1) Select a surface water quality measurement station of interest to you under
http://waterdata.usgs.gov/nwis/current/?type=quality . Select one of the following measured quantities:
temperature, specific conductivity, dissolved oxygen, turbidity, nitrate, pH. Make a plot of this quantity
measured at the station over the last 30 days, and compare to an applicable surface water quality standard,
such as New York's: http://water.epa.gov/scitech/swguidance/standards/wqslibrary/ny_index.cfm
(Section 2). Explain what sources of pollution can affect this quantity. Also give a couple of ways to reduce
the impact of pollution on this quantity if a development project is being planned in this watershed.

2) (a) Find the infiltration rate 1 hour into a strong rainstorm in a Dothan loamy sand. (b) Plot the
infiltration rate as a function of time for a 2-hour long rainstorm. (c) Find the total amount infiltrated over 2
hours.

3) Assume that the water table height (m above sea level) was measured at three wells as
x   y   h
100   100   9.5
200   200   9
300   0   7

where the horizontal coordinates x and y are also in meters.

(a) Determine the magnitude and direction of the local hydraulic gradient assuming a planar water table.
(b) Estimate the groundwater flow velocity assuming that the subsurface is limestone.
(c) Estimate the effective infiltration velocity of benzene in a pollutant plume in the area if the organic
matter mass fraction is 0.005 and the specific gravity is 1.7.

4) Consider a river with a flow rate of 5 m^3/s, uniform temperature of 15 °C, deoxygenation rate $k_d = 0.2$
day^{-1}, reoxygenation rate $k_r = 1$ day^{-1}. Assume that upstream of a pollution source the water is saturated with
DO and contains no BOD. According to the Streeter-Phelps model, how much BOD (in mg O_2 equivalent)
could the pollution source discharge without depleting the DO by more than 10%? Assume that the
discharge does not change the flow rate or temperature in the river.