01-02-2020

APBI 200
LAB # 5 ASSIGNMENT

Please answer the following questions:

Section 1 - Soil pH

1. Soils with a low pH are: (select all that apply)
   a) Acidic
   b) Alkaline
   c) Low in hydrogen ions
   d) High in hydrogen ions
   e) Generally found under humid climates
   f) Generally found under dry climates

[1 point]

2. a) Define buffer capacity in a soil.
   b) What soil characteristics influence the buffering capacity of a soil?
   c) Provide an example exchange reaction which illustrates buffer capacity in soil
   d) Why is the buffering action of soils important?

[4 points]

3. The soil sample which you used to obtain data for pH in this lab, was from the coarse textured A horizon of Totem field, located on the UBC campus. This site has been amended with compost (approximately 6% SOM), and has been under grass cover for a number of years. You obtained different values for the same soil sample when pH was measured in water and 0.01 *M* $CaCl_2$. Which reading was more acidic? Briefly explain why.

[3 points]

Required attachments:

- Your data sheet with pH values obtained by pH meter and field test kit:

[3 points]

Section 2 - Soil organic matter

4. Soil organic matter has a direct impact on: (select all that apply)
   a) Soil bulk density
   b) Cation exchange capacity (CEC)
   c) Soil water holding capacity
   d) Soil thermal properties
   e) Soil structure
   b) Texture

[1 point]

5. Briefly explain how organic compounds contribute to soil cation exchange capacity (CEC). Distinguish how this differs from the contribution that phyllosilicates make to CEC.

   [Hint: think about the source of the charge on organic compounds and phyllosilicates]

   [4 points]

6. Briefly explain how C/N ratio relates to the rate of decomposition of organic residues added to the soil.

   [2 points]

Required attachments:

- Your data sheets for hygroscopic water content and soil organic matter content showing formulas used, calculations and units.

[4 points]

Section 3 – Soil phosphorus

7. It is important to know the concentration of plant available P in soils because:
   a) total soil P is low
   b) the concentration of P in soil solution is low
   c) P is not important for plants

   [1 point]

8. What is a standard curve and how did you use the standard curve in this lab to determine the concentration of available soil P?

   [2 points]

Required attachments:

- The standard curve. Don't forget to include a title and axes labels. Indicate the Absorbance and P concentration values for your sample on the curve.
- Data collection table, including all calculations for your sample; show your units.

[5 points]

Total for lab #5 assignment [30 points]