

AMERICAN UNIVERSITY OF BEIRUT  
Geology Department  
Geol 200(section 2)  
Final Exam

February 1, 1997

Student Name: \_\_\_\_\_

**POLICY ON THE EXAM**

1. Leave all your **belongings** (except for pens) far from your place.
2. Be silent, **don't look** to the sides.
3. **Read** the questions **carefully** before answering.
4. Make your answers clear (**confused answers will not be considered**).
5. If you finish in the **last five minutes**, remain seated **quietly** until all the exam papers have been collected.
6. There is **no penalty** in the first three parts, and concerning part VI answer **only two** questions.

**THANK YOU FOR YOUR COOPERATION**

**Part I. Choose the best answer (30 pts.)**

1. Ferromagnesian silicate minerals include:

- a. olivine, feldspar, pyroxene and biotite
- b. quartz, clays, amphibole and pyroxene
- c. pyroxene, amphibole, olivine and biotite
- d. amphibole, pyroxene, feldspar and quartz

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2. Marble is the metamorphic product of:

- a. limestone
- b. shale
- c. sand
- d. anthracite

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3. The asthenosphere extends from the bottom of the lithosphere to an average depth of . . . km.

- a. 150
- b. 300
- c. 450
- d. 600

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4. San Andreas fault is an example of . . . plate boundaries

- a. continental convergent
- b. oceanic convergent
- c. divergent
- d. transform

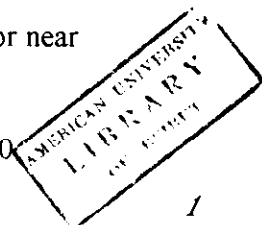
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5. Tsunami or seismic sea waves are the result of an earthquake undersea or near shore, and they travel at speed of up to . . . km/hr.

- a. 100
- b. 500
- c. 1000
- d. 1500

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6. . . . are quiescent or dormant sections of fault zones or locked sections. They could be detected on the maps of the location of earthquake epicenters along major faults as stretches with little or no seismic activity.

- a. creeps
  - b. aseismic slips
  - c. seismic gaps
  - d. all of the above
  - e. none of the above
- 

7. Mesozoic era includes . . . periods.

- a. Devonian, Permian and Cretaceous
  - b. Carboniferous, Triassic and Jurassic
  - c. Jurassic, Cretaceous and Quaternary
  - d. Triassic, Jurassic and Cretaceous
- 

8. . . . is water in the zone of saturation only.

- a. subsurface water
  - b. groundwater
  - c. soil moisture
  - d. perched water
- 

9. The confined aquifer is bounded by . . . rock from above, and by . . . rock from below.

- a. impermeable . . . impermeable
  - b. permeable . . . impermeable
  - c. impermeable . . . permeable
  - d. permeable . . . permeable
- 

10. The most suitable uses of sanitary landfill areas are:

- a. parks, parking lots, and public buildings
  - b. parks, pasturland and parking lots
  - c. pasturland, parking lots and residential areas.
  - d. residential areas, parks and public buildings
- 

11. Handling of industrial liquid wastes follow one of two paths:

- a. 1) dilute and preserve; 2) concentrate and contain
  - b. 1) dilute and preserve; 2) concentrate and dispose
  - c. 1) dilute and disperse; 2) concentrate and contain
  - d. 1) dilute and disperse; 2) concentrate and dispose
-

12. Typical nonpoint pollution sources are:

- a. sewer outlets, steel mills, and septic tanks
  - b. sewer outlets, steel mills, and fertilizer runoff
  - c. septic tanks, fertilizer runoff, and stripmine acid drainage
  - d. road salts runoff, fertilizer runoff, and stripmine acid drainage
- 

13. The three principal constituents of fertilizers are:

- a. nitrates, phosphates and carbonates
  - b. nitrates, phosphates and potash
  - c. sulfates, potash and carbonates
  - d. chlorides, sulfates and carbonates
- 

14. Nitrogen constitutes . . . % of the atmosphere whereas oxygen constitutes . . . %

- a. 67 . . . 32
  - b. 67 . . . 23
  - c. 76 . . . 19
  - d. 76 . . . 23
- 

15. Anthropogenic (human activity) contributions to air pollution particulates are less than . . . %.

- a. 10
  - b. 20
  - c. 30
  - d. 40
- 

**Part II. Fill in the blanks (24 pts.)**

1. The two identifying fundamental characteristics of a mineral are: 1) \_\_\_\_\_  
and 2) \_\_\_\_\_

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2. The polar wander curve of a continent is \_\_\_\_\_

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3. Earthquake of magnitude 5 causes \_\_\_\_\_ times as much ground movement as one of magnitude 4 and the amount of energy released rises by a factor of about \_\_\_\_\_ for each unit.

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4. The principle of superposition states that \_\_\_\_\_

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5. Hardwater contains substantial amounts of dissolved \_\_\_\_\_

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6. The waste materials that are recycled include: \_\_\_\_\_, \_\_\_\_\_,  
\_\_\_\_\_ and \_\_\_\_\_.

7. The residence time is the ratio of \_\_\_\_\_  
\_\_\_\_\_.

8. The main gases of air pollution are: \_\_\_\_\_, \_\_\_\_\_,  
\_\_\_\_\_, and \_\_\_\_\_.

**PART III. Circle T = true or F= false (15 pts.).**

T F 1. The hardness of quartz is more than that of feldspar, whereas the  
hardness of calcite is less than that of gypsum.

T F 2. The results of radiometric dating show that the rocks of the sea floor are  
youngest close to the ocean ridges and become progressively older  
farther away from the ridge.

T F 3. Hot spots are isolated areas of volcanic activity not associated with plate  
boundaries.

T F 4. The deep focus earthquakes are concentrated along mid-oceanic ridges.

T F 5. The principle of cross cutting relationships states that the oldest rocks at  
the bottom and it is overlain by younger beds.

T F 6. When water table intersects the ground surface the result may be lake,  
stream or spring.

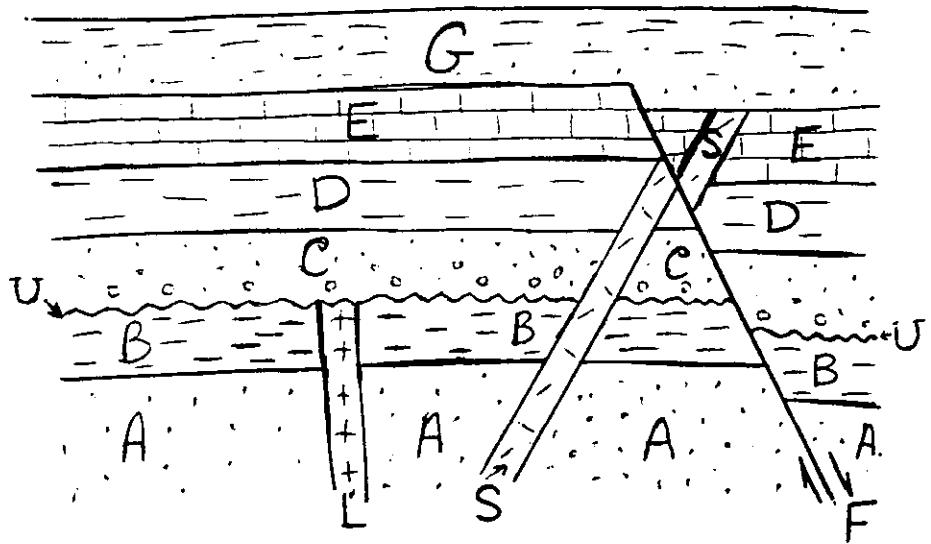
T F 7. In deep-well disposal the rock unit must be relatively porous but  
impermeable and must be sandwiched between 2 permeable layers.

T F 8. The primary stage of sewage treatment is mainly biological where  
bacteria and fungi act on the dissolved and suspended organic matter  
to break it down.

T F 9. Heavy metals tend to accumulate in the bodies of organisms that ingest  
them. Therefore their concentrations increase up a food chain.

- T F 10. Biochemical oxygen demand is a system of measure of the amount of oxygen required to break down the organic matter aerobically.

**Part IV. Relative age: put the correct sequence (from older to younger) of the deposition and formation of the rock units in the diagram. (5 pts.).**



U- unconformity surface  
L, and S are intrusive rocks (dykes).

**Part V. Match the relevant terminologies (one to one) in the following two columns (6 pts.)**

- |                               |                      |
|-------------------------------|----------------------|
| 1. atomic number              | ___ basalt           |
| 2. ionic bonding              | ___ gypsum           |
| 3. covalent bonding           | ___ schist           |
| 4. diamond                    | ___ magnetite        |
| 5. sulfates                   | ___ Na Cl            |
| 6. sulfides                   | ___ granite          |
| 7. oxides                     | ___ protons          |
| 8. clastic sedimentary rocks  | ___ H <sub>2</sub> O |
| 9. chemical sedimentary rocks | ___ conglomerate     |
| 10. intrusive igneous rocks   | ___ pyrite           |
| 11. extrusive igneous rocks   | ___ graphite         |
| 12. metamorphic rocks         | ___ limestone        |

**Part VI. Answer only two of the following three questions (20 pts.)**

1. Drawing its diagram discuss the rock cycle.
2. Define and discuss the salt water intrusion (draw a scheme).
3. Discuss the agricultural pollution including fertilizers, sediment pollution, and herbicides and pesticides.

**GOOD LUCK**