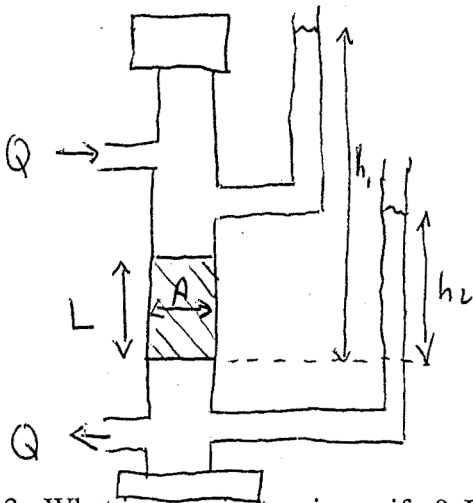


Sample Hydrogeology Exam Questions

1. Sketch/describe a baseflow recession. What information about the groundwater system does a baseflow recession provide?

A baseflow recession is the decline in stream discharge during the dry season when the stream is fed entirely by groundwater. Baseflow recessions from two or more years can be used to estimate groundwater recharge.

2. Sketch/describe Darcy's experimental apparatus. Clearly indicate what quantities are measured in the experiment.



Q = Specific Discharge

L = length of sample

A = cross-sectional area of sample

h_1 = hydraulic head at top of sample

h_2 = hydraulic head at bottom of sample

3. What is an anisotropic aquifer? How does this happen?

In an anisotropic aquifer, the hydraulic conductivity varies depending on the direction of flow. Most often the horizontal hydraulic conductivity is higher than the vertical hydraulic conductivity. Anisotropy occurs most often because of variations in grain shape and orientation or directional nature of fractures.

4. A form of Darcy's law is given below. Give a physically meaningful explanation of each term and give its units.

$$Q = -KA \frac{dh}{dl}$$

Q = Specific discharge, volume of water moving across a cross-sectional area over some period of time, m^3/s ;

K = Hydraulic conductivity, a property of the porous medium and the fluid. A measure of how easy or difficult it is for the fluid to move through the porous medium, m/s .

A = Cross-sectional area over which Q is measured, m^2 .

dh/dl = hydraulic head gradient, dimensionless. Hydraulic head is a measure of the energy contained in a fluid based on its gravitational position and fluid pressure. The gradient is the rate of change with distance. Note the minus sign is because fluid flows from high hydraulic head to low hydraulic head.