Geology of the Environment Study Guide

Chapter 1: Intro Stuff

1) The IPAT Equation
2) Exponential Growth of the Human Race

Chapter 2: Getting Around in Geology

1) Atoms, Elements, Ions, and Isotopes
2) What does it take to be a mineral?
3) Mineral Groups
4) The Three Types of Rocks
    a. Igneous
    b. Sedimentary
    c. Metamorphic
5) Relative and Absolute Dating and Basic Techniques
6) Case Studies
    a. Asbestos: Fact and Fiction
    b. The Litter Belt

Chapter 3: Plate Tectonics

1) Wegener and Continental Drift
2) Arthur Holmes
3) Vine, Matthews and Morley and Paleomagnetism
4) Shadow Zones
    a. Inge Lehmann: P Waves
    b. Richard Oldham: S Waves
5) Wadati and Benioff
6) Plate Boundaries
    a. Convergent
    b. Divergent
    c. Transform
7) Earth's Structure and the Compositional vs. Geophysical Views
8) Hot Spots
9) Case Studies
    a. Exotic Terranes
    b. Visions of how the Earth works

Chapter 4: Earthquakes

1) Types of Faults
    a. Dip Slip Faults
        i. Normal
        ii. Reverse
    b. Strike Slip

i. Right Lateral
ii. Left Lateral

2) Measuring Magnitude
   a. Richter
   b. Moment

3) Seismic Design Considerations
   a. Ground Shaking
   b. Landslides
   c. Ground or Foundation Failure
   d. Ground Rupture
   e. Fires
   f. Tsunami

4) Four Huge Earthquakes
   a. Gujarat
   b. Alaska, 2002
   c. Colima, Mexico (2003)
   d. Northridge, CA (1994)

5) Earthquake Danger Areas

6) Forecasting of Earthquakes
   a. Statistical Analysis
   b. Geological
   c. Early Warning Systems

7) Case Studies
   a. Earthquakes, Landslides and Disease
   b. Predictable Future Shocks
   c. Rx for Failed Freeways

Chapter 5: Volcanoes

1) Who Should Worry

2) The VEI

3) Types of Eruptions
   a. Effusive
      i. Shield Volcanoes
      ii. Continental Flood Basalts
   b. Explosive Eruptions
      i. Stratovolcanoes or Composite Cones
      ii. Lava Domes
      iii. Cinder Cones

4) Benefits of Volcanic Action

5) Volcanic Hazards
   a. Lava Flows

b. Ash Falls
c. Pyroclastic Flows
d. Lahars
e. Tsunami
f. Weather and Climate
g. Gases

6) Mitigation and Prediction
a. Diversion
b. Volcano Hazards and Risk
c. Eruption Forecasting

7) Case Studies
a. New Zealand
b. Mountserrat
c. CO_2, Earthquakes and Hot Water Supply

I will ask you eight essay questions from this list of topics. You will be only required to answer five of those questions. There will also be a bonus question. The essay section of the test is worth 50 points. The multiple choice part of the exam is also worth 50 points.