
Geol 250 – Final Exam

The final exam in Geol 250 will be a comprehensive exam worth 25% of your final grade. It will cover both material that was previously tested and material we have covered since the last exam.

The exam will use a pyramid testing technique and will consist of two parts: an individual exam and a group exam. The individual exam will consist of 35 two-point questions and 6 five-point questions. The group exam will consist of the 35 two-point questions (worth one point each, as normal).

No notes, electronic devices or any other material may be taken out during the class meeting during which the exam is administered. If you finish your individual exam before other students, please sit quietly and wait. If your cell phone or other electronic device goes off (i.e., makes noise) during any part of the exam, your exam will be collected and you will be asked to leave.

To make the exam comprehensive, I will recycle questions from each of the first three exams. There will be one five-point question from each of the first three exams plus two new five point questions from the new material. There will be 5 two-point questions drawn from each of the three exams plus 15 new questions. None of the questions chosen from the first three exams will be metric conversions. However, there WILL be new metric conversion question on the final exam.

The last 5-point question on the final exam will be a matching exercise based on the “Earth: The Living Planet” video exercise we will do in lab on Wednesday (12/3). Please note that you will be turning in your lab books at the last class meeting before study day, so you will not have them study from. You should therefore make a copy of the information you need before you turn in your lab notebooks. Please plan accordingly for any other material you would like to have during finals week. I will return your graded lab notebooks to you at the final exams.

Topics Covered Since Exam Three:

Seismology and the Earth’s Interior: Earthquakes, faults, focus, epicenter, Richter Scale, seismic waves, body waves versus surface waves; body waves: p-waves versus s-waves, seismographs, seismograms; seismic wave velocity discontinuities, Moho discontinuity, layers in the Earth: crust, mantle, (liquid and solid) core.

Plate Tectonics I: scientific paradigms, scientific anomalies, resolving anomalies, paradigm wars, scientific revolution; Alfred Wegener’s continental drift evidence: continent shorelines seem to fit together, paleoclimatology, paleobiogeography, regional geologic similarities, truncated mountain ranges, definition of continental drift; Post-Wegener evidence for continental drift: earthquake and volcanic distributions, paleomagnetism, apparent polar wandering, magnetic striping of ocean basalts adjacent to mid-ocean ridges, leading to the development of the theory of seafloor spreading (a mechanism for continental drift). Seafloor spreading + continental drift = plate tectonics, definition of plate tectonics.

Plate Tectonics II: continental crust (felsic, low density, thick, does not subduct), oceanic crust (mafic, high density, thin, does subduct, formed at mid-ocean ridges from cooling magma and recycled into mantle during subduction); relatively lower density crust floats on higher density mantle, asthenosphere, mantle convection (driving force of plate tectonics); plate boundaries, convergent (oceanic crust destroyed, trenches, subduction, Benioff zones, partial melting, volcanoes, mountain building), divergent (oceanic crust created, rifts, mid-ocean ridge spreading center, volcanoes, shallow earthquakes, mountain building, continental rifting), transform (mostly associated with mid-ocean ridges, crust neither created nor destroyed, earthquakes but no volcanoes or mountain building)

Geologic Time: relative age dating (putting events in the correct order), Principle of Uniformitarianism; Steno’s principles of relative age dating: original horizontality (sedimentary rocks were originally laid down in layers parallel to the surface of the

Earth), superposition (in an undisturbed sequence of sedimentary rocks, the oldest rock is on the bottom of the stack), inclusion (a piece of rock incorporated into another rock body must come from a rock older than the rock in which it is embedded), cross-cutting relationships (a feature that cuts another features is younger than the feature that is cut); contact, formation, unconformities (disconformity, angular unconformity, non-conformity); William "Strata" Smith's Principle of Faunal Succession (biostratigraphy), organisms are temporal entities (they exist only for a period of time after they evolve and before they go extinct), a sedimentary rock containing a fossil was most likely deposited during the time that fossil species was alive; combining the known ranges of fossils with the principle of superposition allowed geologists to create a geologic time scale for Earth (relative age dating of Earth's history), eons, eras, periods. Absolute age dating (putting dates on events), radiometric age dating (absolute age dating using known decay rates of radioactive isotopes), general decay rules, half-life, using radiometric dating to determine ages of a rock.