

# GEOS 131- Principles of Geology II

## Study Guide for the 2<sup>nd</sup> Hour Exam

There will be 25 multiple-choice questions, 5 definitions, and three short-answer questions. If you have been attending all classes and have taken good notes, then you will be quite OK. Pay attention to the concepts. Understand the important terms and illustrations in each chapter. Go over the review questions and the important terms at the end of each chapter in your textbook. Some of the questions will come from your textbook.

Here are some hints and ideas that you should know for the test:

### Evolution and Fossils

- What is the importance of the theory of evolution in earth history?
- What is Darwin's contribution to the understanding of evolution? What is natural selection? Why and how does the natural selection take place in the plants and animals kingdoms (i.e. what causes the evolution to take place)?
- What are the sources of variations in species (change in the genetic make up or mutation and environmental changes)?
- What evidence do scientists use in support of evolution?
- Know the major plants and animals phylum (groups) that existed during the various geologic time periods.
- Know the importance of fossils in studying the earth's history. Know different types of fossils (micro fossils, marco fossils, body fossils, trace fossils, and coprolite)

### Transgression/Regression and Geologic Time Scale

- What processes or factors are responsible for lateral (spatial) and vertical (temporal) changes in facies relationships in an area.
- Know the difference between transgression and regression. Know the Walther's Law and it's importance in the study of sedimentary rock records.
- Know the Geologic Time Scale and the names of major plants and animals phylum (groups) that existed during the various geologic time periods.

### Geologic Time: Relative Ages

- What is time? Why is the concept of time so important or central to geology?
- What is stratigraphy? What is correlation (litho-, bio-, and chronocorrelation)?
- Understand the importance of vertical (gradual vs. sharp changes) and horizontal (pinch out vs. gradual changes) in bedding planes.

- Know the principles and methods to determine relative ages of rock records: original horizontality and continuity; law of superposition (evidence to establish if right side is up for a layer); cross-cutting relationships; law of inclusion, unconformity (angular unconformity, non-conformity, paraconformity, discontinuity, ravinement, etc.); and faunal succession.

### Geologic Time: Absolute Ages

- What are some early attempts made by scientists to determine the absolute age of the Earth? Why or why not are these methods accurate?
- What is radioactivity?
- What is half-life? What is parent-daughter ratio?
- Know half-lives of the most commonly used radioactive elements in determining absolute ages of geologic events.
- What is the principle behind the carbon-14 dating method? Why is the carbon-14 dating method so popular among historians, archaeologists, and geologists?
- What are some assumptions behind radiometric dating techniques? What are some limitations of radiometric dating? How can one overcome these limitations?
- What are some other methods used to determine absolute ages of rock layers or geologic events?

### Crustal Deformation: Folding and Faulting:

- Know the difference between topographic features and structural features (e.g. topographic valley and structural anticline).
- Know the different types of stress and resultant geologic structures.
- What are three components of attitude of a layer? How do you measure them in field?
- Know the difference between a geologic map and a geologic cross section. Also know how you can construct a geologic cross section from a geologic map and vice versa.
- What are some general rules in reading geologic information from a geologic map?
- Know the difference between a syncline, anticline, and monocline in terms of their attitudes shown on map and cross sections?
- Know the difference between a plunging, symmetrical, recumbent, and overturned anticline and syncline.
- What elements are needed to determine the difference between a normal and reverse fault? How can you recognize such faults on a geologic map?
- What geologic settings are responsible for generation some special cases of folding (e.g. nappe, recumbent folds) and faulting (horsts, grabens, basin & ranges, semi-graben-shaped rift valleys)?
- How do left-lateral and right-lateral strike-slip faults vary from each other. In what type of geologic setting are you likely to find a strike slip fault?

