

Part 1: Short essays - Answer *four* of the following *five* questions [6 pts. each].

1- How does frost heave work? Illustrate your discussion with diagrams.

2 – What soils would you find in an arid region? And how would they differ from one in a tropical region?

3 - Briefly describe how the concepts of kinetics and thermodynamics apply to chemical *and* physical weathering.

4 – What might account for the overall cooling during the Cenozoic?

5 – Discuss one example of soils in Deep Time and how the advent of the soils affected the composition of the atmosphere.

Part 2: WEATHERING Short essays, answer one of the two below (16 pts. each).

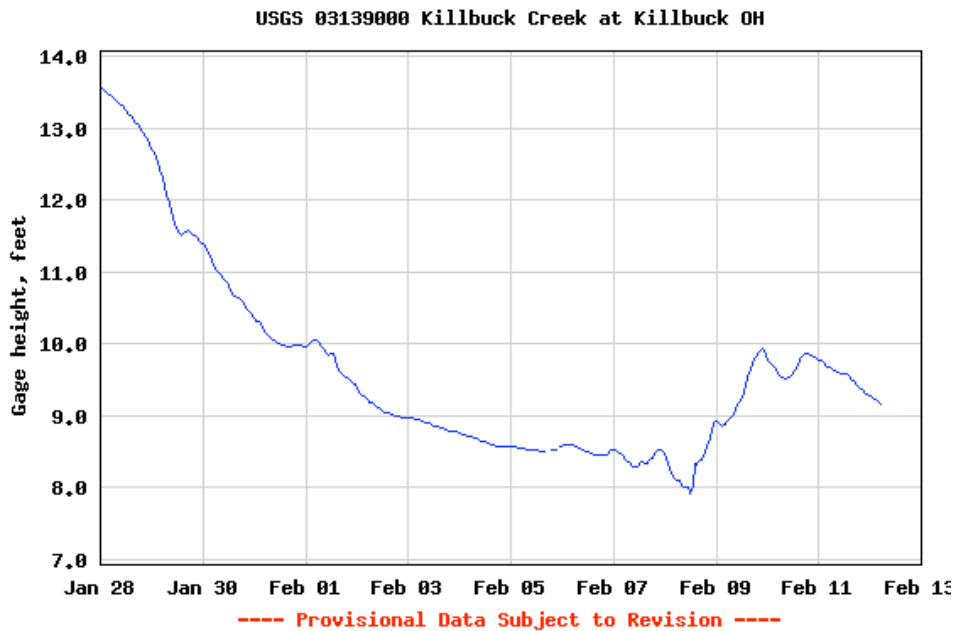
- 1 What controls weathering rates? Discuss the relative roles that hypsometry, climate, climate history and geology have in denudation of landscapes.
- 2 - Outline two chemical weathering reactions that are important in producing secondary minerals. What stays in the soil profile and what goes and why? Be sure to cover the details of the chemistry involved.

SLOPES – Answer either 1 or 2 below (16 pts. each)

- 1 - Sketch a typical slope profile in a humid environment found in Wooster. What processes dominate in each of the segments? Be sure to include the physical explanation of the particular segment shape and the overall hydrology along the slope. How might the ideal slope be modified if it were north or south facing?

- 2 – Draw the classic *block on the slope* diagram and show the forces acting on it and discuss how the idea of driving and resisting forces act to drive the mass to move or how it maintains stability.

Part 3. Answer this **all of you.** [14 pts.]



Above is the gage height over time for Killbuck on the Killbuck. You can see that it is now (12 Feb).

- 1 – What is gage height? [2 pts.]
- 2 – What accounts for the daily wiggles for most days? [2 pts]
- 3 – What function describes the decline after the peak at 20 January? And how could the modeling of this decline be put into use? [4 pts.]
- 4 – What accounts for the rise after 8 February? [2 pts.]
- 5 – There is no appreciable precipitation forecasted over the next few days – project the curve above out for the next several days and it supposed to be cold– draw and explain it. [4 pts.]

Part 4. Answer/explain *six* (6) of the following (5 pts. each)

1 - SPECMAP

2- Internal angle of friction

3 – Sediment transport mechanisms

4- Cation exchange

5- Ergodic assumption

6 - Rheology

8 – Global hypsometry

BONUS: What team of geologists recently presented *A Geological Perspective on the Haiti Earthquake?* [1 pt.]