GEOL 01 – Physical Geology

Mid Term I Study Guide

Geology and the Scientific Method

How old is the Universe? How old is our solar system? What is the name of the 2 types of time divisions that we discussed in class? Name the time periods in each of these time divisions. What is the difference between internal and external processes? What is a mass extinction? What are some causes for mass extinctions? What is the scientific method? If you were given some information, could you determine what step of the scientific method that information is based upon (i.e. the movie quote, "I am in a room with lights" is at what step of the scientific method)?

The Earth

What is the difference between heliocentric and geocentric? How was the heliocentric model justified (what were the observations)? What is the main difference between the inner and outer planets? What are the different ways that heat can be transferred? What is radioactive half life? What is a useful radioactive isotope to measure time over the past 50,000 years? What is differentiation? Why are there different layers inside Earth? What are the layers in the physical property way of viewing Earth's layers? What are the layers in the chemical way of viewing Earth's layers?

What is matter? What is force? What is stress? What is strain? What types of stress (or strain) are there? What is energy? What is the difference between kinetic and potential energy? Describe the steps involved in thermal convection (cooking ramen). Where do we think convection occurs in the interior of the Earth (there are 2 main models, single layer and double layer)?

Plate Tectonics

What are some evidences used by Alfred Wegner to support his idea of continental drift? What are some evidences used by plate tectonicists to support the theory of plate tectonics? What is a magnetic dipole? How can the geomagnetic field be used to study plate tectonics? What is paleomagnetism? What is polar wander? What is a magnetic reversal? How are magnetic anomalies formed in oceanic crust? How did we measure these magnetic anomalies? How are magnetic anomalies used to support the theory of plate tectonics? How can we use the thickness of sediment on the seafloor to study plate tectonics?

How do crustal age and bathymetry relate to each other (basic observation)? Why are crustal age and bathymetry related to each other (see plot comparing data with model results)? Why is some crust

above sea level? Where are the plates (i.e. what was the initial observation that led to the identification of plate boundaries)? What are the different types of plate boundaries (generically and specifically)? What is the cause for plate motion?

Describe the process that leads to formation of oceanic crust at mid ocean ridges. Can you draw a cross section of a subduction zone, a mid ocean ridge, or a hotspot chain? What is the cause for a magmatic (volcanic) arc? How does an accretionary prism form? Could you draw a transform plate boundary (with features showing what is offset)? What are some examples of these different plate boundaries that we discussed in class? What are some important earthquakes that we discussed (include information about the magnitude and the other effects from some of these earthquakes)? How do we know the direction of plate motion along a hotspot island chain? Why do volcanoes turn into seamounts? How does a ghost forest form? Where are the following: Blanco fracture zone, Mendocino fault, San Andreas fault, Cascadia subduction zone, Gorda Rise, Juan de Fuca Ridge, Juan de Fuca plate, and the Gorda plate? What types of earthquakes occur on the Blanco fracture zone, Mendocino fault, San Andreas fault, and Cascadia subduction zone?

Could you calculate the rate of plate motion on a map (could you calculate a plate motion rate given distance and time)? Could you calculate a plate motion rate from GPS data (north-south, east-west, and overall direction and rate)?