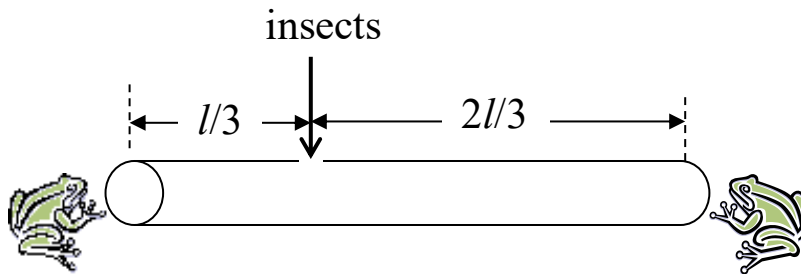**Name:**

Homework for Lecture 4

Suppose there are two frogs waiting at the two ends of a feeding tube of length l. Now we feed the frogs by putting insects into the tube from an open slot located at a position of $l/3$ from left, as shown in the Figure below. After the insects enter the tube, they can either go left or right by taking a random walk. When they reach the ends of the tube, they will be eaten by the frogs.

1). Suppose we keep putting the insets into the open slot to maintain the local insect concentration at C_0 all the time, and the number of insects inside the tube initially increases and then reaches the steady state, what's the distribution of insects inside the left and right side of tube in the steady state? *(Hint: solving a one-dimensional diffusion problem; a steady state means, $\frac{\partial C}{\partial t} = 0$.)*

2). In the steady state, how many insects in the left side of the tube and how many in the right side?

3). What is the flux of insects inside the left and right side of tube in the steady state?

Answer: covered in Lecture 4