

Soils 201 - Study Questions – Soil Genesis, Morphology, and Classification

Note: This list is meant to help you learn and review the main points. They are not necessarily the exact topics or questions that will be asked on exams. You'll see that there are more topics here than could possibly be on a single exam. But, by learning/understanding this material, you should be a long way toward doing well and learning the fundamentals of Introductory Soils!

Soil Genesis (Formation)

- 1) What is the difference in meaning between the term *rock* and the term *mineral*?
- 2) Give examples of several kinds of minerals that we examined, and their characteristics
- 3) Give examples of several different kinds of rocks that we examined, and their characteristics
- 4) Explain what affects the kind(s) of minerals that are found in rocks, and give examples of rock types to illustrate your points.
- 5) List and describe the three general classes of rocks in the global 'rock cycle'?, and give an example for each.
- 6) Explain the difference between *primary minerals* and *secondary minerals*.
- 7) What is *weathering*, and what kinds of weathering can occur?
- 8) Which minerals are most easily weathered when at the earth's surface (give specific examples). Explain WHY these minerals are most easily weathered.
- 9) Explain and give examples of the affects rock mineralogy can have on subsequent soils formed from them.
- 10) We gave two different conceptual models by which we understand the process of soil formation – including Simonsen's four processes. List these four processes, and give an example to illustrate each.
- 11) The second conceptual model is Hans Jenny's 'Factors of Soil Formation'. List the five factors, and explain the relative affects each factor is likely to have.
- 12) Besides plant materials and bedrock, *transported parent materials* make up a large portion of soil parent materials. What are the different agents of transport? What kinds of deposits (parent materials) does each agent create? (This is a 'big' question, as is the former – notes and text break the topic down!).
- 13) Some examples:
 - a.) If a soil has a horizon of clay and carbonate accumulation, what can we reasonably speculate is the environment in which that soil formed?
 - b.) Grassland and forest soils are typically very different in their properties. Compare and contrast the properties each would likely have, and explain why.
 - c.) What differences would you expect to see between a very young and a very old soil?

Soil Morphology and Soil Architecture I (*What soil looks like; found in Ch. 2 and 4 (a bit in 1)*)

Soil Horizons

- 14) List the letters used to designate the “Master Soil Horizons” and explain what each means.
- 15) We learned a number of subordinate horizons as well (b,g,k,n,p,s,t,w)
- 16) What is the designation for a plowed A horizon? A buried horizon?
- 17) Which lower case letter indicates a gley soil color, indicating wet soil conditions?
- 18) Explain the differences you would expect to see between a Bt, a Bw, Bk, and Bs horizon.
- 19) The ‘Bn’ designation indicates a horizon of sodium accumulation. Which form of soil structure is typically found in this horizon?

Soil color

- 20) What type of equipment or tool is used to evaluate soil color?
- 21) What do the three components (hue, value, chroma) of soil color designation each mean?
- 22) What agent is primarily responsible for the dark color of A horizons?
- 23) What agents are primarily responsible for soil colors in the red-orange-yellow spectra?
- 24) What does mottled soil coloring indicate about moisture conditions of that soil?
- 25) Describe the ‘gley’ colors

Soil Structure

- 26) What are the different kinds of structural units and their characteristics? (Be able to describe, draw and recognize the main types, and know what part of the soil profile they are typically found)
- 27) Why do we care about soil structure?
- 28) Which desirable kind of structure is typically associated with A horizons?
- 29) Which of the structural shapes typically found in the subsoil are NOT desirable? What do they indicate about the characteristics of the soil and the soil’s ability to function? (at least two of the ones we talked about in class fit in this category)

Soil Texture

(covered somewhat in the introduction to the course too – Ch 1)

- 30) What are the boundaries of the particle size classes called *sand*, *silt* and *clay*?
- 31) What are mineral materials 2mm diameter and greater, called?
- 32) Does organic matter content affect soil texture?

- 33) Once we know the relative proportion of sand silt and clay for a soil, we can determine its *texture* using the *texture triangle*. What texture class does a soil that is 30% clay, 35% silt, and 35% sand fall into?
- 34) What about a soil that is 50% sand and 20% silt? (what is the clay content of this soil?)
- 35) Given a cumulative curve of the percentage of particles smaller than given particle diameters, how do you determine the texture class?
- 36) Can soil management affect the texture of a soil? Explain.
- 37) How does soil texture differ from soil structure?

Soil Classification

- 38) Why do we bother to classify soils?
- 39) What is the name of the soil classification system used in the US?
- 40) What is the highest level in the classification system (like 'Animal' level for a chickadee)
- 41) What is the word used for the lowest level in the classification system (analogous to *species*)
- 42) List the 12 soil orders, and give a brief description for each.
- 43) For the previous question, what characteristics would YOU use to identify that particular soil order from a monolith or soil profile photo?
- 44) What is the general name of the publication that contains descriptions of soil types at the local level, including maps of the delineated soil types drawn on air photos, and interpretive tables indicating suitability of each soil map unit for particular uses?