Candidate forename		Candidate surname	

Centre number						Candidate number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

A2 GCE

F795

GEOLOGY

Evolution of Life, Earth and Climate

FRIDAY 27 JANUARY 2012: Morning
DURATION: 1 hour 45 minutes

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Electronic calculator
Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

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INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. 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.**

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.**

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Turn over for Question 1

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

(a) (i) Identify the groups for each of the fossils on INSERT 1.

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. [2]

composition _____

function _____

(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) Describe how a pedically attached brachiopod is attached when alive. You may use diagrams to help you write your answer.

[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) Describe how internal and external moulds and casts of fossils are formed. You may use a diagram to illustrate your answer.

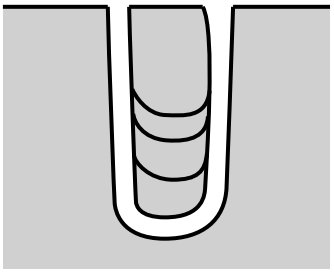
[4]

(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



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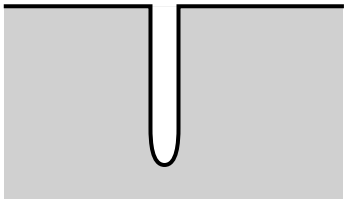
fossil F



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]**

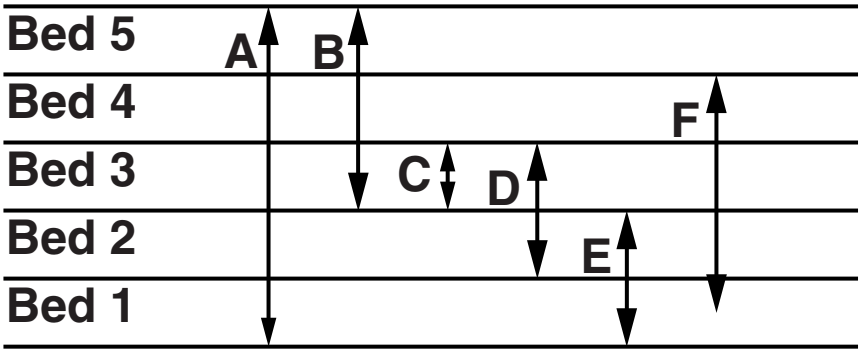
(iii) Describe the conditions necessary for tracks and trails to become preserved on the sea floor.

_____

_____

_____ **[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.

_____

_____

_____

_____

_____

_____

_____

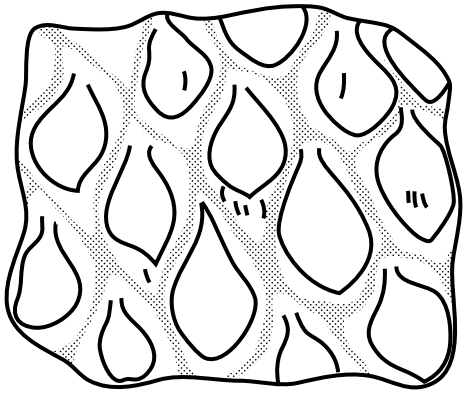
_____

_____ **[3]**

[Total: 21]

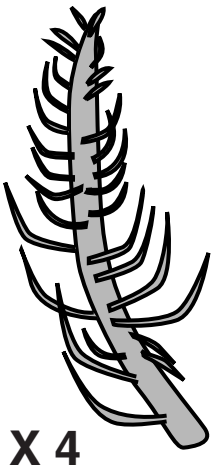
3 (a) The fossil fragments below belong to extinct organisms from the Carboniferous period.

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 on INSERT 2. 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.

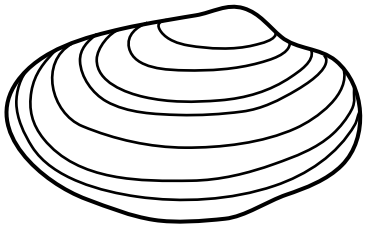
(i) Complete the table by circling the correct response in each case, either true or false.

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

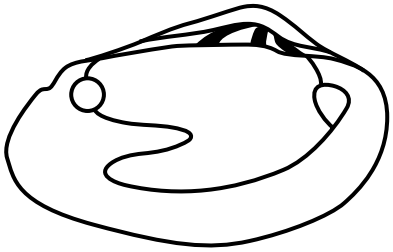
[4]

(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. You may use a diagram to illustrate your answer.

(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. You may use diagrams 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. You may use a diagram 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

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