

GEOLOGY 202 FINAL



NAME..... DATE: June 13<sup>th</sup> 1997  
Answer all sections: Read the questions carefully.

SECTION 1 30% of marks True or false

Tick the appropriate box and if FALSE give a brief explanation why. 1.5 marks a question.  
Where statement is false marks will be deducted for an inaccurate correction.

- |   | T                        | F                        |
|---|--------------------------|--------------------------|
| 1) Most gold and diamonds comes from the Precambrian  | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Amphibians have an amniotic egg.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) The warmest global climates of the Cenozoic are believed to have been during the Paleocene.                        | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Ichthyosaurs were long necked marine reptiles of the Mesozoic.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) Global sea levels were higher in the Late Jurassic and Late Cretaceous than the Early Cretaceous.                  | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) A glacial sequence in N. Europe will be correlated with a fluvial one in the Middle East                           | <input type="checkbox"/> | <input type="checkbox"/> |
| 7) Bipedal herbivorous dinosaurs only occur amongst the Saurischians  | <input type="checkbox"/> | <input type="checkbox"/> |
| 8) Some ray finned fish belong to the cartilaginous fishes  | <input type="checkbox"/> | <input type="checkbox"/> |
| 9) Gymnosperms occurred first in the Permian  | <input type="checkbox"/> | <input type="checkbox"/> |
| 10) The ammonoids showed a progressively simpler suture with time.  | <input type="checkbox"/> | <input type="checkbox"/> |
| 11) Komatiites are rocks formed by impacts .  | <input type="checkbox"/> | <input type="checkbox"/> |
| 12) The Laramide orogeny had finished by the start of the Tertiary.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 13) Some of the best American trilobites formed during the Illinoan time period                                       | <input type="checkbox"/> | <input type="checkbox"/> |
| 14) The Tethyan ocean north of Arabia first closed during the Miocene.  | <input type="checkbox"/> | <input type="checkbox"/> |
| 15) There are no non human primates in the New World other than monkeys.  | <input type="checkbox"/> | <input type="checkbox"/> |
| 16) <i>Homo erectus</i> gave rise to <i>H. habilis</i> around 2 Ma.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 17) Gondwana did not begin to breakup until the Early Jurassic  | <input type="checkbox"/> | <input type="checkbox"/> |
| 18) There is a virtually world wide iridium anomaly at the base of the Tertiary.                                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 19) Of the three plate boundary types, the only one not seen along the west coast of the USA<br>is a spreading margin | <input type="checkbox"/> | <input type="checkbox"/> |
| 20) The Arabo-Nubian shield was uplifted during the Early Cretaceous.   | <input type="checkbox"/> | <input type="checkbox"/> |



**SECTION 2. 30% of marks**

Sheet 1 has a sequence of rocks from the continent of Musicia. Examine it and answer the following questions. Do bear in mind that the sequence is a logical one obeying stratigraphic rules. You may find it best to answer the questions in pencil first and ink the answers in when you have completed the whole question.

1) The **Bach Series** is a complex series of foliated metasandstones and metaconglomerates. Two Rb-Sr dates from these rocks have been obtained; 2200 Ma from a granite clast and 700 Ma from micas in the matrix. Explain the difference

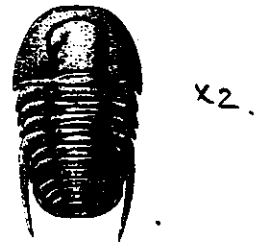
2) The **Puccini Formation** is a bright red unit of unfossiliferous sandstones with a poorly sorted conglomerate at the base with angular clasts of the Bach Series in it. The top surface of the Bach Formation shows deep parallel scratches in it. Parts of the Puccini Formation show thick sequences of fine alternations of clays with fine sands. What sort of environment do you think these beds were deposited in?

3) What events can you interpret to have happened between the Bach and Puccini Formations?

If this was in the Arabia area to what event would we attribute the main deformation?

5) The **Wagner Formation** is a sequence of fine sands with small organisms like this in it. What are they?

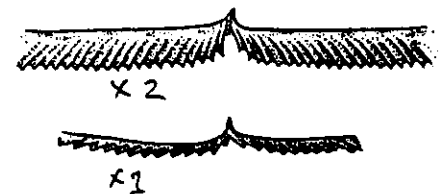
Do you think the Wagner formation is conformable on the underlying Puccini Formation. If not why not?



6) The **Dvorak Formation** is a series of pale limestones with small reefs and a fine conglomerate at the base. Some ashes within the sequence have given reliable dates of 480Ma. Suggest what creatures might form the reef

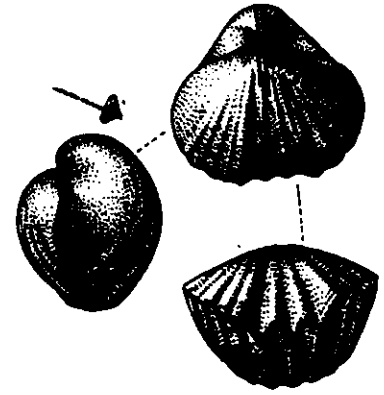
7) Why might the **Wagner Formation** be missing in the east?

8) The **Elgar Formation** is a series of dark shales with the following organisms in. What are they?



What environment do you think these rocks were deposited in?

9) The **Bruckner Formation** is a sequence of sandy limestones which has the following fossils. What are they?  
What environment were they deposited in?



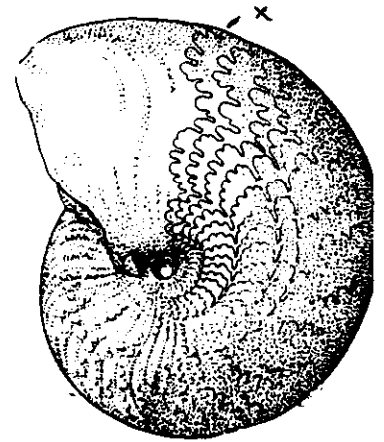
10) The **Haydn Formation** of shales and sands contains tree stems, thin red beds with primitive insects and is overlain by the **Liszt Formation** which is a coral bearing limestone with small reefs.

Fossils show that the top of the Haydn Formation is in fact the same age as the base of the Liszt. How can this be explained?

What does it suggest about depositional conditions during the time these two units were deposited.

12) The **Strauss Sandstones** have marine interbeds with the following fossils in them. What are they?

What are the fine lines marked X.



13) What has happened between Strauss Sandstones and the previous formations? If *Musicia* was in eastern North America what would we probably term this event? If it was in western Europe what would we call it.?

What would this event be due to in either case?

14) The **Bartok Formation** is a sequence of dark marine shales with high levels of organic material. What fossils might be found in this?

What economic interest might such a unit have?

What periods of time do you know when such units were widespread?

15) The **Mahler Formation** is a white, fine powdery limestone with thin beds of silica. What is the most likely origin of this rock unit?

During what period are such beds common?

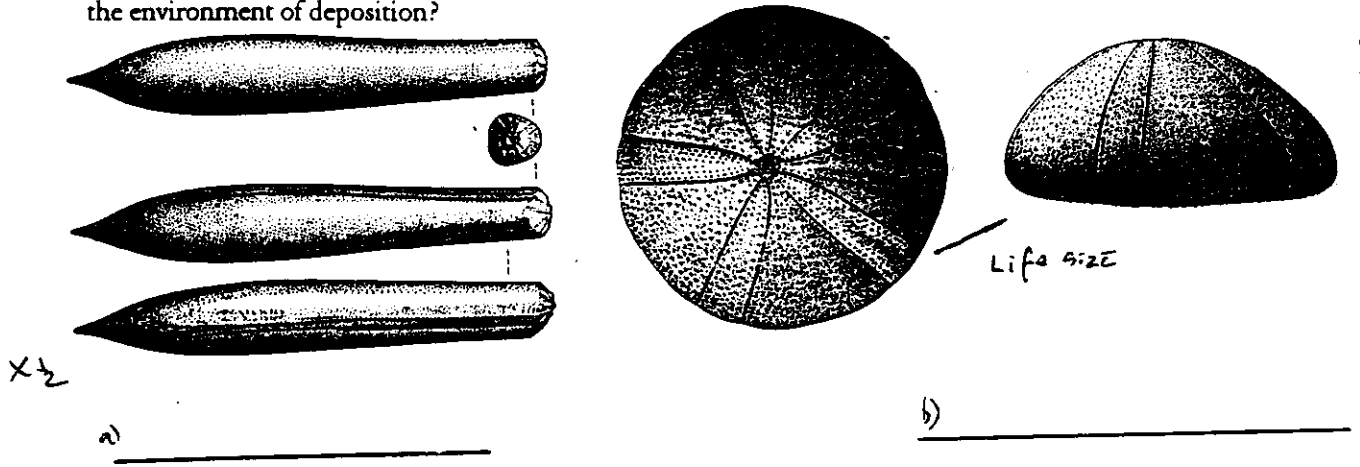
16) The **Chopin Formation** is a sequence of fine sands and limestones with giant coin shaped foraminifera. What age is this likely to be?

17) The **Mozart Formation** is pale grey hard finely crystalline rock. What would this rock type be most probably be termed? What do we call the way it occurs?

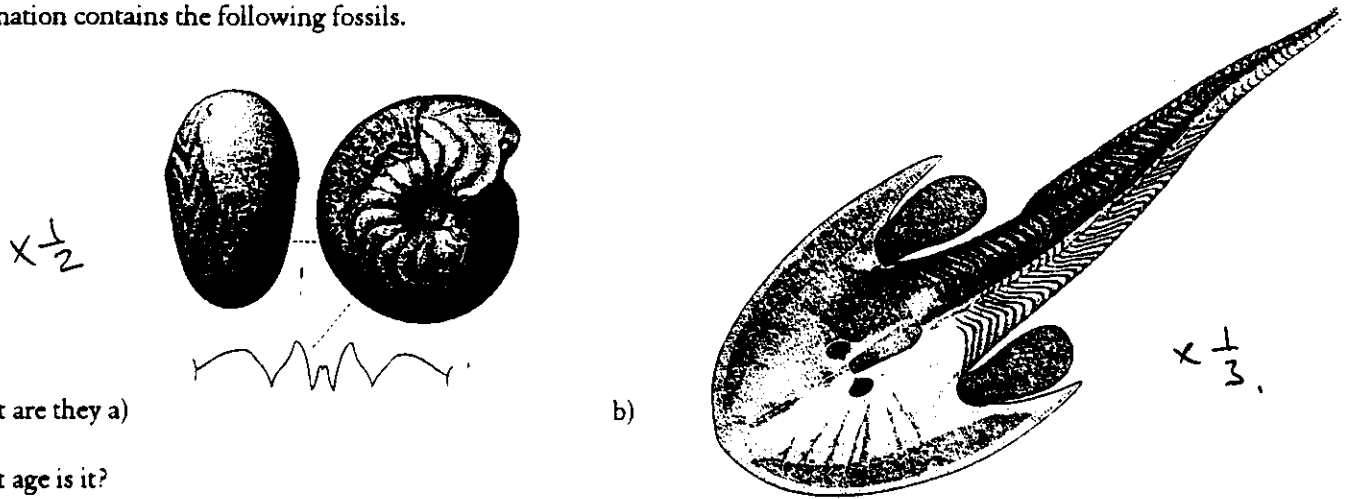
18) The **Verdi Formation** are a series of fine dark rocks made up of crystals with columnar jointing. These rocks give a K-Ar date of 35 Ma. What can we deduce about the origin of these rocks?

What seems to have happened prior to the deposition of this bed?

19) The following fossils are found within the **Brahms Formation**. What are they and what do they tell you about the environment of deposition?



20) The base of the **Beethoven Formation** of mudstones is marked by an abrupt sheared surface. The Beethoven Formation contains the following fossils.



What are they a)

What age is it?

Explain its position in the sequence.

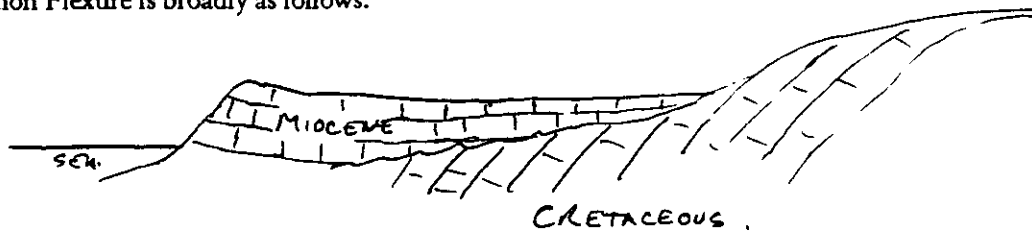
### SECTION 3 20% Geology of Lebanon.

1) What distinguishing features would you look for to identify the Jurassic-Cretaceous boundary in the field in Lebanon.

2) What age are the oldest rocks in Lebanon?

3) What conditions are necessary to get the preservation of the soft bodied faunas of units like those in the Lebanese Fish Beds?

4) The Dog River Miocene is dated as Mid Miocene and dated as around 12 Ma. Its relationship to the Western Lebanon Flexure is broadly as follows.



a) What does this tell us about the timing of the folding?

b) What has happened since?

c) Rocks that are probably of a similar Mid Miocene age occur in the Bekaa where they are conglomerates, breccias and lake sediments.

d) Why are these different in their lithology?

ii) I use the word 'probably'. Why are there difficulties in correlating between the two areas?

6) Summarise briefly the geological history of Lebanon using concepts such as environments, transgressions, regressions, volcanism tectonism etc for the:

a) Jurassic

b) Cretaceous

c) Cenozoic

## SECTION 4: 20% ESSAY QUESTIONS

### Answer Two

- 1) Why has research on Precambrian strata really only developed in the last 50 years? The Precambrian of the Arabian plate north of about the latitude of the Dead Sea is totally unknown even from boreholes as it is so deep. In what ways may it have been significant to regional Phanerozoic history?
- 2) Discuss the possible and probable effects on **Life on Earth** if the following changes to history had taken place.
  - a) Outgassing had produced twice the CO<sub>2</sub> that it did.
  - b) The continents had stayed together after the Triassic.
  - c) The K/T bolide had missed.
  - d) Sealevels had risen substantially during the Late Cenozoic
- 3) Consider the following features. Choose four and in each case list the evolutionary advantages and, where relevant, the disadvantages.
  - a) jaws
  - b) sexual reproduction
  - c) brains
  - d) placental reproduction
  - e) large size
- 4) Explain briefly the significance to earth history of four of the following
  - Archaeopteryx*
  - The coelacanth *Latimeria*.
  - Marrella*, *Sidneyia*, *Wiwaxia* and their friends .
  - Australopithecus afarensis*
  - Quetzacoatlus*
  - Montypythonoides*

Best wishes

CDW