

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)
- Acidic
 - Alkaline
 - Low in hydrogen ions
 - High in hydrogen ions
 - Generally found under humid climates
 - Generally found under dry climates

[1 point]

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

[4 points]

2. 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 CaCl₂. 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

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

[1 point]

4. 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]

5. 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

6. 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]

7. 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]