GROUNDWATER FLOW THROUGH A DEEP, CONFINED AQUIFER

Subsurface information is available from logs of three wells in this area, as shown in Figure 8.2. The well data are presented in a format common for such data—all measurements are made relative to the ground surface—that is, they are *depth* measurements.

In order to correlate between wells, you will need to reduce the depth/ground elevation data to a common datum, normally sea level, because that is the datum for ground elevations.

Each of the wells was cased, with the casing perforated in the intervals shown. The map in Figure 8.3 shows structure contours on the top of impermeable bedrock. This is all of the information available.

1. Determine the discharge through the aquifer.

Suggestions: Note in looking at Figure 8.3 that there are no boundaries to a flow field shown, nor do you see any equipotential surfaces. One main part of this problem, therefore, will be to determine the aquifer geometry. You can do this by working with the well data to determine the aquifer depth and thickness, and solution of a three-point problem will provide an approximate strike and dip of the aquifer. You will have to combine this information with the structure contour map to determine the aquifer geometry and, thus, the boundaries of the flow field.

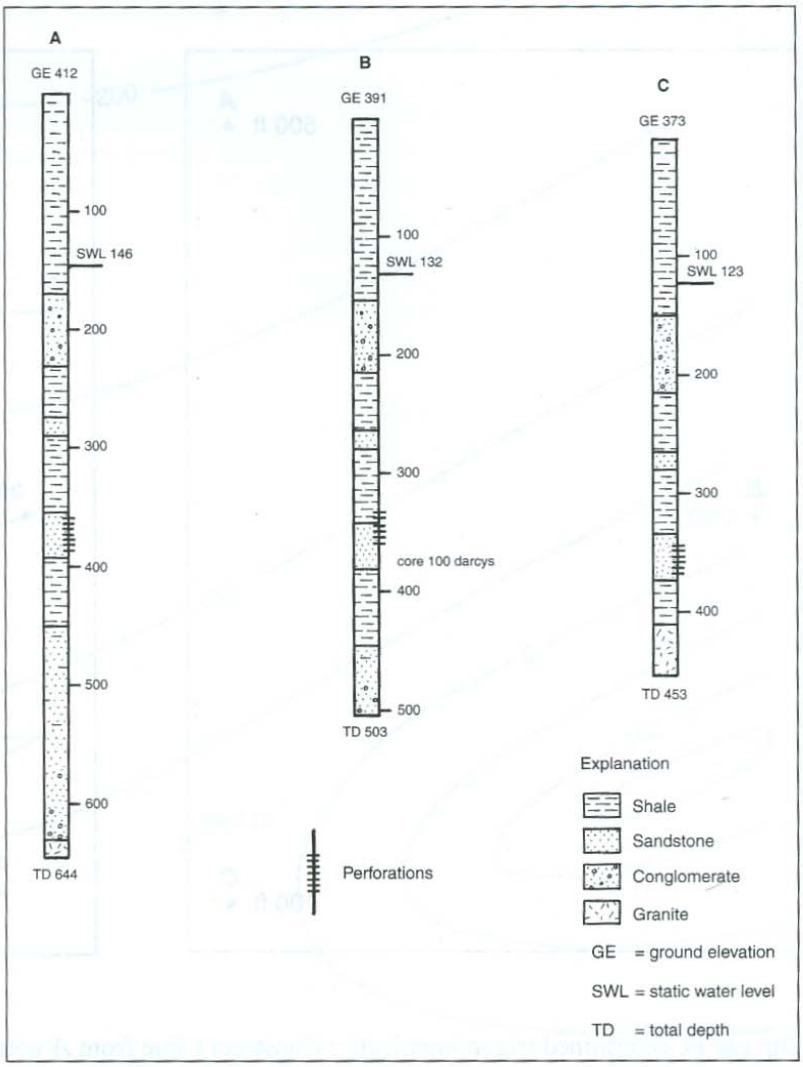

Figure 8.2—Lithologic logs of the three wells shown on the map (Fig. 8.3) plotted to scale. Measurements are in feet; there is no horizontal scale.

Try to visualize the aquifer in three dimensions. This is difficult, but start with the dip. Which way is the aquifer dipping? You might begin by correlating the lithologic units in the wells. Draw lines connecting the tops of each unit, including the basement.

The general dip direction of the sedimentary rocks is toward the _____.

You can get a more quantitative estimate of strike and dip by solving a three-point problem, as shown below.

Given three points of known elevation on a plane at *A*, *B*, and *C*, you can determine the strike by connecting any two points of equal elevation. For example, draw a line connecting the two points of highest and lowest elevation, in