



AMERICAN UNIVERSITY OF BEIRUT
Geology Department
Geology 200
Final Exam



June 16, 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. Anyone found cheating will have their paper confiscated.
5. Make your answers clear (confused answers will not be considered).
6. If you finish in the last five minutes, remain seated quietly until all the exam papers have been collected.
7. There is no penalty in the first four parts, and concerning part V answer only two questions.

THANK YOU FOR YOUR COOPERATION

Part I. Choose the best Answer (36 pts.)

1. The ground motion caused by an earthquake of magnitude 7 (Richter scale) is . . . times more than that of an earthquake of magnitude 4.

- a. 100 b. 900 c. 1000 d. 27000
-

2. . . . % of the earthquakes in the World occur along the . . . belt.

- a. 80 . . . Mediterranean-Trans-Asiatic b. 80 . . . Circum-Pacific
c. 60 . . . Mediterranean-Trans-Asiatic d. 60 . . . Circum-Pacific
-

3. . . . is silica poor, iron/magnesium rich magma, it has low viscosity and gases escape easily.

- a. Granitic b. Andesitic c. Basaltic d. Rhyolitic
-

4. . . . volcanoes are built up in a layer-cake fashion (alternating layers of pyroclastics and some lava).

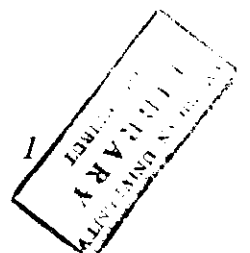
- a. Composite b. Shield
c. Cinder cones d. Volcanic domes
-

5. Soil-moisture water is held in . . . zone . . . water table.

- a. phreatic . . . below b. phreatic . . . above
c. vadoze . . . below d. vadoze . . . above
-

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6. Hard water contains substantial amounts (80-100 ppm) of dissolved:

- a. Ca and Mg
 - b. Fe and Mg
 - c. Na and K
 - d. Al and Cu
-

7. Pegmatite and its accompanying minerals such as tourmaline and beryl are typical examples of . . . deposits.

- a. hydrothermal
 - b. sedimentary
 - c. metamorphic
 - d. igneous and magmatic
-

8. Nonmetallic minerals include:

- a. sulfur, lead, cobalt and halite
 - b. phosphate, gypsum, halite and sulfur
 - c. lead, zinc, nickel and cobalt
 - d. bauxite, sand, clay and gravel.
-

9. The per capita mineral consumption in the United States is about . . . times that of the world average.

- a. 2
 - b. 4
 - c. 6
 - d. 8
-

10. Oil and natural gas are believed to form from . . . buried by sediment.

- a. marine microorganisms
 - b. land microorganisms
 - c. marine plants
 - d. land plants
-

11. The limitations on . . . use (as an energy source) are: 1) it is not versatile; 2) it cannot be used in most forms of modern transportation; and 3) it is dirty and inconvenient for home heating.

- a. petroleum
 - b. natural gas
 - c. coal
 - d. shale oil
-

12. The radioactive elements that can be activated in a chain-reaction process are:

- a. Uranium-235 and plutonium-239
 - b. Uranium-235 and Uranium-238
 - c. Thorium-232 and Plutonium-239
 - d. Thorium-232 and Uranium-238
-

13. . . . is not a form of solar energy.

- a. Hydropower
 - b. Wind energy
 - c. Biomass
 - d. Tidal power
-

14. . . . wastes constitute more than half of the bulk of wastes.

- a. Mineral extraction and processing
 - b. Municipal and industrial
 - c. Crop and animal
 - d. Crop and industrial
-

15. In anaerobic conditions the decomposition of wastes produce:

- a. CO₂ and H₂S
 - b. CO₂ and SO₂
 - c. CH₄ and H₂S
 - d. CH₄ and SO₂
-

16. Typical nonpoint pollution sources are:

- a. fertilizer runoff, septic tank, and roadsalt runoff
 - b. fertilizer runoff, strip-mine acid drainage and roadsalt runoff
 - c. sewer outlet, steel mill and septic tank
 - d. sewer outlet, strip-mine acid drainage and septic tank
-

17. The most toxic, to humans or other life forms, agricultural pollutions are:

- a. fertilizers
 - b. spoil banks
 - c. sediment pollution
 - d. herbicides and pesticides
-

18. Anthropogenic contribution to particulate air pollution constitutes about . . . % of its total bulk.

- a. 10
 - b. 20
 - c. 30
 - d. 50
-

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

1. Seismic _____ are quiescent, or dormant, sections of fault zones or locked sections. _____ are things that happen or rock properties that change prior to an earthquake.

2. In terms of activity, volcanoes are classified into: _____, dormant and _____.

3. Confined aquifer is bounded _____.

4. The concentration factor is the ratio of the concentration of metal in the _____ to its average _____.

5. Because most of the "easy ores" have been discovered, a variety of new methods are being applied in mineral exploration; these are _____, _____ and _____.
-
6. The conversion processes of coal into liquid or gaseous hydrocarbon fuels are termed: _____ and _____.
-
7. The nuclear fuel supply (fission) can be extended by using _____ reactors where the core coolant is not water but _____.
-
8. The municipal sewage treatment consists of three stages: 1) primary which is a physical process; 2) _____ which is mainly a _____ process; and 3) _____ which is a _____ process.
-
9. The most common inorganic pollutants - metals are: _____, _____, _____ and _____.
-
10. The main impacts of air pollution on weather are due to: _____ and _____.
-

Part III. Circle T = true or F= false, and explain why if it is false (18 pts.)

- T F 1. When movement occurs gradually along faults it is called creep or aseismic slip.
-
- T F 2. The earthquake control comprises unlocking locked faults by hammering the ground and fluid injection.
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- T F 3. The outpouring of magma at spreading ridges is an example of fissure eruption, for example - Hawaii.
-
- T F 4. Cone of depression is a circular lowering of the water table immediately around the well which forms upon pumping water from an unconfined aquifer.
-
- T F 5. "ppb" is a measure of water quality used for highly concentrated solutions.
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T F 6. Placers are deposits mechanically concentrated by water movement and sorted by size and density.

T F 7. Open-pit mining is more often used to extract coal or when the material of interest occurs in a layer near, and approximately parallel to, the surface.

T F 8. Oil and natural gas are among the renewable energy sources.

T F 9. Fusion is the process by which the sun generates its energy, where simple hydrogen nuclei are fused.

T F 10. Hydropower and nuclear energy contribute about 12% to world energy use.

T F 11. In a septic system waste water is transferred to a settling tank and the remaining liquid seeps out through porous perforated pipes into the soil of the leaching field.

T F 12. The longer the residence time of a pollutant in a reservoir, the lower the environmental impacts.

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

- | | |
|--------------------------|------------------------------|
| 1. P waves | _____ evaporites |
| 2. S waves | _____ volcanic bombs |
| 3. earthquake focus | _____ asbestos |
| 4. pyroclastics | _____ compressional waves |
| 5. pyroclastic flows | _____ phreatic eruption |
| 6. steam explosion | _____ surface subsidence |
| 7. artesian system | _____ black smokers |
| 8. excessive pumping | _____ shear waves |
| 9. sinkholes | _____ nuee ardentes |
| 10. sedimentary deposits | _____ karst |
| 11. hydrothermal ores | _____ epicenter |
| 12. metamorphic deposits | _____ potentiometric surface |
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Part V. Answer only two of the following three questions (20 pts).

1. Discuss locating the epicenter, including calculating the distance to the earthquake station (draw a scheme).
2. Discuss the enhanced oil recovery and the geopressurized natural gas.
3. Describe the secure landfills and deep-well disposal and draw schemes.

GOOD LUCK