

**Tuesday 10 June 2014 – Afternoon**

**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




Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

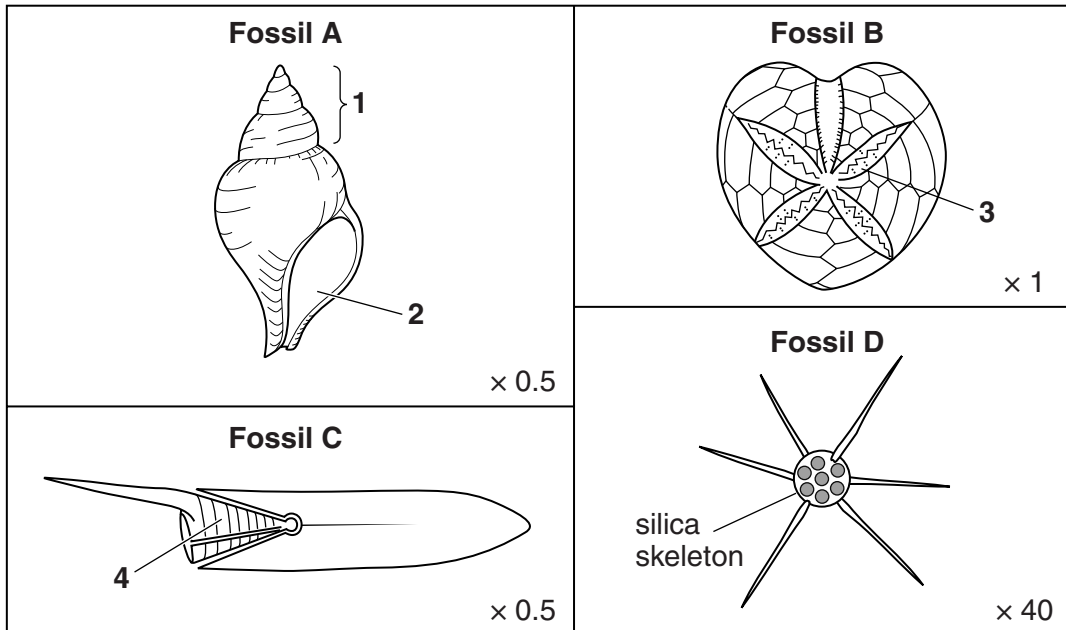
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting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



(a) (i) Complete the table with the phylum and group for the fossils above.

Fossil	Phylum	Group
<b>A</b>		
<b>B</b>		
<b>C</b>		
<b>D</b>		

[4]

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

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

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

[3]

(iii) Contrast the modes of life of fossils **A** and **C**.

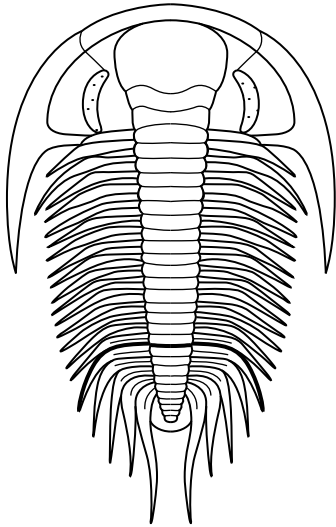
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 ..... [2]

(iv) Fossil **D** is found in a greater variety of different rock types than fossil **B**. Explain why.

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

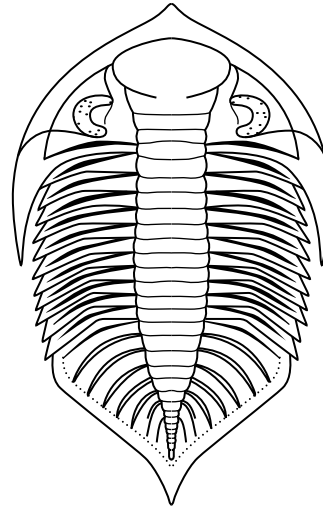
Fossils **E** and **F** are two trilobites from different geological periods.

**Fossil E**



**Cambrian trilobite** × 1

**Fossil F**



**Silurian trilobite** × 1

- (b) (i) Clearly label the following features on both fossils **E** and **F**:
- cephalon
  - pygidium
  - thorax.
- [2]

- (ii) Label a thoracic segment on fossil **F**. [1]

- (iii) How many pairs of legs did fossil **F** have?  
**F** ..... [1]

- (c) (i) Describe how the Silurian trilobite protected itself from predators.  
 .....  
 ..... [1]

- (ii) Using morphological evidence from the diagrams, suggest which trilobite would have had the best vision. Explain your answer.  
 .....  
 ..... [1]

- (iii) Use evidence from the diagrams to describe differences in the spines of the two trilobites.  
 .....  
 ..... [1]

[Total: 17]

Turn over

- 2 (a) Specimens of long bones from fossil dinosaurs have been found concentrated on two bedding planes (1 and 2) within a sequence of Cretaceous fluvial mudstones and sandstones. Orientations of these fossils were measured using a compass and recorded in the tables below.

Orientations on bedding plane 1	
181°	021°
140°	065°
152°	275°
005°	035°
070°	095°
000°	330°

Orientations on bedding plane 2	
070°	060°
055°	035°
225°	220°
042°	044°
230°	350°
059°	065°

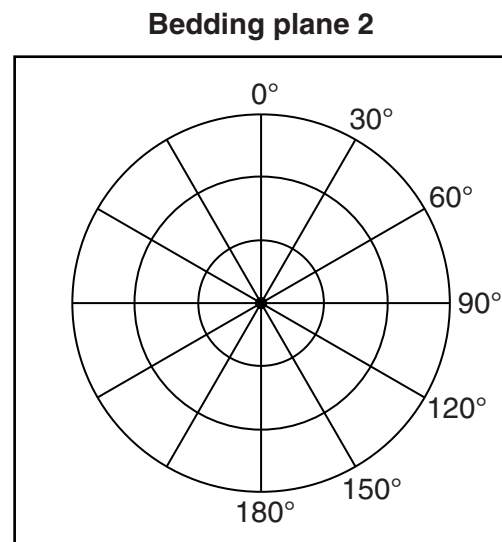
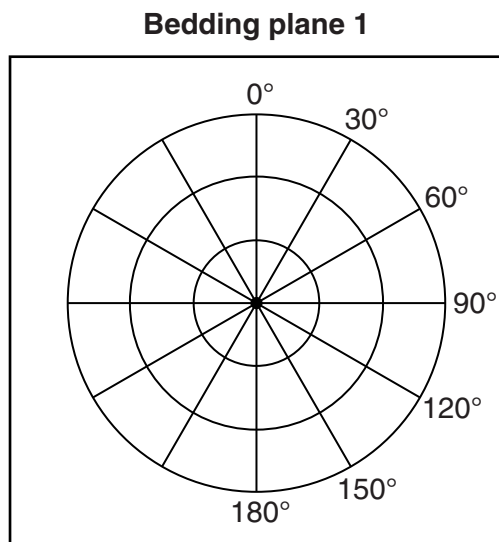
- (i) Use the data to complete the tally charts below.

Bedding plane 1		
Orientation		Tallied number of specimens
000 – 030°	181 – 210°	
031 – 060°	211 – 240°	
061 – 090°	241 – 270°	
091 – 120°	271 – 300°	
121 – 150°	301 – 330°	
151 – 180°	331 – 360°	

Bedding plane 2		
Orientation		Tallied number of specimens
000 – 030°	181 – 210°	
031 – 060°	211 – 240°	
061 – 090°	241 – 270°	
091 – 120°	271 – 300°	
121 – 150°	301 – 330°	
151 – 180°	331 – 360°	

[2]

- (ii) Plot the data you have tallied for the bedding planes on the rose diagrams.



[2]

(iii) Describe and explain the distribution of the data you have plotted on the rose diagrams.

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..... [3]

(b) (i) Describe the characteristic features of the dinosaur *Diplodocus* that suggest it was a herbivore.

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..... [2]

(ii) Describe the characteristic features of the dinosaur *Tyrannosaurus* that suggest it was a carnivore.

.....

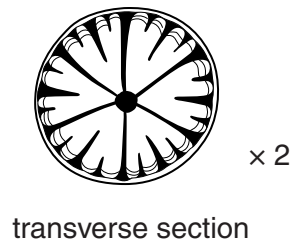
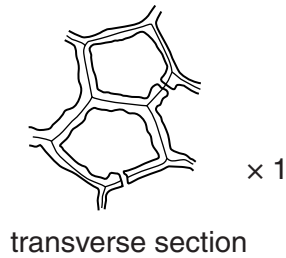
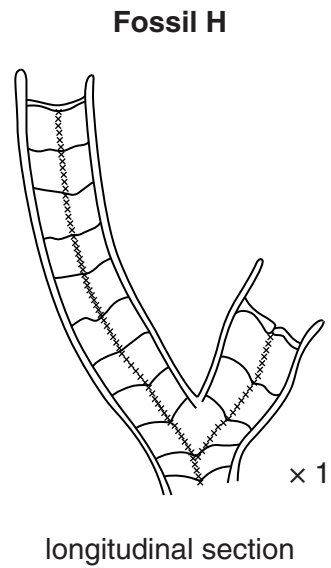
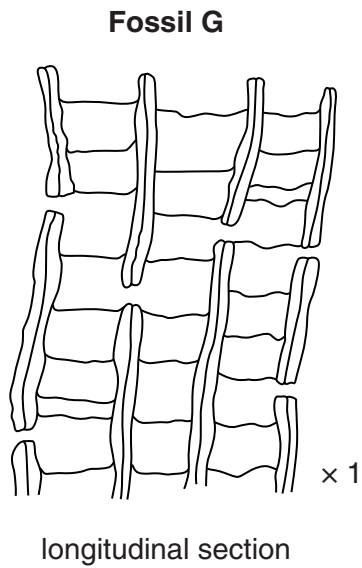
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..... [2]

[Total: 11]

3 (a) The diagrams show fossils, **G** and **H**, from two coral groups.



(i) Label the following morphological features on the relevant fossils **G** and **H** above:

- columella
- corallite
- dissepiments
- tabula.

[3]

(ii) Identify the coral group to which fossil **G** belongs.

**G** .....

[1]

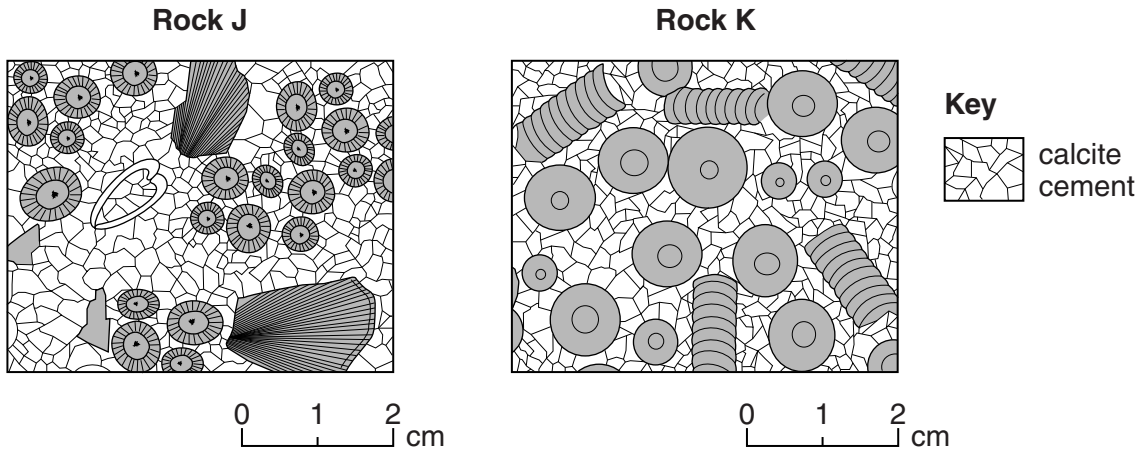
(iii) Describe the function of the septa.

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

(iv) Describe the symbiotic mode of life of modern colonial corals.

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

(b) The diagrams show two carbonate rocks, **J** and **K**, which were formed around a tropical island during the Carboniferous Period.



(i) Identify the different types of carbonate rock shown in **J** and **K** above.

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

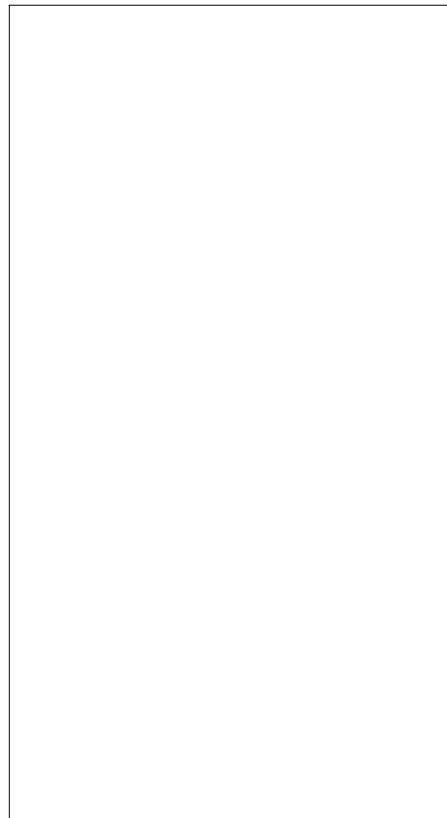
(ii) Other than corals, identify the fossil fragments seen in rock **J**.

..... [1]

(iii) Rock **K** contains fragments of one fossil type. In the box below, draw a labelled diagram to show this type of fossil as it would have been in life position. You must add at least **three** labels and identify the fossil you have drawn.

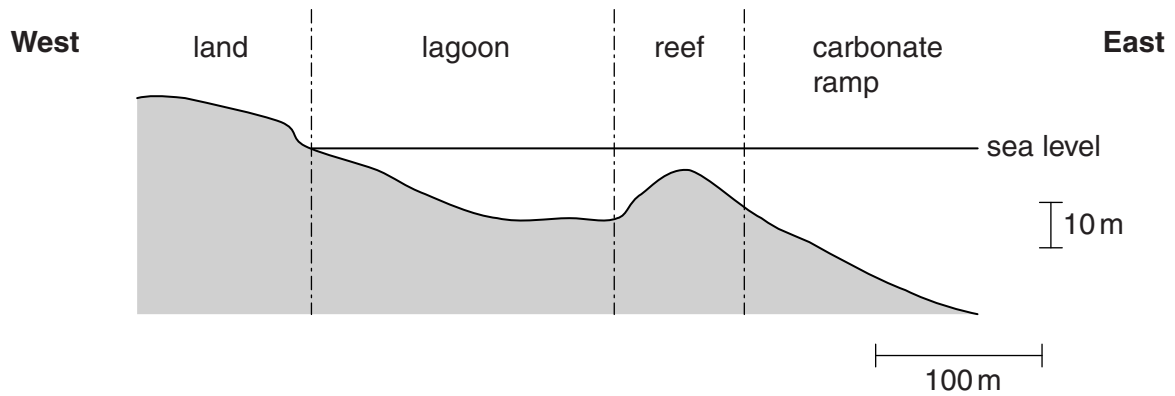
identification

.....



[3]

(iv) The diagram below shows a modern reef system in cross-section, similar to those found in the Carboniferous Period.



On the diagram, use the letter **J** to indicate where rock **J** is most likely to have formed. Explain your choice of location.

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..... [1]

(v) Describe, in detail, **four** environmental conditions that are required for the growth of colonies of scleractinian corals in tropical reefs.

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..... [3]

[Total: 17]



- 4 (a) Descriptions of different geological terms are given below. Match the correct geological term to each description. Use only the terms provided. Each term can be used once or not at all.

**assemblage**      **biostratigraphy**      **chronostratigraphy**  
**diachronous**      **lithostratigraphy**      **varve**

Description	Term
glacial or fluvioglacial lake sediments forming distinctive bands that can be correlated	
correlating sequences of rocks of the same type between different areas	
the same type of sediment laid down in different locations at different times	
correlating deposits of volcanic ash from the same eruption over a large area	
a number of different fossil types found in the same rock	

[4]

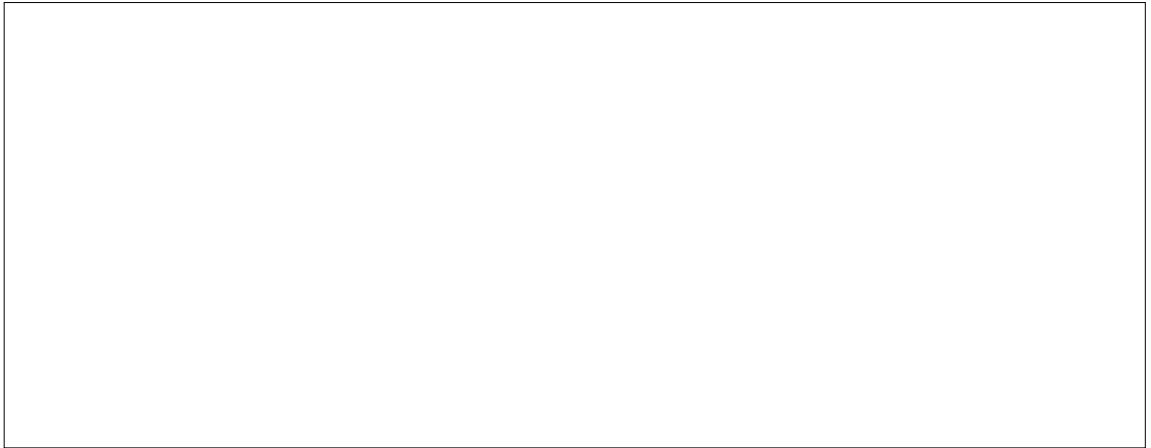
- (b) (i) Explain, with the aid of a labelled diagram, how included fragments can be used to identify the relative ages of rocks.

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.....

..... [2]

- (ii) Explain with the aid of a labelled diagram, how cross-cutting rocks can be used to identify the relative ages of rocks.



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

- (c) Trace fossils can be found in some sedimentary rocks. What factors determine if the trace is preserved as a fossil or if it is destroyed?

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

- (d) (i) Describe **two** methods that preserve wood in the geological record.

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

- (ii) Describe how pyritisation of fossils occurs in anoxic deep sea sediments.

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..... [2]

(iii) With the aid of labelled diagrams, describe how an articulated shell can form internal and external moulds during diagenesis.

before diagenesis	after diagenesis

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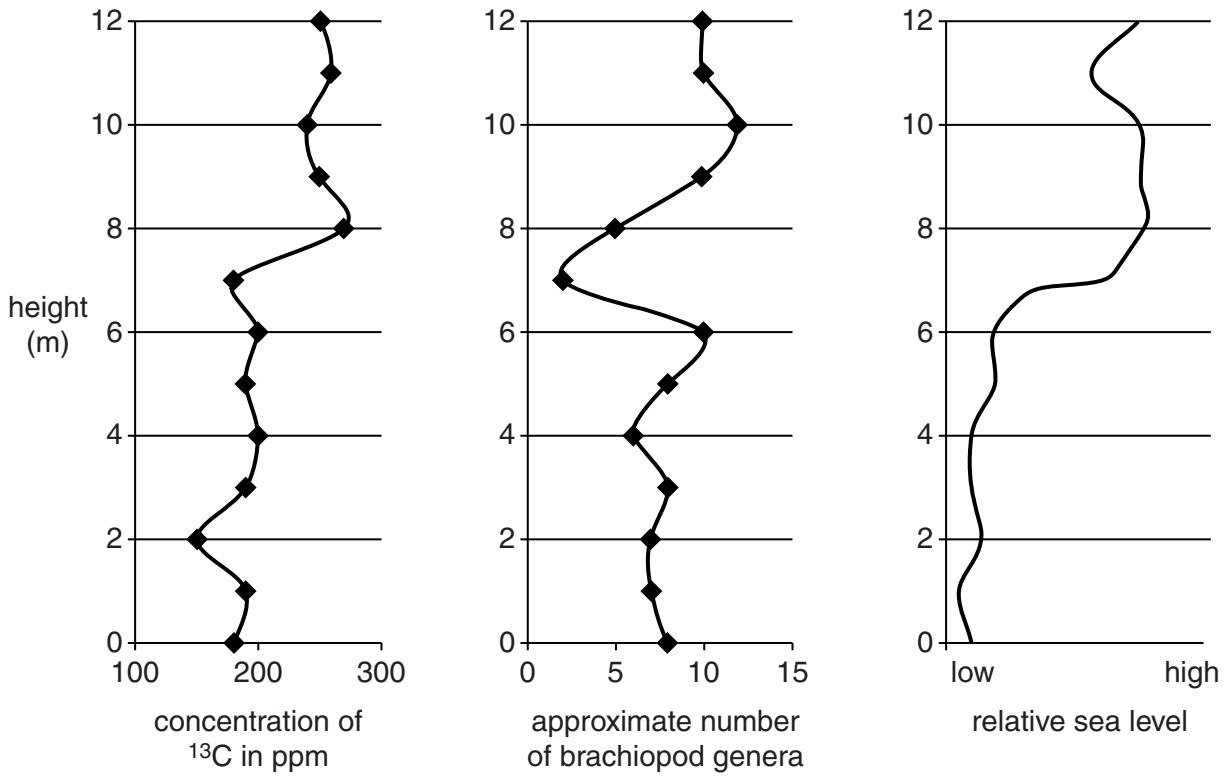
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..... [3]

[Total: 16]

5 (a) The graphs below show information about a short geological sequence from part of the Cretaceous Period.



(i) On the appropriate graph above, label the position of an extinction event. [1]

(ii) Describe and explain any common trends and relationships between the three graphs above.

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..... [4]

(b) (i) Describe how sea level can change due to isostatic readjustment.

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..... [2]

(ii) Explain how eustatic sea level changes take place.

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..... [2]

(c) Explain why some groups of organisms are more affected by sea level change than others. You must give suitable examples in your answer.

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..... [3]

[Total: 12]

- 6 (a) (i) The table shows descriptions of geological terms used in the geological column. Match the correct geological term to each description. Use only the terms provided. Each term can be used once or not at all.

**Cambrian                  Carboniferous                  Cenozoic                  Cretaceous**  
**Mesozoic                  Ordovician                  Permian                  Precambrian                  Triassic**

Description	Term
consists of the Tertiary and Quaternary	
the time before hard bodied fossils existed	
geological system when ferns and fast growing plants were abundant	
geological system dominated by chalk deposition	
oldest geological system in the Palaeozoic era	
era when dinosaurs existed	

[3]

- (ii) Describe the basis on which geologists have divided the geological column into separate geological systems.

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

- (iii) Rocks in the Cretaceous System in the UK have a thickness of 1700m. The Cretaceous System lasted 80 Ma.

If there was continuous sedimentation, calculate the average thickness of rock deposited in one year. Show your working.

..... mm [1]

(b) Describe how Lord Kelvin used ideas about rates of cooling to estimate the age of the Earth. Explain why his estimate was incorrect.

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[Total: 7]





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**[Total: 10]**

**8** Describe the advantages and disadvantages of using graptolites and microfossils as zone fossils.



*You should make clear whether the advantages and disadvantages apply to just graptolites, or just microfossils, or to both groups of fossils.*

**[10]**

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**ADDITIONAL ANSWER SPACE**

If additional answer space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margins.

This block contains a large area of lined paper for writing answers. It features a vertical margin line on the left side and horizontal dotted lines for writing. The lines are evenly spaced and extend across the width of the page.

A large rectangular area with a solid vertical line on the left side and horizontal dotted lines extending across the page, providing a space for writing answers.



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