

# Earth Systems 3209

## Possible Long Answer Topics

### UNIT 1

1. Describe the process of segregation.
2. Which factors allowed for segregation to occur?
3. Describe the four spheres. Give examples that demonstrate the interaction of the four spheres. (E.g., earthquakes, volcanic eruptions, water cycle.)
4. Describe solar nebula hypothesis.
5. Explain the Big Bang Theory. In Contrast to creationism.

### UNIT 2

1. Use uniformitarianism to explain why certain events will occur again in the future. Compare to catastrophism.
2. Understand relative dating techniques/principals/laws, which include: superposition; cross-cutting relations; inclusions; horizontality; fossil succession (index fossils); and unconformities (angular unconformity, disconformity, and nonconformity)
3. Understand absolute dating techniques/processes/features, which include: varves; growth rings; and radioactive dating.
4. Know how to do the different radioactive dating problems.

### UNIT 3

1. Define a mineral (5 Points).
2. Know the seven different mineral groups (Rules).
3. Explain the process in determining the specific gravity of an unknown mineral.
4. Compare and contrast minerals.
5. Which mineral properties are useful? / Which mineral properties are not as useful as the others?
6. Be able to draw and explain the rock cycle.
7. Brother-sister igneous rocks.
8. Describe the sequence of formation of coal.
9. Distinguish between contact metamorphism and regional metamorphism.

### UNIT 4

1. Describe the Theory of Continental Drift. Be sure to understand how Wegener thought that the continents were moving. What were the causes of the “drifting” continents as proposed by Wegener?
2. Understand the evidence that supports the Theory of Continental Drift.
3. Describe the evolution of the Theory of Plate Tectonics. Be sure to understand the contributions of the various scientists involved.

4. Describe the three types of collisions (i.e. convergent plate boundaries). Understand the molten composition that relates to each collision.
5. Describe a rift valley and how it evolves into a divergent plate boundary.
6. Describe the geology of the island of Newfoundland.
7. Describe the three types of forces/stresses that produce crustal deformation.
8. Describe the three types of deformation.
9. Understand the two categories of faulting, the specific types of faults, and the forces/stresses involved.
10. Describe the properties of earthquake waves
11. Distinguish between the Richter scale and the Modified Mercalli scale
12. Describe the eruption type that relates to the three different types of volcanoes, and relate each to the different plate boundaries.

## **UNIT 5**

1. Describe the different types of economic mineral deposits. Be able to draw and label diagrams of each of the economic mineral deposits.
2. Describe techniques for processing ore deposits. Be able to draw and label diagrams for floatation, gravity separation, and heap leaching.
3. Describe the origin and the process of formation of petroleum. Be sure to include (1) organic matter and (2) and preservation potential.
4. Understand how kerogen evolves into petroleum as a result of diagenesis, catagenesis, and metagenesis.
5. Draw and describe the four different petroleum traps. On each trap be able to identify source rocks, reservoir rocks, cap rocks, good drill locations, presence of gas, presence of oil, and presence of water.
6. Describe the 3 methods of refining petroleum.