American University of Beirut
Geology Department
Geology 201
Final Exam

June 22, 1998

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. Anyone found cheating will have their paper confiscated.
5. Make your answers clear (**confused answers will not be considered**).
6. **There is no penalty** in the first three parts, and concerning parts IV and V answer **only two questions** of each part.

THANK YOU FOR YOUR COOPERATION

Part I. Choose the best answer (40 pts.)

1. The Atomic Number is the number of:

a. neutrons
b. protons
c. neutrons and electrons
d. protons and electrons

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2. . . . are the most abundant minerals in the Earth's crust.

a. Sulfates
b. Silicates
b. Oxides
d. Carbonates

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3. Basalt is an igneous rock formed from . . . cooled magma and has . . . – grained texture.

a. rapidly . . . coarse
c. rapidly . . . fine
b. slowly . . . coarse
d. slowly . . . fine

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4. Sediment is converted into sedimentary rock by:

a. lithification
c. solidification
b. crystallization
d. deposition

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5. Areas with wet climate are characterized by . . (soil) and areas with temperate climate by . . .

a. pedocals . . . pedalfers
c. pedalfers . . . laterites
b. laterites . . . pedalfers
d. pedalfers . . . pedocals.

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6. Chemical weathering increases as we move from . . . .

a. Florida (wet), Arizona (dry) to Arctic regions
b. Arizona, Arctic regions to Florida
c. Arctic regions, Arizona to Florida
d. Arctic regions, Florida to Arizona

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7. . . . is a series of rock layers that everywhere has about the same physical properties and contains the same assemblage of fossils.

a. Formation
b. Series
c. System
d. Stage

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8. The units of Geologic Time scale, from largest to smallest are:

a. eons, periods, eras, epochs
b. eras, periods, eons, epochs
c. periods, epochs, eras, eons
d. eons, eras, periods, epochs

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9. . . . are flowing masses of material mostly finer than sand with large amount of water.

a. Earthflows
b. Debris flows
c. Mudflows
d. Solifluction

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10. . . . is the slowest unconsolidated mass wasting, with a rate of movement ranging between . . .

a. Slump. . . 1-10 mm/year
b. Creep . . . 1-10 mm/year
c. Slump . . . 1-10 m/day
d. Creep . . . 1-10 m/day

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11. The water frozen in glaciers makes up about . . . % of the Hydrosphere.

a. 20
b. 7
c. 3
d. 1.1

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12. Potable water should be agreeable to taste and not dangerous to health and typically containing . . . ppm of TDS.

a. 1800
b. 1250
c. 650
d. 150

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13. . . . or . . . waves are transmitted only through solids.

a. S. . . shear
b. P. . . shear
c. S . . . compressional
d. P . . . compressional

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14. Shallow-focus earthquakes at divergent plate boundaries characterize . . . faulting caused by . . . forces.

a. normal . . . compressional
b. thrust . . . compressional
c. normal . . . tensional
d. thrust . . . tensional

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15. In the earthquake shadow zone, located between. . . (angular distance from the focus), direct . . . waves do not appear.

a. 105° and 142° . . . P and S
b. 90° and 105° . . . P and S
c. 105° and 142° . . . S
d. 90° and 105° . . . S

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16. The Mohorovicic (Moho) discontinuity is the boundary between the . . . .

a. lithosphere and asthenosphere
b. crust and mantle
c. mantle and core
d. outer and inner core

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17. The oceanic crust is . . . by seafloor spreading in the . . . .

a. generated . . . trench
b. generated . . . rift valley
c. destroyed . . . trench
d. destroyed . . . rift valley

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18. The age of the oldest oceanic rocks is about . . . million years

a. 3500
b. 1750
c. 350
d. 175

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19. Across transform boundaries at the ocean bottom, the rocks are of . . . ages and at . . . water depth.

a. different . . . the same
b. the same . . . the same
c. different . . . different
d. the same . . . different

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20. . . . is a slow gradual downward or upward movement of the crust affecting . . . regions.

a. Orogeny . . . narrow and elongated
b. Epeirogeny . . . narrow and elongated
c. Orogeny . . . large
d. Epeirogeny . . . large

Part II. Fill in the blanks (20 pts.)

1. A mineral is naturally occurring, inorganic, solid, _____ with a _____.

2. Regional metamorphism occurs upon _____, whereas contact metamorphism occurs upon _____ and restricted to smaller areas.

3. The types of physical weathering (what determines how rocks break?) are: 1) natural zones of weakness (jointing); 2) activity by organisms; 3)_____; 4)_____; 5)_____.

4. Angular unconformity separates between two sets of layers _____; whereas _____ overlies metamorphic or igneous rocks.

5. _____ is the maximum angle at which a slope of loose (unconsolidated) material will be without cascading down. In consolidated materials, the slopes may be _____.

6. _____ are periods of months to years when precipitation is much lower than normal. During these periods, rivers may _____ reservoirs may _____, and soil may _____.

7. In measuring the size of an earthquake, _____ depends on the amplitude (size) of the ground movement caused by seismic waves; whereas _____ _____is based on the product of the fault slip, the area of fault break and the rigidity of the rock.

8. The most important 2 types of remnant magnetization are: 1)_____ and 2)_____.

9. The rock assemblages at the ocean bottom are called _____ and they consist of _____, _____ and _____.

10. _____ are extensive, flat, tectonically stable interiors of the continents composed of ancient rocks deformed in Precambrian time, they include large areas called _____ that consist of very old exposed crystalline basement rocks.

Part III. Circle T = true and F= false, and explain why if it is false (14 pts.)

T F 1. Polymorphs are minerals that have the same chemical composition but different crystal structure.

T F 2. The A-horizon of the soil profile is the topmost layer, it is poor in organic matter and it constitutes the zone of leaching.

T F 3. The principle of original horizontality states that, in a tectonically undisturbed sequence of sedimentary rocks, each layer is younger than the one beneath it and older than the one above it.

T F 4. The three main factors that move masses are; 1) the nature of the slope materials, 2) the amount of water present, and 3) the steepness and instability of slopes.

T F 5. Karst topography is characterized by a lack of surface streams and many caverns and sinkholes.

T F 6. Surface seismic waves are confined to the Earth's surface and outer layers and their speed is slightly less than P waves.

T F 7. The heat flow by convection occurs when thermally agitated atoms and molecules jostle one another, mechanically transferring the vibrational motion from hot region to a cool one.

T F 8. In 1915, Harry Mass who founded the modern concept of continental drift, cited other (than the jigsaw puzzle fit of Atlantic shorelines) evidence, and at a later stage he postulated a supercontinent called Pangaea "all lands".

T F 9. Uplift of mountain ranges (produced by plate tectonics) has affected the world climate and the chemistry of the oceans.

Part IV. Answer only two of the following three questions (10 pts.)

1. Match the relevant terminologies (one to one) in the following two columns (5 pts.)

1. nucleus	___ heat flow
2. mineral	___ sedimentary rock
3. electron	___ Dead Sea fault
4. basalt	___ ion
5. sandstone	___ crystal
6. foliation	___ reversals
7. geotherm	___ igneous rock
8. paleomagnetism	neutron
9. convergent boundary	___ Alps
10. transform boundary	metamorphic rock

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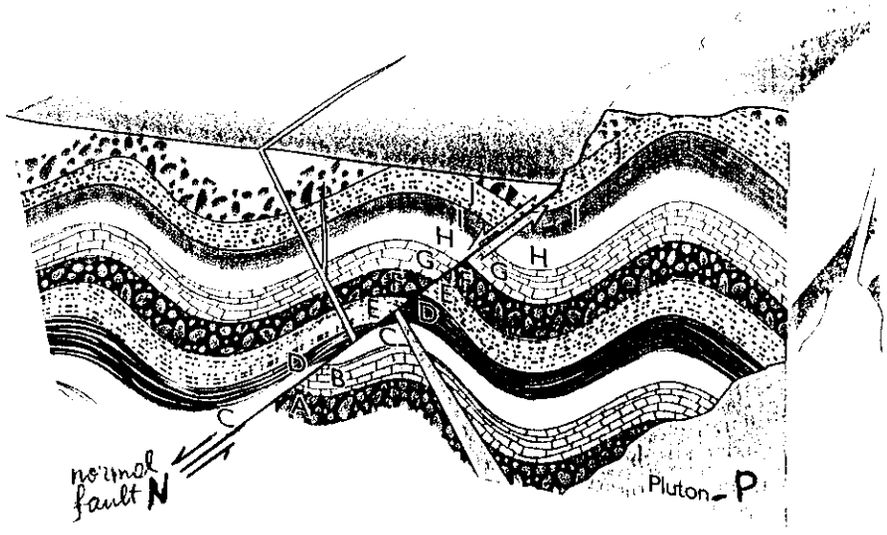
2. Put the symbols of different beds and other geologic features in the right order from oldest to youngest (5 pts.).



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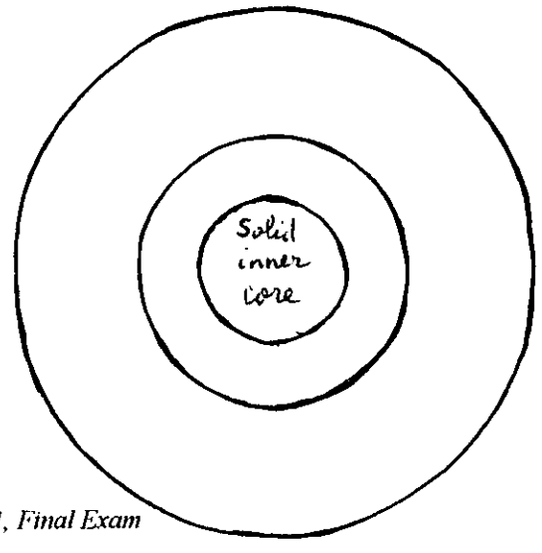
3. Draw on the given diagrammatic cross section of the Earth's sphere, the trajectories of the following S, SS, P, PP, PcP, PKP, PKIKP waves radiating from a common earthquake focus. (5 pts.).



Part V. Answer <u>only two</u> of the following three questions (16 pts.)

1. Draw the scheme of the rock cycle as it is given in the textbook.
2. Define the seismograph and explain how the earthquake epicenter is located, draw schemes.
3. Discuss the microplate terranes and plate tectonics, give some examples.

GOOD LUCK