

HONR 115-Earth Resources and Environment

Study Guide for Hour Exam #2 (to be held on November 4, 2008)

There will be **10 definitions** (3 points each), **5 short answer questions** (10 points each), and **1 essay question** (20 points).

Soils:

Terms: Soil, sediments, soil texture, Ternary diagram, soil horizons, zone of leaching, zone of accumulation, fertility of soils, porosity, permeability, soil moisture, Field capacity, wilting point, plant available water, moisture equivalent water-holding capacity of soil, soil nutrients, cation exchange capacity (CEC), soil erosion, Best Management Practices in Agriculture and forestry, soil remediation.

Short answer questions:

- What is soil? What are the major components of soil? How does soil differ from loose sediments or regolith?
- What is the importance (other than the obvious fact that foods grow in soil) of soils?
- What factors influence formation of soils?
- Know the characteristics of various soil horizons (soil profile).
- What criteria are used to determine soil texture, cation exchange capacity (CEC), water holding capacity, and fertility of soils?
- What are major nutrients in soil? What are some sources of these nutrients?
- What factors are responsible for top soil loss or soil erosion?
- What are some control measures (Best Management Practices) that can be taken to reduce soil erosion in a region?

Impact of Mining/Drilling on the Environment:

Terms: acid mine drainage (AMD), noise pollution, thermal pollution, ghost town, particulate pollutants

Short answer questions:

- Know the impact of surface and underground mining on land, soil, surface water, and groundwater
- What are some other impacts that result from mining and drilling on environment and society?
- Know the impact of coal mining has on the environment and society in central PA.

Topographic and Geologic Maps:

Terms: topographic map, topographic profile, contour line, contour interval, relief, gradient, bench marks, representative fraction, verbal scale, bar scale, geologic map, geologic cross section, strike (spread), dip, anticline, and syncline

Short answer questions:

- Know the differences between topographic map and geologic map
- Know the differences between geologic cross section and topographic profile
- Know the rules to read a topographic map
- Know how to construct a topographic profile
- Know how to sketch various landforms (hill, closed depression, valley, steep cliff, etc.) using contour lines
- Know how to show an anticline and a syncline on a geologic map using strikes and dips of outcrops (exposed layers of rocks)
- Know the difference between an anticline and a syncline in terms of ages of rocks that are exposed on the surface of these features
- Know the importance of geologic and topographic maps

Surface Water:

Terms: Hydrologic cycle, watershed, drainage divide, hydrograph, rating curve, discharge, flood, return interval of floods, probability of floods, point sources vs. non-point sources of pollution

Short answer questions:

- Know the importance of surface water
- Know different components of the hydrologic cycle and their inter-relationships
- What is a watershed? Why is it important to know watershed boundaries on different scales (local, regional, national)? What does the phrase “we all live downstream” mean? What is a drainage divide? Know at least two major drainage divides in the US
- What is flood? How can you measure determine return interval of floods? How does urbanization affect flooding potential in a watershed?
- What does the phrase “100-year-flood” really mean? Will a 100-year-flood always occur in every 100 years or is it possible that a “100-year-flood” will become a “50-year-flood”? Under what circumstances the return interval of a flood will change over time?
- What are some measures that people take against flooding? How effective are those measures? Know some pros and cons of those flood control measures
- What are some common sources of surface water pollution? What measure can be or need to be taken to reduce surface water pollution?
- What is the cause of AMD? Why and how do limestone and organic materials (such as wetlands) play a major role in treating AMD affected surface water?

Groundwater:

Terms: zone of aeration, zone of saturation, groundwater table, recharge vs. discharge zone, effluent vs. influent streams, aquifer, aquiclude, springs, geysers, artesian well, cone of depression, drawdown, Darcy's Law, perched water table, sinkholes, karst topography, caves, disappearing streams, solution valleys, salinity intrusion, Clean Water Act, Maximum Contaminant Level, Total Maximum Daily Load (TMDL), phosphate, nitrate, acidity, pH, alkalinity, hardness, sulfate, trace metals, volatile organic compounds, DNAPL vs. LNAPL, conductance, total dissolved solid (TDS), turbidity, BMPs.

Short answer questions:

- Know various zones of groundwater and be able to draw sketches showing these zones
- Know how to determine groundwater flow in an area using groundwater table data.
- Know the importance of groundwater. Know the common point and non-point sources of groundwater pollution
- Know the most common water quality parameters (listed above under terms) and their sources. Know the impacts of these chemical parameters on water quality and health.
- Know the problems associated with groundwater. Know the steps involved in treatment of contaminated groundwater.