Lock Haven University

GEOS 360 – Hydrogeology, Fall 2009
Study Guide for Test #2 (to be held on 11/06/2009)

There will be 10 definitions (5 points each), two short-answer questions (10 points each), and an essay question (30 points) in the test. You will not have to write any equation, unless you want to use them to shorten your explanations, but sketches, maps, and other illustrations will be helpful in answering some of the questions.

Know the following terms:

Hydrologic cycle, infiltration, zone of saturation, vadose zone, groundwater table, perched water table, piezometric or potentiometric surface, piezometer, hydraulic head, Bernoulli's equation, effluent vs. influent streams, aquifer, aquiclude, aquitard, porosity, permeability, specific yield (live storage), specific retention (dead storage), specific storage (elastic storage), hydraulic conductivity, confined vs. unconfined aquifer, pearched aquifer, equipotential, spring, geyser, seepage, artesian well, lake, recharge vs. discharge areas, homogeneity and isotropy of aquifer, transmissivity, storativity, Darcy's law, Reynold's number, laminar vs. turbulent flow, flow nets, flowtube.

Short answer questions:

** Why is it important to study groundwater (GW)? What are some uses of GW?
** What is potentiometric surface? What are the components of hydraulic head?
** Why do local, intermediate, and regional flows of GW vary?
** Why is it important to learn if a stream is effluent or influent? What are some ways in which an effluent stream can become an influent stream?
** How do permeability and hydraulic conductivity differ from each other? How are they related? Know different methods for determining hydraulic conductivity. Which of these methods seem to be better and why?
** How do you construct flowlines in an anisotropic aquifer?
** What is Darcy's Law? What are the assumptions behind this law? Why is it considered to be one of the most fundamental principles in GW flow? What are some specific uses of this law?
** How do the porosity (n), permeability (Ki), and hydraulic conductance (K) relate to each other? What are different ways in which you can determine the hydraulic conductance? Why are there so many different ways to determine hydraulic conductance (i.e. what are some practical implications)?
** What is the difference between volumetric and gravimetric porosity? Which one is better and why? How can you determine porosity and permeability of rocks in an outcrop?
** What are some differences and similarities between hydraulic conductance (K), transmissivity (T), Specific storage (Ss), and storativity (S)? How can you determine these?
** What is flownet? What are different types of boundaries in GW flow? What is the basis for flow net construction? What are some practical implications or uses or flow nets?

The essay question: you will have to be able to synthesize information from various topics to answer this question. To best answer this question, formulate an outline in your head before you attempt to elaborate. At the very least, you should have a bulleted outline that summarizes your thoughts on the topic.