

ADVANCED GCE GEOLOGY

Palaeontology

MONDAY 11 JUNE 2007

Additional materials: Ruler (cm/mm)

Electronic calculator

2834

Morning

Time: 1 hour 30 minutes



Candidate Name							
Centre Number				Candidate Number			

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer all the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do not write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

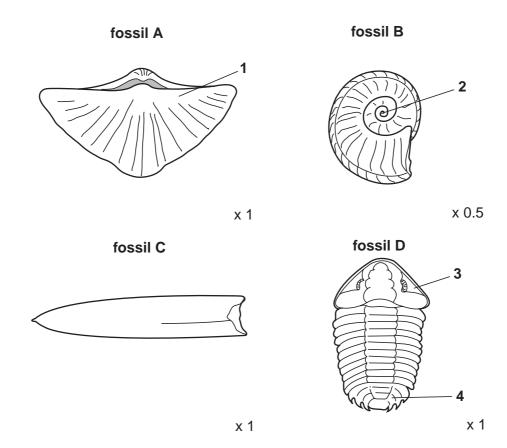
- The number of marks for each question is given in brackets [] at the end of each question or part question.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- The total number of marks for this paper is 90.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculation.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	18	
2	17	
3	16	
4	14	
5	25	
TOTAL	90	

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1



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

fossil	phylum	group
Α		
В		
С		
D		

(ii)	Name the morphological features labelled 1 to 4 on fossils A, B and D.
	1
	2
	3
	4[4

nektonic

benthonic

(iii) Using the terms provided, complete the table below to describe the mode of life of fossils **A**, **B**, **C** and **D**. Terms may be used once, more than once or not at all.

planktonic

sessile

[4]

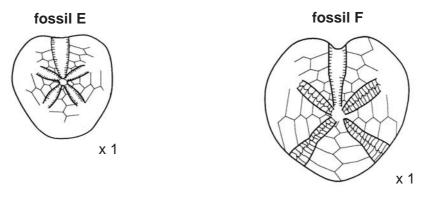
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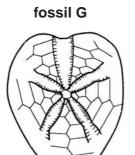
fossil	mode of life
A	
В	
С	
D	

(b)	(i)	Explain why fossil A is often found as a complete fossil in many types of sediments.	
			[2]
	(ii)	Explain why fossil C is often found in large numbers aligned in sediments.	
			[2]
	(iii)	Explain why fossil D is often found as fragments.	
			[2]

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2 Below are three fossil echinoids E, F and G.





x 1

(a)	(i)	Name the group of echinoids to which fossils E , F and G belong.	
			[1]
	(ii)	Label the following morphological features on fossil G .	
		petaloid ambulacra	
		anterior groove	[2]
	(iii)	Describe the position and explain the function of the following morphological features) .
		labrum	
		plastron	

[4]

(b)	(i)	Describe an be seen in the	d explain two morphological differences between fossils E and G which ne diagram.	can
		1		
		2		
	(ii)	Fossils E , F evolutionary	and ${\bf G}$ make up an evolutionary sequence. Put these fossils in the cororder.	rect
		youngest		
		oldest		[2]
(c)	Fos	sil H is a sket	ch of another type of echinoid.	
			fossil H	
			© © 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	(i)	Describe two	o morphological differences between fossils E and H .	
		1		
		2		[2]
	(ii)	Name and d	escribe the mode of life of fossil H .	
		name the mo	ode of life	
		describe the	mode of life	
				[2]

[Total: 17]

- 3 Below are diagrams of four fossils; L, M, N and O.
 - (a) Complete the table below to show:
 - a description of the fossil or trace fossil

[6]

• the energy level and the depth of water in the environment.

[3]

The first one has been done for you.

fossil	(i) description	(iii) environmer	nt
fossil L sand	a trace fossil made by a burrowing worm in soft sediment, infilled by later sediment	low water dep	medium	high
U			marine	marine
fossil M		energy lev		
		low water dep	medium th	high
x 1		littoral	shallow marine	deep marine
fossil N		energy lev		
		low	medium	high
		water dep	tri	
x 0.5		littoral	shallow marine	deep marine
		_		
fossil O		energy lev		
		low	medium	high
		water dep		doon
x 1		littoral	shallow marine	deep marine

	prolites are a type of trace fossil which are interpreted as fossil dung. What can they tell us ut palaeoenvironments?
	[2
(i)	Explain how the following methods preserve hard skeletal tissue.
	silicification
	carbonisation
	[4
(ii)	Aragonite alters to calcite over time. Explain why this process occurs.
	[Total: 16
	abo

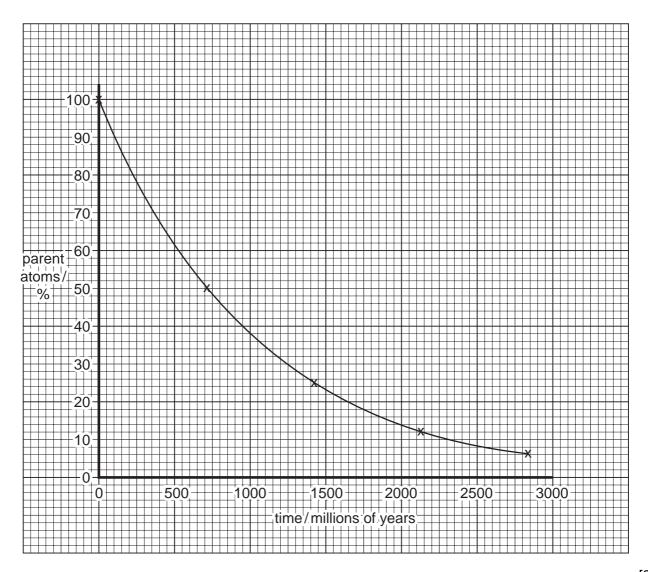
- 4 The decay of radioactive elements occurs at different rates, depending on the isotope.
 - (a) (i) Explain the term radioactive decay.

[2]

(ii) The radioactive isotope ²³⁵U decays to ²⁰⁷Pb, and has a half-life of 710 million years. This decay curve is drawn on the graph below.

The radioactive isotope **X** has a half life of 300 million years.

Plot the decay curve for **X** on the graph below. Plot four half lives.



((iii)	Use ideas about radioactive decay to explain the differences between the curves.
		[1]
((iv)	State the percentage of parent atoms remaining after 1000 million years for ^{235}U and isotope \mathbf{X} .
		²³⁵ U % X % [1]
	(v)	Describe three reasons why radiometric dating will not always produce an accurate date.
		1
		2
		3
		[3]
(b)	Anc	other radioactive isotope that can be used for dating rocks is ⁴⁰ K.
	(i)	Name the daughter product formed by the decay of ⁴⁰ K.
		[1]
	(ii)	State the half life of ⁴⁰ K.
		[1]
	(iii)	Name one mineral in which ⁴⁰ K can be found.
		[1]
((iv)	Name a rock type that may contain this mineral.
		[1]
		[Total: 14]

In this question, two marks are available for the quality of written communication.			
(a)	(a) Describe, with the aid of diagrams, how bivalves are adapted to the following modes of life:		
	• burrowing		
	• swimming		
	attached		
	free lying.		

		[12]
(b)	Describe the similarities and differences between rugose and tabulate corals. Diagrams be used to illustrate your answer.	may

 [11]

Quality of Written Communication [2]

[Total: 25]

END OF QUESTION PAPER

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