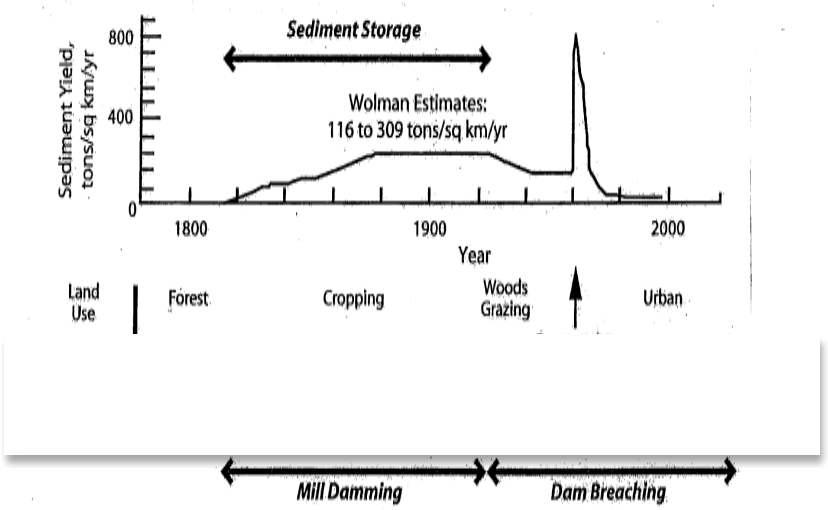
Exam II - Geomorphology - *Spring 2014* Name _____

Part I. Answer these first two questions.

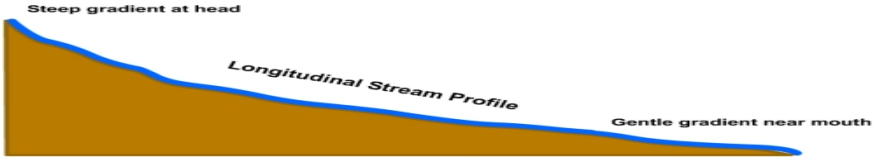
1 - Using the diagrams below and your knowledge of the fluvial system explain how a stream may respond to fluctuations in sediment load resulting from changes since the early 1800s. Describe briefly the complex response of the system? What happens upstream and downstream as the stream adjusts to this load – make a series of cartoons [10 pts.].

A.



Draw and explain the response here:

A. *Initial conditions*



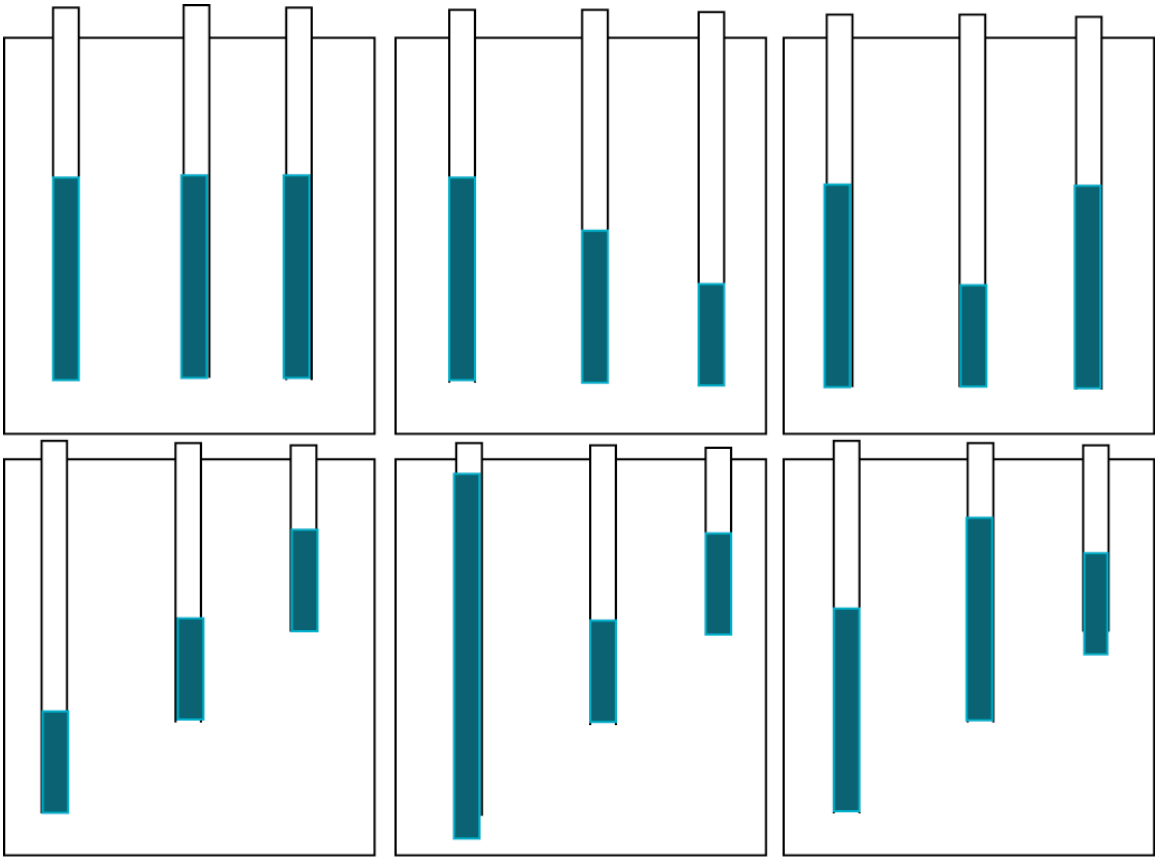
B. *1850*

C. *1900*

D. *1950*

E. *2000*

2 – On the diagrams below draw the flow (up or down/ right or left) of the water in the boxes (note that all wells are piezometers (wells) open only at their ends). Draw arrows. [10 pts.]



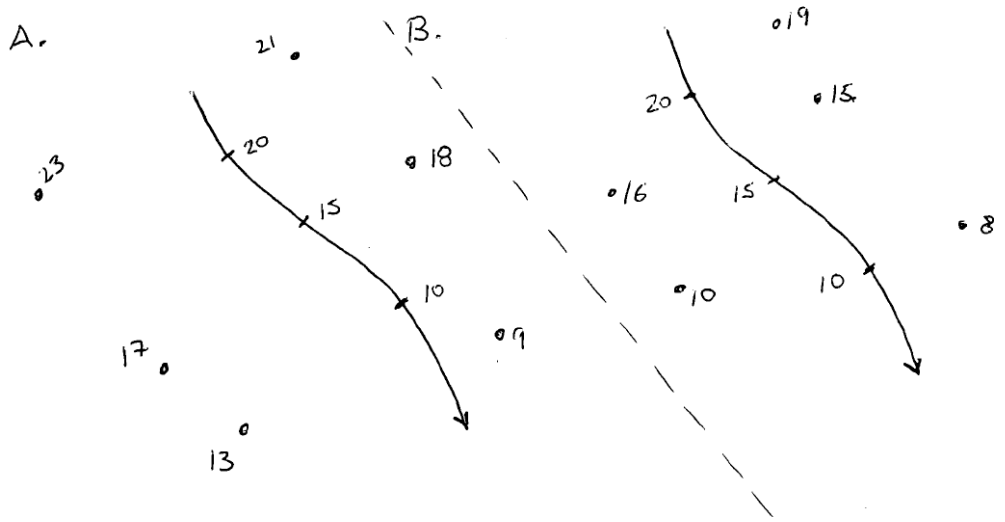
Which of the diagrams above is a lake?

Part II. Answer *three* [3] of the following four [4] questions – be sure to draw diagrams to illustrate you answers [15 pts. each]

1 – Illustrate the empirical origin of Darcy's law. What is the utility (use) of this relationship and how it is used to measure hydraulic conductivity.

Why is hydraulic conductivity in the horizontal greater generally than in the vertical?

2 – Draw a flow net (equipotential and flow lines) around a gaining and losing stream. The diagrams below are water levels (above sea level) of the same stream. What is the hydraulic gradient from C to D?



3 – **Meander.** Diagram a typical vertical sequence of sediments laid down by a meandering stream. What processes form the laterally and vertically accreted deposits? Draw a cross-section and map view of the hydraulics around a typical meander bend.

The meander cutoff at Fern Valley formed during the flood in March - now there is a lake – why did it cutoff and what kind of lake is this?

4 – **Pores Space.** Define porosity and how does porosity vary with grain size, with sorting and with packing? How are *specific yield* and *specific retention* relevant to porosity? Illustrate your discussion.

Define Hydraulic conductivity.

Part III. Define and describe 7 of the 8 below (5 pts each).

1 - Discharge-rating curve

2 – Hydraulic geometry

3 – Homogeneous and isotropic

4 –Eddy viscosity and molecular viscosity

5 - Froude number and standing waves

6 - Hydraulic radius and its utility

7 - Gilbert-type deltas

8 – Piping

Bonus: Dr. Jess Conroy – our *2014 Osgood Speaker* used three isotopes to date her lake cores…for three points each, which isotopes are they? [3 pts.]