

**American University of Beirut
Department of Geology
Geol. 205 – Final Exam
Summer 2007/2008**

Exam rules apply

Name: _____

Inst.: Ms. R. Oueida

ID #: _____

Time: 2 hrs

Grade: %

Good Luck ☺

I. Circle the correct answer (30 %)

1. All are attributes of coal environmental constraints except one
 - a. acid mine drainage
 - b. mine explosions
 - c. increased release of CO₂ gas
 - d. lowering of water table level
2. Electrical power generation is basically provided from
 - a. solar energy
 - b. nuclear energy
 - c. hydroelectric resources
 - d. fossil fuels
3. All are considered as ore minerals except one
 - a. quartzite
 - b. sphalerite
 - c. chalcopyrite
 - d. cinnabar
4. An example of a metal that is usually not alloyed with iron is
 - a. cobalt
 - b. mercury
 - c. vanadium
 - d. tungsten
5. Cassiterite forms mineral ore deposit of
 - a. tin
 - b. mercury
 - c. gold
 - d. lead
6. Fresh ground water forms in shallow subsurface zones due to ----- processes
 - a. erosion
 - b. diagenetic
 - c. leaching
 - d. migration
7. In comparison, oil and gas generation would match ----- formation under same burial (T and P) conditions
 - a. peat
 - b. lignite
 - c. bituminous coal
 - d. anthracite
8. An alloy of silver and mercury is
 - a. pewter
 - b. amalgam
 - c. solder
 - d. brass
9. The dominant metal used in the preparation of pewter aside Tin is
 - a. lead
 - b. zinc
 - c. cobalt
 - d. copper
10. Sylvanite is a mineral ore deposit of
 - a. silver
 - b. tellurium
 - c. gold
 - d. native gold
11. Deterioration of water quality directly affects
 - a. availability of water
 - b. TDS concentration
 - c. safe yield limit
 - d. specific yield limit
12. An example of a metal sulfide mineral is
 - a. quartz
 - b. magnetite
 - c. chalcopyrite
 - d. vanadium

25. The only mineral resource that did not form in the Earth's crust is
 a. copper
 b. zinc
 c. diamond
 d. corundum
26. Malachite is a mineral ore deposit that belongs to the
 a. sulfide family
 b. carbonate family
 c. silicate family
 d. oxide family
27. Pegmatite's generally form with
 a. basalt flows
 b. contact metamorphic zones
 c. granitic intrusions
 d. large basaltic intrusions
28. For the same amount of metal produced from the ores, environmental impact of open pit mines is relatively ----- than that of underground mines
 a. much less
 b. much greater
 c. about the same
 d. exactly the same
29. Alloys of remarkable magnetic properties involve the use of this metal
 a. mercury
 b. cobalt
 c. vanadium
 d. gold
30. Precious and base-metal vein deposits generally form
 a. as a result of deep weathering
 b. from hydrothermal fluids
 c. in large basaltic intrusions
 d. from leaching of sulfide deposits
31. Anti-harmful radiation shields are prepared mainly from this metal
 a. tungsten
 b. vanadium
 c. lead
 d. zinc
32. An example of a natural type of glass that has a volcanic origin is
 a. table-wear glass
 b. sand
 c. obsidian
 d. olivine
33. Anti-corrosive metals usually belong to the group of
 a. ferro-alloy metals
 b. base metals
 c. precious metals
 d. b & c
34. A ----- in solubility of dissolved materials causes precipitation of valuable mineral resources.
 a. balance
 b. decrease
 c. increase
 d. change
35. All belong to the sulfide family except one
 a. galena
 b. chalcocite
 c. azurite
 d. cassiterite
36. Olivine minerals are valuable sources for use as/ in
 a. building stones
 b. ceramic products
 c. refractory bricks
 d. paint products

37. When a river is channelized
- | | |
|--------------------------------------|--------------------------------------|
| a. the rate of flow increases | c. the rate of flow decreases |
| b. the rate of evaporation increases | d. the rate of evaporation decreases |
38. Regional metamorphism of shale results in the formation of
- | | |
|--------------|-----------|
| a. quartzite | c. slate |
| b. limestone | d. basalt |
39. One of the major uses of tungsten nowadays is
- | | |
|-------------------------------|---------------------------|
| a. for electrical bulb-wiring | c. as a cutting agent |
| b. for medical cures | d. as a galvanizing agent |
40. In its transformation phase into fossil fuel, organic matter remains found as a carbon solid residue in the stage of
- | | |
|----------------|---------------------|
| a. diagenesis | c. metagenesis |
| b. catagenesis | d. all of the above |

II. Choose to sketch and label only two of the following givens (14%). Please draw on the back of this page.

1. Formation of skarn deposits - **diagram form** – 7 %
2. Refined products of crude oil (add percentages) – **table form** – 7 %
3. Effects of local geology on drilling of successful underground water wells – **sketch form** – 7 %

III. Fossil fuels and process of transformation of organic matter (10 %)

Order and in sequence, the following transformational changes that occur during the formation of fossil fuels.

- _____ reduction of water and volatile substances
- _____ metabolism of organic matter
- _____ increased T and P conditions
- _____ production of methane gas
- _____ increase in C and H concentration
- _____ decrease in microbial activity
- _____ reduction of O and N content
- _____ biochemical changes
- _____ carbon rich residue
- _____ compaction of rock

IV- Short answers - questions (20%)

A. List four environmental drawbacks that result from the disposing of domestic & industrial waste products (5 %)

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B. How could the formation of scarce metals be explained numerically and geochemically? (5 %)

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C. What is TDS and from where do dissolved constituents of water come from? List only three (5 %)

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D. Define carbonization and coalification (5 %)

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V. Geologic processes and formation of resources (20 %)

A. Fill in the blanks with the appropriate example of the resulting resource and its mineral ore deposit (12.5 %)

<u>Geologic Process</u>	<u>Resource</u> (5 %)	<u>Mineral-ore</u> (5 %)	<u>Use</u> (2.5 %)
Example:			
Evaporative	<u>Salts</u>	<u>Gypsum</u>	<u>Plaster</u>
1. Weathering	_____	_____	_____
2. Erosion	_____	_____	_____
3. Biogenic	_____	_____	_____
4. Sedimentation	_____	_____	_____
5. Marine	_____	_____	_____
6. Hydrothermal	_____	_____	_____
7. Contact metamorphic	_____	_____	_____
8. Metamorphic	_____	_____	_____
9. Magmatic	_____	_____	_____
10. Volcanogenic	_____	_____	_____

B. Compose and explain a cycle of concentration, alteration or dispersion among processes #9, 1 and 2 consecutively (6 %).

C. Give an example of a metal that experience this cycle from process # 9 to #1 then to #2 (1.5 %).

VI. Case study analysis: How does the presence of (metal) by-products play a critical role in the viability (workability) of a mine? (6%)