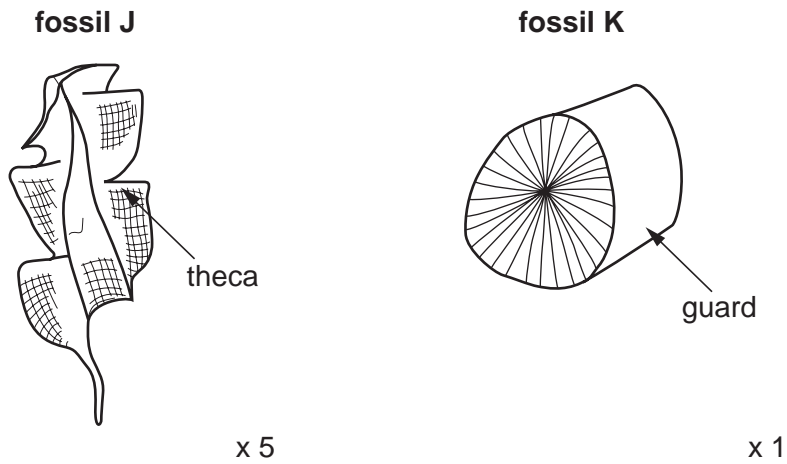
.....  
 ..... [1]

(iii) Give a reason why gastropods are classified as belonging to Phylum Mollusca.

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

[Total: 13]

3 Fossil fragments **J** and **K**, along with some of their features, are shown below.



(a) (i) State the fossil groups to which fossils **J** and **K** belong.

**J** .....

**K** ..... [2]

(ii) Describe the mode of life of fossil **K**.

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

(b) A group of fossils found together is called an assemblage. Describe a fossil assemblage found in each of the following environments. Explain why these fossils are found together.

terrestrial (non-marine) assemblage

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

deep marine assemblage

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

(c) Original organic material is not usually preserved in the fossil record.

(i) Describe how silicification and carbonisation alter original organic material.

silicification

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

carbonisation

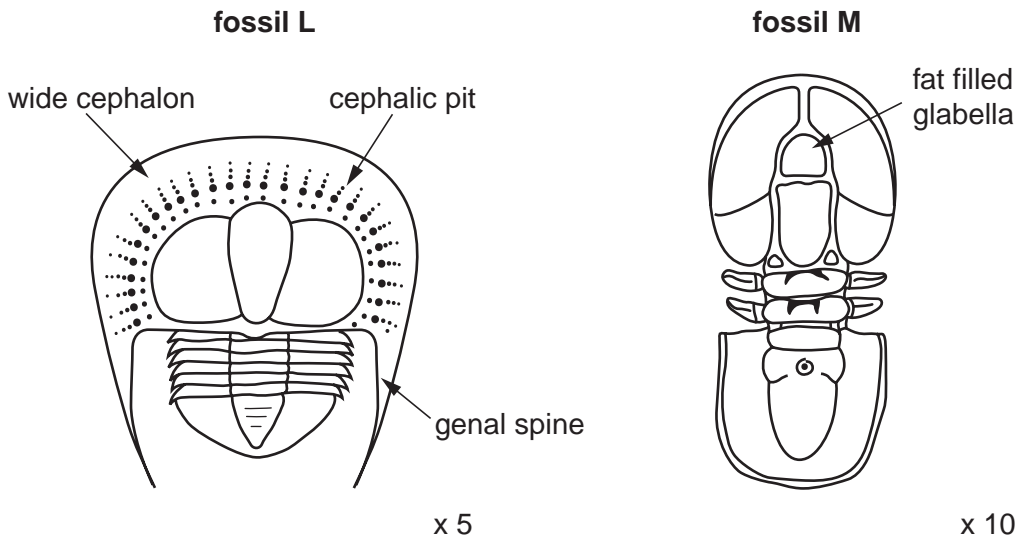
.....  
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.....  
..... [4]

(ii) Describe and explain how exceptional preservation occurred in the Burgess Shale.

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

[Total: 16]

4 (a) Fossils **L** and **M** are trilobites that have evolved to live in different environments.



(i) State the phylum to which trilobites belong.

..... [1]

(ii) Which term best describes the mode of life of fossil **L** when it was alive? Circle the correct term.

**planktonic      epifaunal      infaunal**

[1]

(iii) Which term best describes the form of fossil **L**? Circle the correct term.

**isopygous      micropygous      macropygous**

[1]

(iv) Explain the functions of the following morphological features found in fossils **L** and **M**.

genal spine .....

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

wide cephalon .....

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



fat filled glabella .....  
.....  
.....  
..... [6]

(b) Describe and explain how benthonic trilobites moved.

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

(c) (i) Explain what is meant by the term *evolution*.

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

(ii) Give **one** example of a macrofossil from the Mesozoic era that shows evolutionary changes allowing it to be used as a zone fossil.

..... [1]

(iii) Explain why microfossils are important zone fossils.

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

[Total: 17]

**5** In this question, two marks are available for the quality of written communication.

**(a)** Describe the differences between brachiopods and bivalves. Diagrams are essential to illustrate your answer.

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