

Homework set #7
BENG 100
Spring 2008
Due: March 27, 2008

1. Why is a high-pressure capillary system required in the kidney?
2. Describe the characteristics of the glomerular membrane and its permeability to various substances.
3. For the following steps in urine formation, state where it occurs and what is the purpose. a) tubular reabsorption; b) tubular secretion.
4. A person consumes a 100 micrograms of a tracer chemical. Assume that the person is able to collect all of the tracer in their urine (and therefore measure the amount that has come out of the body), as well as the concentration in the blood, as a function of time (Table 1).
 - (A) Is a first order rate constant appropriate for describing the process of elimination via the kidneys? Justify your answer.
 - (B) Assuming that the answer to (A) is “yes”, find the rate constant k and the total volume V from this data.

Time (hr)	Amount collected in urine during the previous hour (microg)	Concentration in the blood (microg/L)
1	9.4	90
2	8.7	82
3	7.9	75
4	6.9	66
5	6.5	61
6	5.7	55
7	5	50
8	4.9	43
9	4.3	39
10	3.9	35

5. In problem 4, does the value of V that you determine equal the “volume” of the person. Why or why not?

EXTRA CREDIT

Write a homework problem that you think would be useful and appropriate to include at the end of Chapter 9. Please supply both the problem and the solution.