

## EPSc 413 Homework #6

Due April 26, 2017

*Write all answers on separate sheets of paper. Please only write on one side of the page. Answers may also be typed.*

**1.** *This question asks you to consider the transformations that nitrogen experiences in soil environments.*

Consider a wetland soil with an aerobic surface layer and anaerobic subsurface layer. In this soil nitrogen ( $N_2$ ) is fixed in the anaerobic layer. Describe the processes that must occur for this fixed nitrogen to be converted back to  $N_2$  through denitrification and then lost to the atmosphere.

**Please be sure to:**

- a. Discuss all of the major steps involved
  - b. Specify where in the soil each process likely occurs
  - c. Identify the form of N produced at each step
  - d. Indicate the ways in which nitrogen can be lost from the soil before it is converted to  $N_2$
- (28 pts)**

**2.** *This question requires you to become familiar with transformations of phosphorus in soil.*

Phosphorus added as fertilizer is often fixed in soil and becomes unavailable for plant uptake.

Describe how phosphorus becomes fixed under:

- a. acidic soil conditions
- b. alkaline soil conditions

Make sure to include the form(s) of phosphate that result from fixation under each condition and the process involved in fixation.

**(24 pts)**

**3.** *This question asks you to become familiar with the role of many elements as both micronutrient and contaminants.*

Explain why it is often unwise to add large quantities of micronutrients to a soil all at once with the goal of alleviating micronutrient deficiencies for many years.

**(12 pts)**

**4.** *This question asks to explore the behavior of soil contaminants.*

Describe the similarities and differences in the behavior of organic and inorganic contaminants in soils.

**(18 pts)**

**5.** *This question asks you to learn the different types of soil erosion.*

What are the difference between sheet, rill, and gully erosion?

**(18 pts)**