



ADVANCED GCE

GEOLOGY

Evolution of Life, Earth and Climate

F795

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:

- Electronic calculator
- Ruler (cm/mm)

**Monday 21 June 2010
Morning**

Duration: 1 hour 45 minutes




Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use 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. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

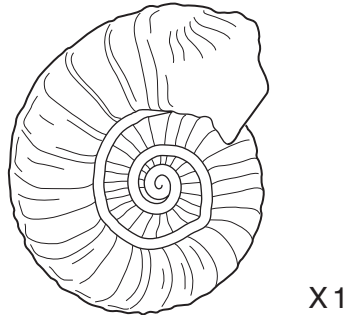
INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **100**.
-  Where you see this icon you will be awarded marks for the quality of written communication in your answer.
- You may use an electronic calculator.
- This document consists of **20** pages. Any additional and blank pages are indicated.

Answer **all** the questions.

1 The diagram below shows a cephalopod, fossil **A**.

fossil A



(a) (i) Label the following morphological features on the diagram.

aperture protoconch rib **[3]**

(ii) Describe the type of coiling seen in fossil **A**.

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

(b) (i) The suture lines of cephalopods evolved over time. In the space below, draw labelled diagrams to illustrate the differences between the suture lines of an ammonite and a goniatite.

ammonitic suture	goniatitic suture

[3]

(ii) Which of the following cephalopods had the simplest suture? Circle the correct answer.

ammonite ceratite nautiloid **[1]**

(iii) What function do the following features have in a cephalopod?

body chamber

.....

septa

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

(iv) Describe **one** different evolutionary change that occurred in the cephalopods. You may use diagrams to illustrate your answer.

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..... [3]

(c) Modern day cephalopods, such as *Nautilus*, can move vertically and horizontally in the water column. Explain how this movement is brought about.

vertical movement

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horizontal movement

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..... [4]

(d) Describe how modern day cephalopods feed.

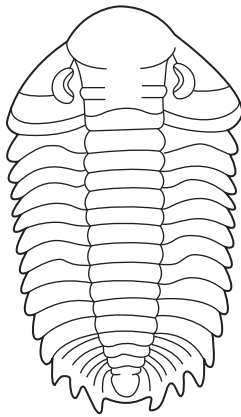
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Turn over

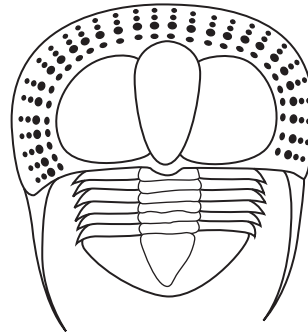
2 Fossils **B** and **C** are both arthropods.

fossil B



X 1

fossil C



X 5

(a) (i) To what class do both fossils **B** and **C** belong?

..... [1]

(ii) Label the following morphological features on the appropriate diagram.

compound eye

genal spine

glabella

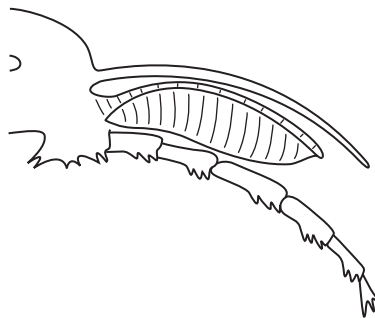
facial suture

[4]

(iii) Shade the pygidium on fossil **B**.

[1]

(b) The diagram below shows a cross section through part of the thorax of fossil **B**.



(i) Label the following morphological features.

gill

jointed appendage

[2]

(ii) Describe how fossil **B** moved around when it was alive.

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

(c) Describe and explain the morphological features that trilobites have evolved to enable them to live in the following ways.

nektonic

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infaunal

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planktonic

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..... [6]

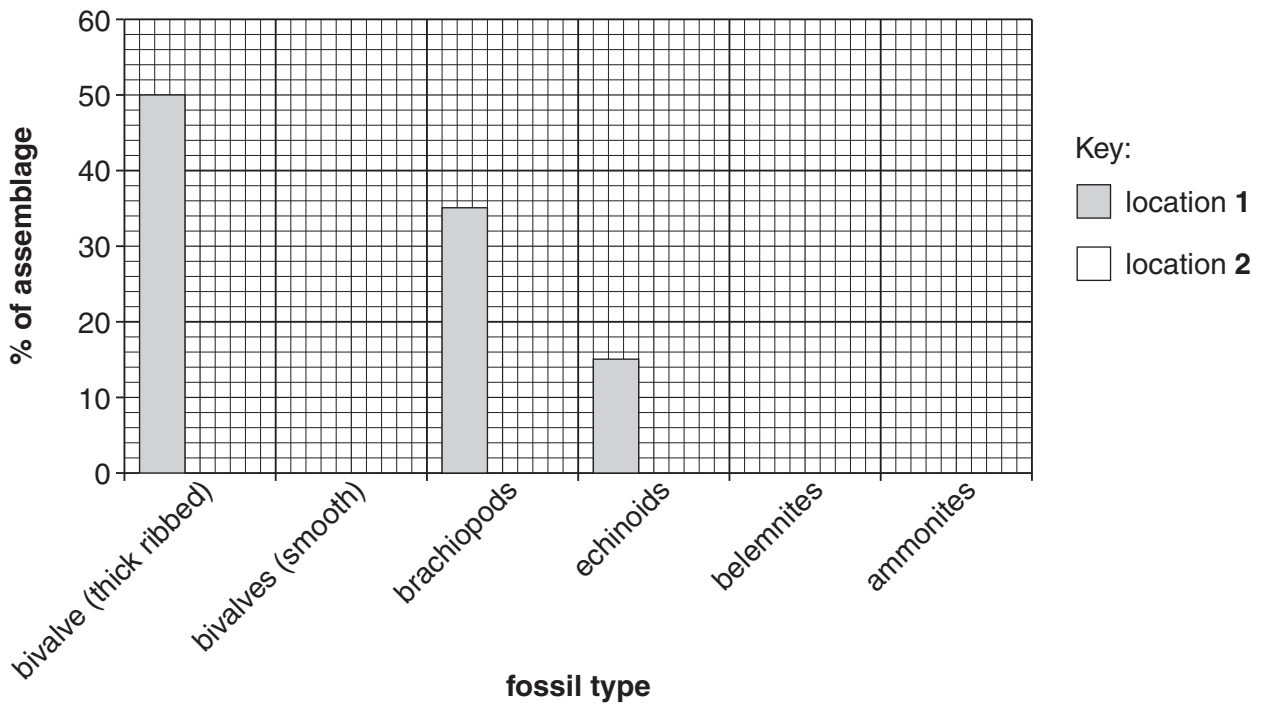
[Total: 16]

- 3 (a) Fossils were collected from two different locations (1 and 2) from rocks of the same age. The percentage of each assemblage was recorded in the table below.

fossil type	percentage (%) of assemblage	
	location 1	location 2
bivalve (thick ribbed)	50	0
bivalves (smooth)	0	30
brachiopods	35	52
echinoids	15	0
belemnites	0	5
ammonites	0	13
% of total which are unbroken fossils	30	60

- (i) What percentage of the fossils in the assemblage from location 2 were free swimming?
 % [1]

- (ii) Complete the bar chart to show the differences in fossil assemblages between locations 1 and 2.



[2]

(iii) Describe the type of environment in which the assemblage from location 2 was laid down. Give **two** reasons for your answer.

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..... [3]

QUESTION 3b(i) STARTS ON PAGE 8

- (b) (i) The table below shows a list of fossil features that can be found in either brachiopods, bivalves or both. Place a tick in the correct box to indicate if the features listed are present.

	brachiopod	bivalve
lophophore		
ligament		
permanent gape between shells		
made of CaCO ₃		
diductor and adductor muscle scars		
zig-zag commissure		

[5]

- (ii) In the space below, draw labelled diagrams to show an external view of a deep burrowing bivalve.

[3]

- (iii) Describe **two** features found in attached bivalves but are absent from burrowers.

1

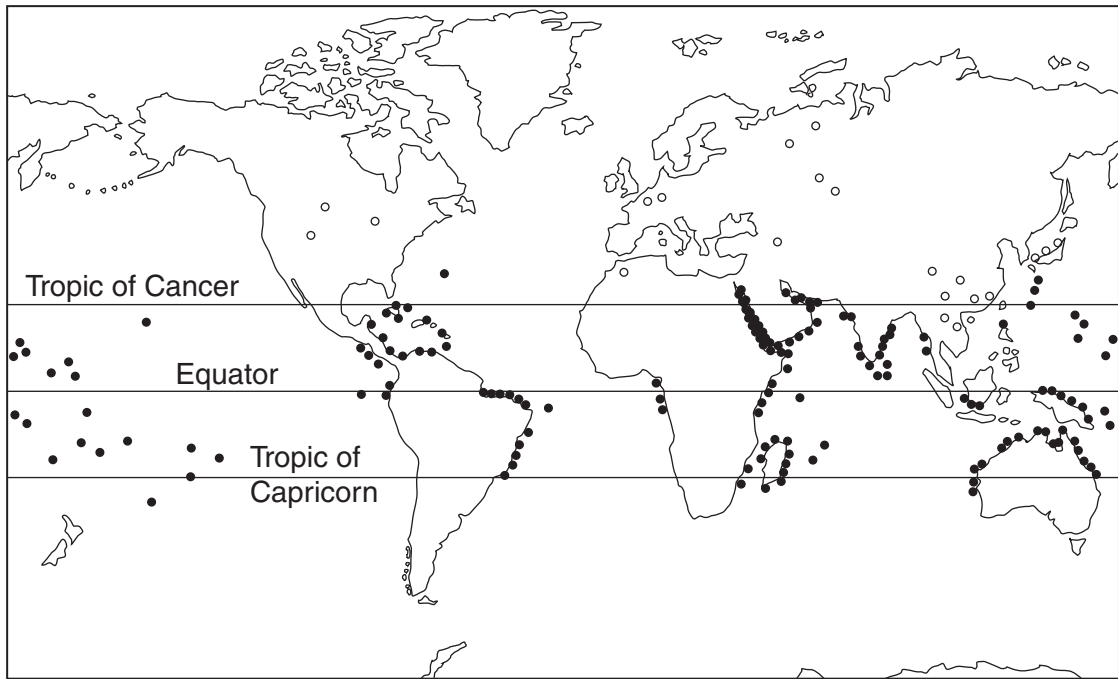
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2

..... [2]

[Total: 16]

- 4 The map below shows the present day global distribution of colonial coral reefs (solid circles) and the distribution of reefs that were present during the Lower Carboniferous (open circles).



- (a) (i) Explain the difference between the global distribution of coral reefs at the present day and in the Lower Carboniferous.

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..... [3]

- (ii) Describe in detail the conditions that corals require to develop major coral reefs.

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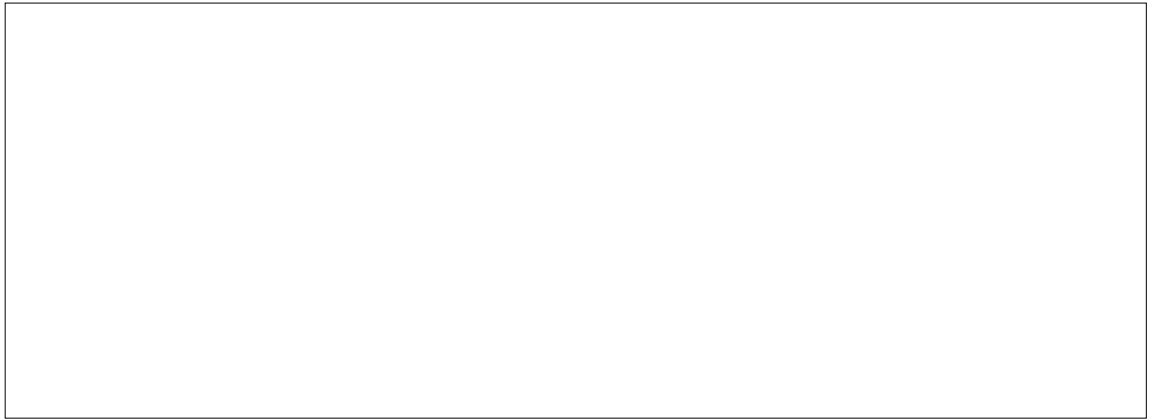
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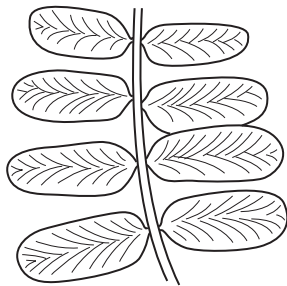
(iii) Draw a labelled diagram of a Carboniferous rugose solitary coral in the space below.



[3]

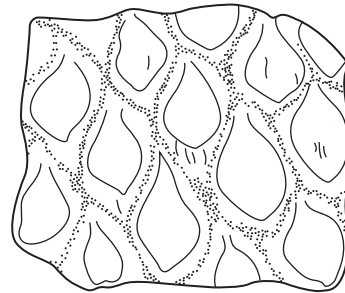
(b) Fossil fragments **D** and **E** are found in rocks from the Carboniferous Period.

fossil D



X5

fossil E



X0.5

(i) What type of organism do fossil fragments **D** and **E** originate from?

..... [1]

(ii) Name **one** other organism that may have lived in the same environment.

..... [1]

(iii) Describe the environment of deposition that allowed the preservation of these fossil fragments.

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..... [3]

[Total: 14]

5 (a) Earth's climate is not static, but has changed throughout geological history. Changes in climate have led to "Icehouse Earth" and "Greenhouse Earth" conditions.

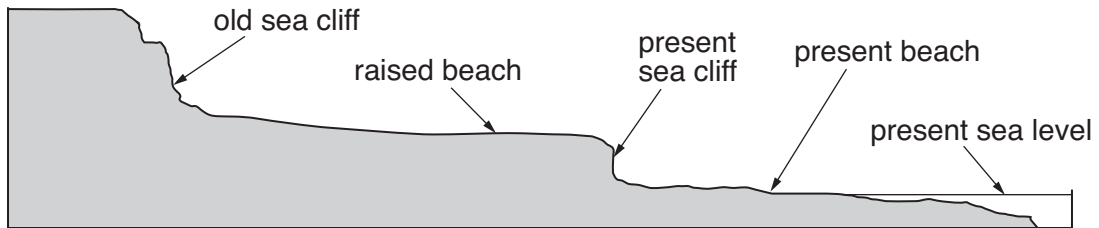
(i) Define the term *climate*.

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..... [2]

(ii) What are the characteristics of an "Icehouse Earth"?

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..... [2]

(b) The diagram below shows a field sketch through a coastal section in Scotland.



(i) Explain how raised beaches are thought to have formed as a result of isostatic changes in sea level.

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..... [2]

(ii) Suggest how changes in the spreading rates at mid ocean ridges can affect sea level.

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..... [2]

(iii) Explain the relationship between sea level and climatic change.

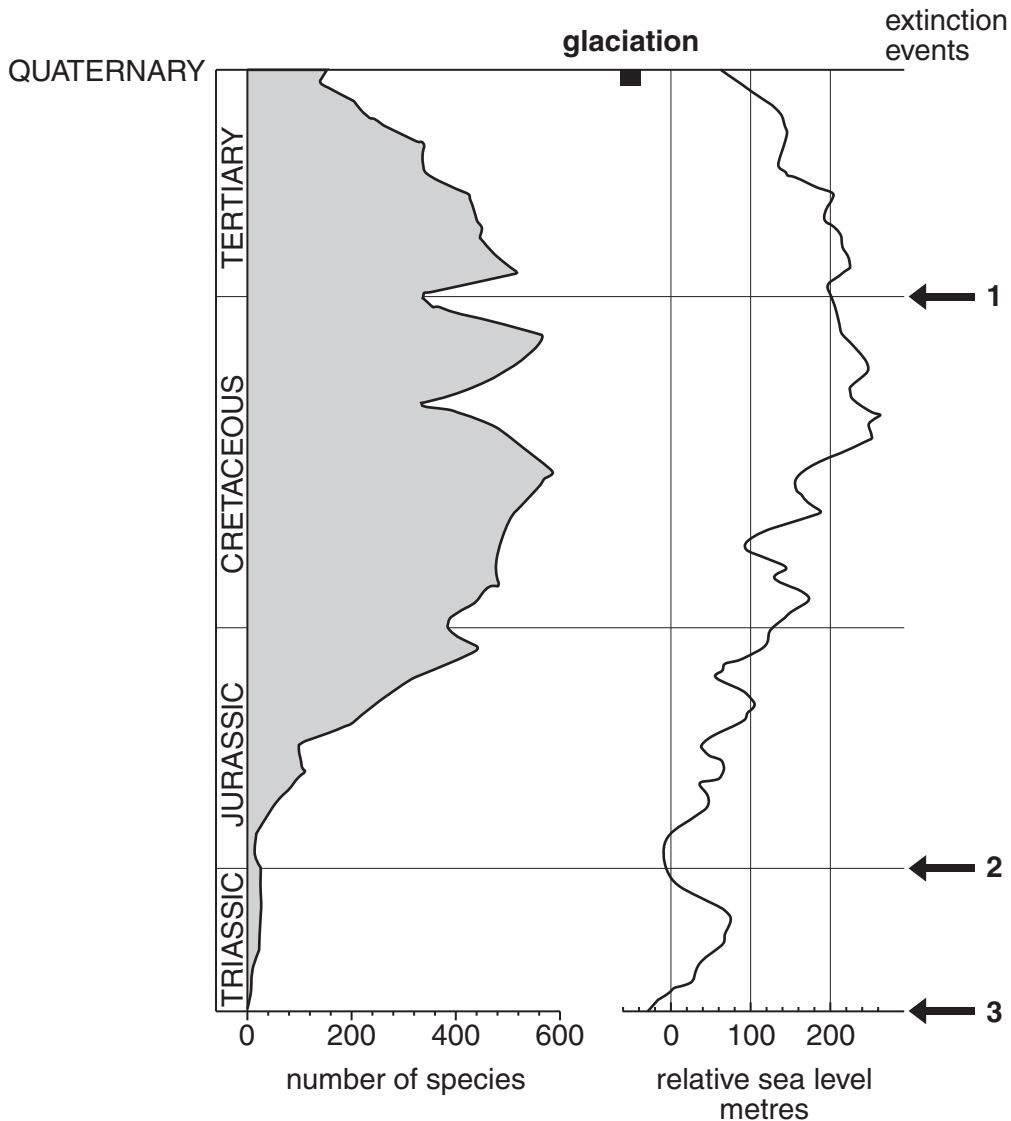
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..... [2]

(c) The diagram shows data on species diversity (numbers of microplankton), relative sea level and the position of major extinction events for part of the geological column.



(i) Mark with an X on the sea level curve diagram, a time where the Earth's land area was of greatest extent. [1]

(ii) Describe the general relationship between species diversity and relative sea level.

.....

..... [1]

(iii) What additional factor other than sea level change might have caused a decrease in species diversity for extinction event 1?

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

(d) Microplankton can become microfossils. Outline the uses of microfossils in stratigraphy.

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

[Total: 15]

- 6 Write an account of the mass extinction event at the Permo-Triassic boundary. Describe the main characteristics and the possible causes of this extinction event.



You should structure your answer to include evidence for each possible cause.

A series of horizontal dotted lines provided for the student to write their answer to the question.

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[Total: 10]

QUESTION 7 STARTS ON PAGE 16

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[Total: 10]

END OF QUESTION PAPER

ADDITIONAL PAGE

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