

Monday 3 June 2013 – Morning

A2 GCE GEOLOGY

F795/01 Evolution of Life, Earth and Climate

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

- Electronic calculator
- Ruler (cm/mm)

Duration: 1 hour 45 minutes

MODIFIED LANGUAGE



Candidate
forename

Candidate
surname


Centre number

Candidate number

INSTRUCTIONS TO CANDIDATES

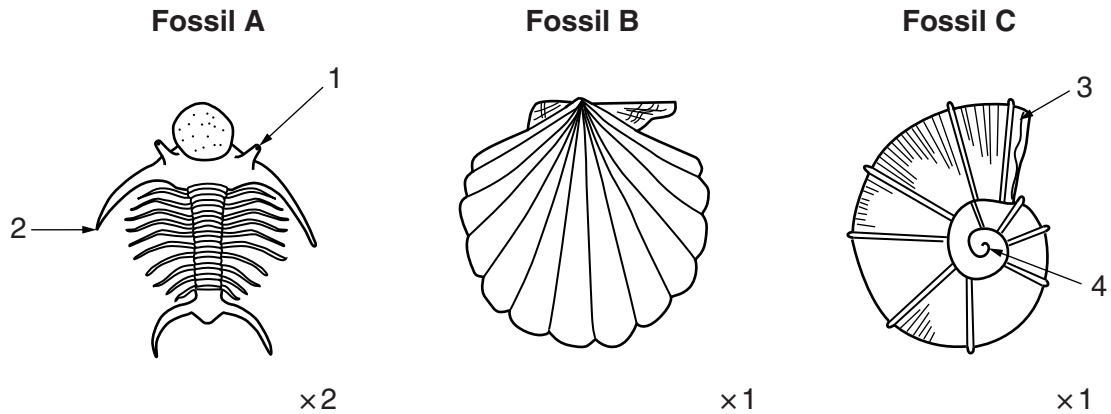
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting 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.

Answer **all** the questions.

- 1 **A**, **B** and **C** are members of different fossil groups.



- (a) (i) Identify the phylum and group for each of the fossils above.

Fossil	Phylum	Group
A		
B		
C		

[3]

- (ii) Label the morphological features **1** to **4**.

1 2

3 4

[3]

- (iii) These fossils have been interpreted as nektonic organisms. For each fossil (**A**, **B** and **C**) describe **one** morphological feature that supports this interpretation. Explain how each feature you describe may have helped it live a nektonic lifestyle.

fossil A

.....

fossil B.....

.....

fossil C

.....

[3]

- (iv) Explain why Fossil **C** is found in a greater variety of rock types than fossils **A** and **B**.

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

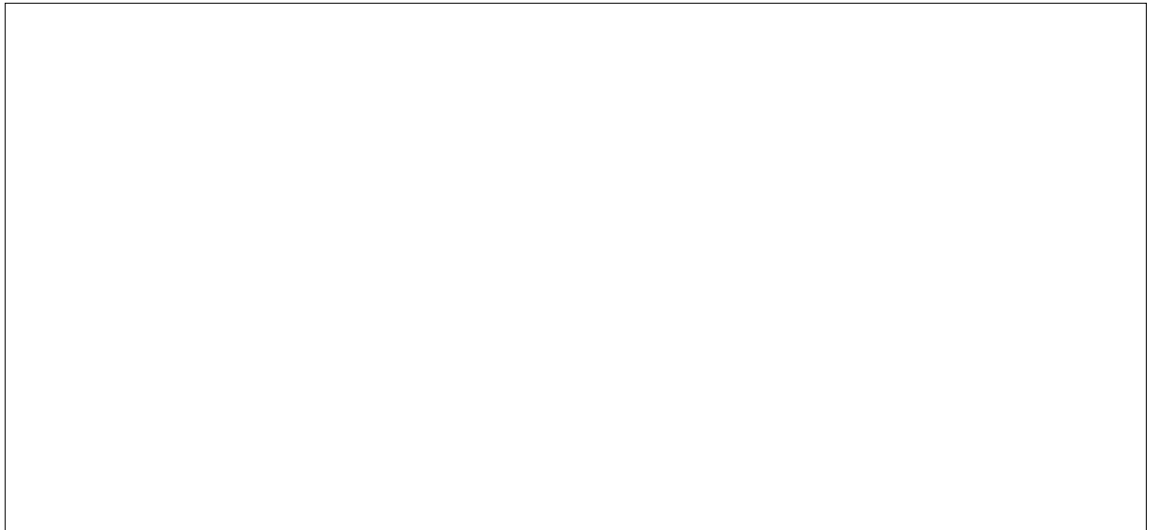
- (v) State the original chemical composition of organism **C**.

..... [1]

- (vi) What preservation process causes the composition of fossils to vary over time?

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

- (b) (i) Draw a labelled diagram in the space below to illustrate the morphology of a typical Ordovician graptolite.



[3]

- (ii) Describe **one** morphological difference between an Ordovician and a Silurian graptolite.

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

- (iii) Describe **one** piece of evidence that suggests that graptolites were planktonic.

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

[Total: 17]

- 2 (a) Below are statements about brachiopods, or bivalves or both.

Complete the table below. Use a tick to indicate a correct statement and a cross to indicate an incorrect statement. The first one has been done for you.

Statement	Bivalve ✓ or ✗	Brachiopod ✓ or ✗
consists of two valves	✓	✓
has growth lines parallel to the edge of the shell		
has a pallial line seen around the margins of the shell		
uses gills for respiration		
has adductor and diductor muscles to open and close the shell		
has cardinal teeth located under the umbo and many teeth and sockets along the hinge line		

[4]

- (b) Describe how symmetry and relative valve size can be used to tell the difference between a brachiopod and a bivalve. You may use a diagram(s) in your answer.

.....

.....

.....

..... [2]

- (c) (i) Describe, in detail, the feeding mechanism of a brachiopod and explain how it functions.

.....

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..... [2]

- (ii) Describe how a bivalve may burrow into soft sediment.

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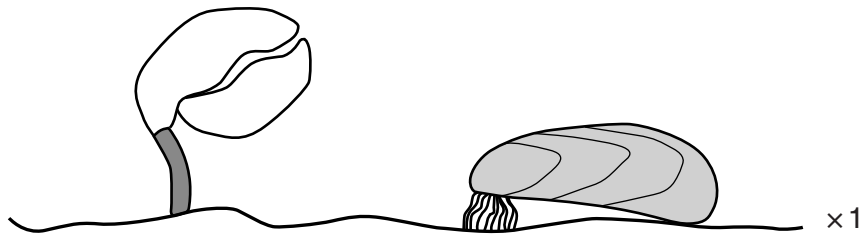
..... [2]

- (iii) Explain why some types of brachiopod have a zig-zagged shell margin.

.....

..... [1]

- (d) The diagram below shows a brachiopod and a bivalve attached to a hard substrate on the sea floor.



Discuss the different attachment mechanisms used by the brachiopod and bivalve, shown in the diagram.

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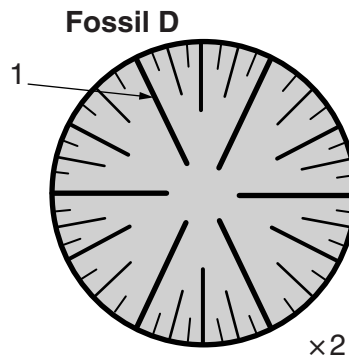
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..... [3]

[Total: 14]

- 3 The diagram below shows a cross-section through **Fossil D**.



- (a) (i) Identify the phylum to which corals, sea anemones and jellyfish belong.
 [1]
- (ii) To which group of corals does fossil **D** belong? Circle the correct answer.
 rugose **scleractinian** **tabulate** [1]
- (iii) Name the morphological feature **1** and describe the function of this feature.

 [1]
- (b) (i) Describe **three** environmental conditions needed for good modern coral growth. Give reasons for your answers.

 [3]
- (ii) Explain why geologists think that fossil corals needed the same conditions as modern corals.

 [1]

- (c) (i)** Using a series of labelled diagrams explain how coral atolls form in tropical oceans.

[3]

- (ii)** Name a region in the world where there are many modern coral atolls.

..... [1]

- (d) A geologist collected fossils from two different locations (1 and 2). The percentage of each assemblage was recorded in the table below.

Fossil Type	Percentage (%) of Assemblage	
	Location 1	Location 2
shells (thick, ribbed)	70	7
shells (thin, smooth)	13	70
graptolites	0	10
corals	14	2
nautiloids	3	11
total % of whole fossils	25	75

- (i) Describe the type of environment in which the assemblage from location 1 was laid down. Give **two** reasons for your answer.

.....

.....

.....

.....

.....

..... [3]

- (ii) What lithological evidence would the geologist need to collect in the field to determine the environment of deposition at location 1? Explain your answer.

.....

.....

.....

..... [2]

- (iii) What percentage of the fossils in the assemblage from location 2 were benthonic?

..... [1]

- (iv) Explain why a high proportion of fossils at location 2 are preserved whole.

.....

..... [1]

[Total: 18]

4 This question is about crinoids and echinoids.

(a) (i) The table below shows features of **regular echinoids** or **irregular echinoids**, or **both**.

Complete the table by circling the correct option in each row. Circle only **one** answer in each row. The first one has been done for you.

Features	Options		
has a test composed of calcite plates	regular	irregular	<u>both</u>
has only one plane of symmetry	regular	irregular	both
has spines for defence	regular	irregular	both
has a fasciole	regular	irregular	both
has ambulacra and interambulacra	regular	irregular	both
has tube feet	regular	irregular	both

[3]

(ii) Describe the following features found in some fossil echinoids and explain the function of each feature:

plastron

.....

pore pairs.

.....

[4]

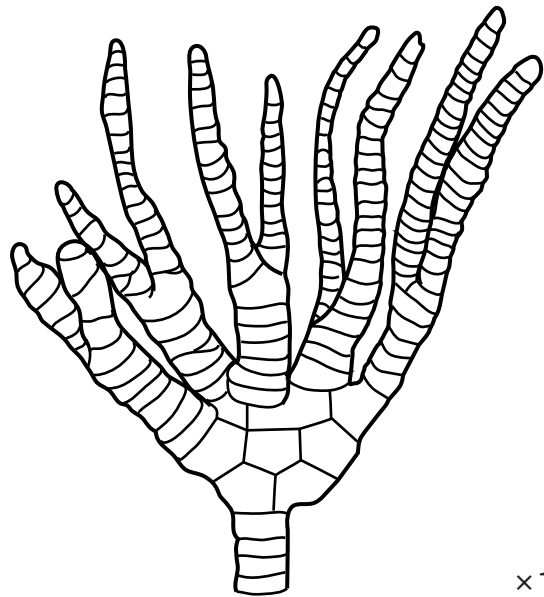
(iii) Complete the table to describe the usual mode of life of regular and irregular echinoids.

	Mode of Life
Regular echinoid	
Irregular echinoid	

[1]

(b) Fossil **E** is a crinoid.

Fossil **E**



(i) On the diagram above, label the following morphological features:

- brachia
- calyx
- stem.

[2]

(ii) On fossil **E** shade and label **one** ossicle.

[1]

(iii) Describe **one** similarity between the morphology of fossil crinoids and echinoids.

.....
 [1]

(iv) Explain why fossil crinoids are often found disarticulated in rocks.

.....
 [1]

(c) (i) Describe how macrofossils can be used to correlate sequences in different areas.

.....
 [1]

(ii) Describe how varve deposits can be used to correlate between different areas.

.....
 [1]

[Total: 15]

- 5 (a) The information shown in the table below relates to the drift of the British Isles through geological time.

- (i) Draw lines to match each geological period with the correct description of evidence below:

Geological Period	Description of Evidence
Carboniferous	aeolian sandstones deposited in hot deserts palaeocurrent direction indicates a north easterly wind
Cretaceous	clays and limestones which contain some corals are deposited in sub-tropical seas in the south and east of the British Isles
Jurassic	limestones formed in tropical seas, followed by coals formed in deltas associated with foresets
Permian	fossil plants indicate a warm and humid climate ammonites common, but die out at the end of this period

[3]

- (ii) Describe how lithological information indicates that the British Isles has drifted northwards over time.

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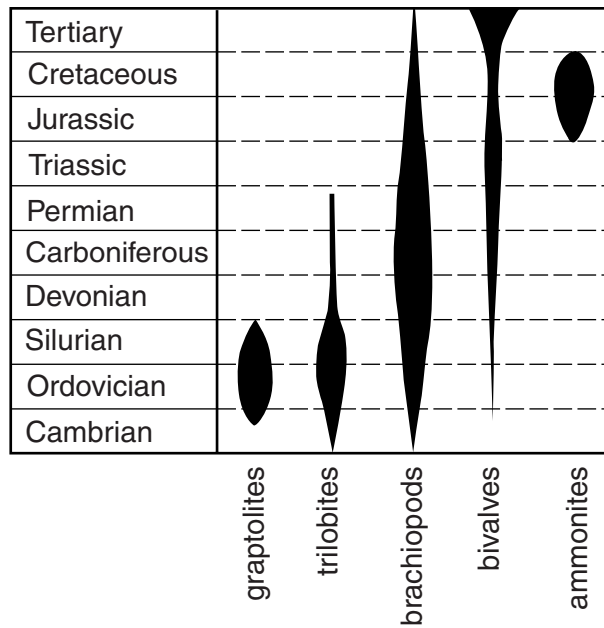
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..... [2]

(b) The table below shows information about some fossil ranges.



(i) Which fossil group has existed for the longest time?

..... [1]

(ii) Explain why you would not expect to find a trilobite and an ammonite in the same layer of sedimentary rock.

..... [1]

(iii) Name and describe the event that caused the extinction of the rugose corals. Describe **two** possible causes of this event.

.....

.....

.....



.....

.....

..... [3]

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

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

Fossil	Suture type	Geological range	Suture diagram
F	nautiloid	Cambrian to Recent	
G	goniatitic	Devonian to	
H		Carboniferous to Triassic	
J		Jurassic to	

[3]

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

.....
 [1]

(iii) Describe the difference in the positions of the septal necks in fossils **F** and **J**.

.....
 [1]

(iv) What is the function of the septal necks?

..... [1]

[Total: 16]

- 6 Describe and explain the adaptations shown by trilobites to live in a benthonic environment. Describe **one** benthonic trilobite that is considered epifaunal and **one** benthonic trilobite that is considered infaunal.



You should structure your answer to clearly link the morphologies you describe to the explanations you give.

[10]

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[Total: 10]

- 7 Describe the characteristics of Ornithischian dinosaurs. Describe how the morphological adaptations of the Ornithischian dinosaur *Iguanodon* were suited to its mode of life.



You should clearly link the morphologies you describe to any explanations you give. [10]

[illegible]

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[Total: 10]

END OF QUESTION PAPER

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