APBI200 - LAB 4 ASSIGNMENT

Section 1 - soil acidity and pH

Please answer the following questions:

1. 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?

[2 points]

2. What factors influence the buffering capacity of a soil? Why is the buffering action of soils important?

[2 points]

Required attachments:

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

Method	**pH**
pH meter – determination in water	
pH meter – determination in 0.01 *M* $CaCl_2$	
Field test kit	

[2 points]

Section 2 - halomorphic soils

Please answer the following questions:

3. Why are high concentrations of salts in soils detrimental to plant growth?

[2 points]

4. Explain why sodic soils have poor structure.

[2 points]

5. Listed below are data for three salt-affected soils:

Soil Property	**Soil #1**	**Soil #2**	**Soil #3**
cation exchange capacity ($cmol_c/kg$)	8	15	21
base saturation (%)	95	98	85
exchangeable sodium (%) or ESP	19	28	6
electrical conductivity (dS/m)	9.2	0.5	12
classification			

a. Fill out the last row of the table indicating the classification for each soil (saline, sodic, saline-sodic, or normal).
b. Which of the above soils would be **most** likely to disperse following irrigation? Explain.
c. Which of the above soils would benefit **most** from the application of excess irrigation water to leach soluble salts from the soil? Briefly explain.

[3 points]

Required attachments:

Your data sheet with pH and EC values:

Sample name:	pH determined in water (from previous lab section)	
	Electrical conductivity (EC) of saturation extract (mmho/cm)	
	Soil classification based on salinity indicators	

[2 points]

Section 3 - soil organic matter

6. What effects does organic matter have on soil physical, chemical and biological properties? Briefly explain.

[3 points]

7. What factors influence the amount of organic matter in soil? Briefly explain.

[2 points]

Required attachments:

Your data sheet with soil organic matter calculations.

[2 points]

Section 4 – soil phosphorus

8. Soil phosphate fixation
   a. Discuss soil phosphate fixation relative to soil pH.
   b. What are the implications for the phosphorus nutrition of plants?

[2 points]

Required attachments:

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

[2 points]

Total for lab 4 assignment **[26 points]**