GLG 101 — Possible Essay Questions (Exam 4)

I will choose two of the following essay questions to put on the exam. You need only answer one of the selected questions on the day of the exam. The essay questions on the exam will be word-for-word off this sheet.

1. Use an annotated concept sketch, complete with labels, to describe how the epicenter of an earthquake is located. Describe what is necessary to locate the epicenter and why it is done this way. Include in your discussion how travel times for P- and S-waves help determine the epicenter.

2. Use a concept sketch of the different types of plate boundaries to discuss where shallow-, intermediate-, and deep-focus earthquakes occur. Describe why some plate boundaries have only shallow earthquakes, while others have all three. Discuss how convergent plate boundaries can be identified on a global seismic hazard map based on the location of shallow, intermediate, and deep earthquakes.

3. Use a concept sketch to discuss whether the rocks in ocean basins are young or old and why. Also discuss the origin and significance of magnetic stripes on the ocean floor.

4. Sketch and describe the main layers and boundaries in the earth (inner core, outer core, mantle, crust, Mohorovicic discontinuity [Moho], and lithosphere vs. asthenosphere). Discuss the importance of each layer, and indicate the approximate thickness of the crust and lithosphere.

5. Describe what is meant by isostasy (use a sketch if you can). Draw and label a cross section showing how the elevation of a region is related to the thickness of continental crust, according to the principle of isostasy.

6. Describe the hazards associated with earthquakes, both on land and near the sea. Include in your discussion those things that control how destructive an earthquake might be.

7. Sketch, annotate, and label cross sections of the main features found in the deep ocean basin (mid-ocean ridges, trenches, seamounts, island arcs). Use your annotations to describe how each forms.

8. Use concept sketches to describe at least four ways you can build mountains. Discuss how these mountains are formed, what processes are occurring, and whether it thins or thickens the crust. Give a modern-day example for each of your four sketches.

9. Sketch a cross section illustrating the formation of porphyry copper deposits (like those here in Arizona). List all the factors that help determine whether this deposit could be mined.

10. Describe how petroleum forms and migrates and where you might look for it. Sketch and label at least three petroleum traps, describing how each is able to trap oil.