OCR
RECOGNISING ACHIEVEMENT

Friday 27 January 2012 – Morning

A2 GCE GEOLOGY

F795 Evolution of Life, Earth and Climate

F712980112

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Electronic calculator
- Ruler (cm/mm)

Duration: 1 hour 45 minutes

F795

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

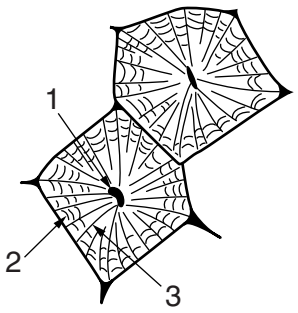
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined pages at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the bar codes.

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 a mark for the quality of written communication in your answer.
- You may use an electronic calculator.
- This document consists of **20** pages. Any blank pages are indicated.

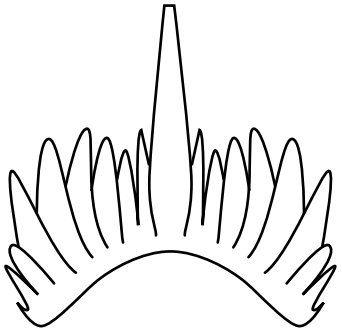
1 Fossils **A**, **B**, **C** and **D** are members of different groups of fossils.

fossil A



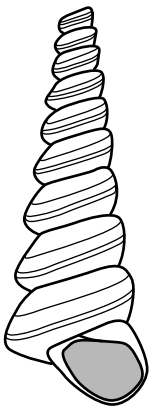
X 4

fossil B



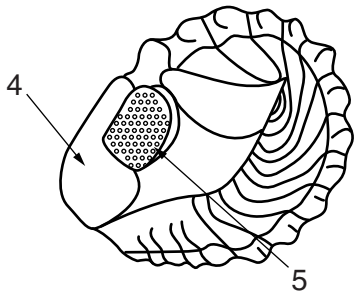
X 100

fossil C



X 1

fossil D



X 2

(a) (i) Identify the groups for each of the fossils above.

fossil	group
A	
B	
C	
D	

[4]

(ii) Label the morphological features **1** to **5** on fossils **A** and **D**.

1 ..... 2 .....

3 ..... 4 .....

5 ..... **[4]**

(iii) Describe the function of morphological feature **2**.

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

(iv) State the composition and function of fossil **B**.

composition .....

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

(v) Clearly label **two** morphological features on fossil **C**. **[1]**

(vi) Describe the environment in which fossil **C** lived.

.....

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

(vii) Giving **two** pieces of evidence, deduce the probable mode of life of fossil **D**.

.....

.....

.....

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

(b) (i) In the space below, draw a labelled diagram to show a pedically attached brachiopod in life position.

[2]

(ii) Explain how brachiopods filter feed using a lophophore.

.....

.....

.....

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

[Total: 19]

2 **(a)** The table below shows information about fossils and the different ways they can be preserved.

Complete the first column of the table by matching the correct term to its description. Choose terms from the list below.

amber **body fossil** **carbonisation** **diagenesis**

pyritisation **replacement** **silicification** **tar** **trace fossil**

term	description
	sulfur bacteria on the sea floor react with iron in the environment and iron minerals replace shell material
	hard parts of skeletons which may be whole or fragmented
	organisms are trapped in black sticky material, excluding oxygen and stopping decay
	material is dissolved atom by atom and substituted with another mineral
	changes within the sediment after burial, accelerated by moving groundwater
	organisms are trapped in resinous material, excluding oxygen and stopping decay

[5]

(b) In the space below, draw annotated diagrams to show how internal and external moulds and casts of fossils are formed.

[4]

(c) Explain how transport distance, particle size and diagenesis can affect the quality of preservation in a fossil.

.....

.....

.....

.....

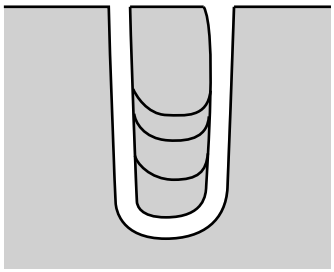
.....

.....

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

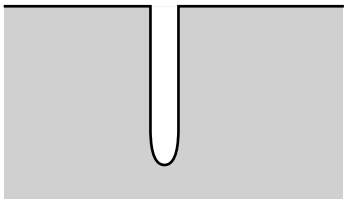
(d) Fossils **E** and **F** are trace fossils.

fossil E



X 1

fossil F



X 1

(i) Describe how fossils **E** and **F** were formed.

.....

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

(ii) How could these trace fossils be used to identify an unconformity?

.....

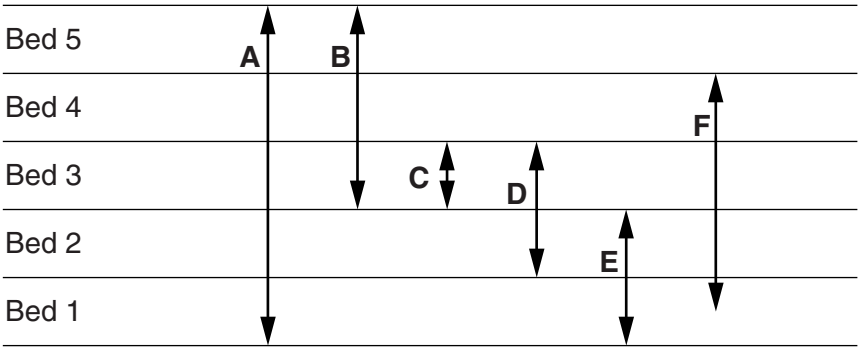
..... **[1]**

(iii) Describe the conditions necessary for tracks and trails to become preserved on the sea floor.

.....

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

(e) A series of Jurassic strata in Yorkshire have been logged and the ammonite fauna recorded as species **A** to **F**.



(i) Which is the **best** zone fossil? Explain your answer.

.....

.....

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

(ii) Which bed is most clearly defined in terms of the fossil ranges? Explain your answer.

.....

.....

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

(iii) Describe **Bed 2** in terms of the ammonite assemblage.

.....

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

(f) Explain why the fossil record is incomplete.

.....

.....

.....

.....

.....

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

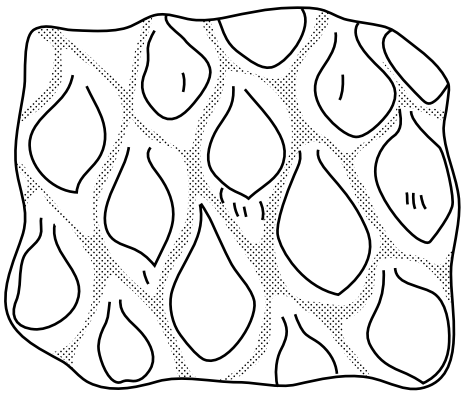
[Total: 21]

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

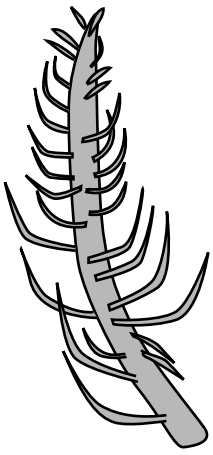
3 **(a)** The fossil fragments below belong to extinct organisms from the Carboniferous period.

fossil bark of a Carboniferous tree showing leaf scars



X 2

fossil leaves and stem of a Carboniferous plant



X 4

(i) Describe the environment of deposition that allowed the preservation of these plant fragments.

.....

.....

.....

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

(ii) Describe **two** morphological similarities between lobe finned fish and the early amphibians in the Devonian.

.....

.....

.....

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

(iii) Vertebrate bones from fossil amphibians were found with the plant fossils. Describe **two** pieces of morphological evidence to show how early amphibians were adapted to terrestrial life in the Carboniferous.

.....

.....

.....

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

(b) Large forests covered much of the UK during parts of the Carboniferous period. The climate during this time has been interpreted as different from today.

(i) Explain how the following observations about these plants can give us evidence that the palaeoclimate was different during the Carboniferous compared to today:

absence of tree rings

.....

.....

growth of up to 40 m high.

.....

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

(ii) State the climate of the UK during the Carboniferous period.

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

(c) Give **two** other pieces of evidence that suggest that the palaeoclimate was different during the Carboniferous period. Explain your answer.

.....

.....

.....

.....

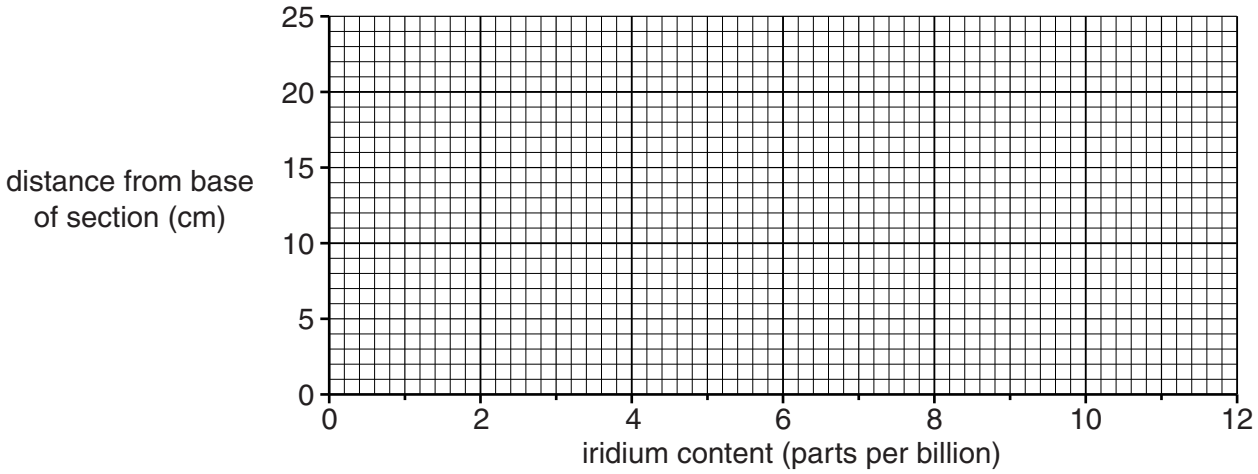
..... **[2]**

[Total: 11]

4 **(a)** The table below shows the results of sampling in a series of beds at close intervals. The samples were analysed for their iridium content. The beds investigated were a series of limestone and sandstone beds with one thin clay layer.

distance from the base of the section (cm)	iridium content (parts per billion)
0	0.3
3	0.2
6	0.7
8	8.0
9	11.0

distance from the base of the section (cm)	iridium content (parts per billion)
11	6.0
13	3.5
18	0.9
21	0.5
24	0.3



(i) Plot the data on the graph paper above. Draw an appropriate curve of best fit. **[2]**

(ii) Draw a line on the graph to show where a mass extinction event occurred. **[1]**

(iii) Background levels of iridium are approximately 0.3 to 0.5 ppb or less. Suggest and explain the source of the raised levels of iridium in this section.

.....

.....

.....

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

(b) There is no iridium anomaly at the Permo–Triassic boundary. This mass extinction is possibly due to large-scale volcanic activity.
Describe and explain how the volcanic activity could have caused a mass extinction.

.....

.....

.....

.....

.....

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

(c) Choose **two** methods of relative dating that can be used to date rocks. For each method describe and explain how it is used.

method 1 .....

.....

.....

.....

method 2 .....

.....

.....

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

(d) **(i)** Sequences can be correlated from one area to another using rocks. State the name of this type of correlation.

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

(ii) Define the term *diachronous rocks*. Explain one problem of diachronous rocks when correlating between two different geographical areas.

.....

.....

.....

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

[Total: 15]

5 **(a)** The table below shows statements that may be true or false about bivalves.

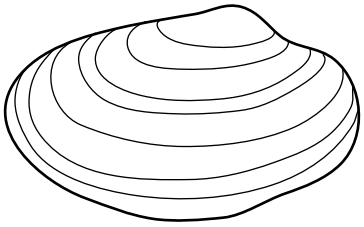
(i) Complete the table by circling the correct response in each case, either true or false.

features	options	
has two identical valves, left and right	true	false
does not have a foot	true	false
has a ligament to hold the valves closed	true	false
bilaterally symmetrical about a medial plane of symmetry	true	false
is composed of calcium carbonate	true	false
has a pallial line	true	false
has two teeth within the hinge apparatus of the pedicle valve	true	false

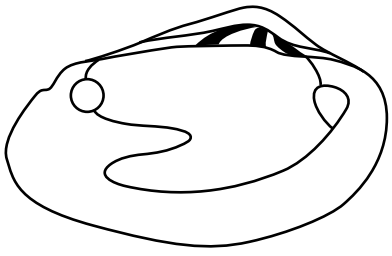
[4]

(ii) On the diagrams below label the following features:

- adductor muscle scars
- growth lines
- pallial sinus
- umbo



X1



X1

[2]

(b) Describe and explain the adaptations shown by different epifaunal bivalves to live in the following environments. Use labelled diagrams to illustrate your answers.

(i) high energy marine environment on a rocky shore

.....

.....

.....

[3]

(ii) low energy marine environment with soft muddy substrate

.....

.....

.....

[3]

(c) Explain how studying bivalves alive today can allow us to understand assemblages of bivalves in the geological record.

.....

.....

.....

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

[Total: 14]

6 Write an account of the changes in morphology of graptolites as they evolved through the Lower Palaeozoic. Labelled diagrams are essential to illustrate your answer.

You should structure your answer to describe the oldest graptolites first and include descriptions and evidence to support your ideas.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[Total: 10]

7 Describe the morphological similarities and differences between nautiloids and ammonoids. Use diagrams to illustrate your answer.

You should use external and internal morphological features that belong to both types of cephalopod and features that are different.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[Total: 10]

END OF QUESTION PAPER

ADDITIONAL PAGE

If additional space is required, you should use the lined pages below. The question number(s) must be clearly shown.

ADDITIONAL PAGE

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE