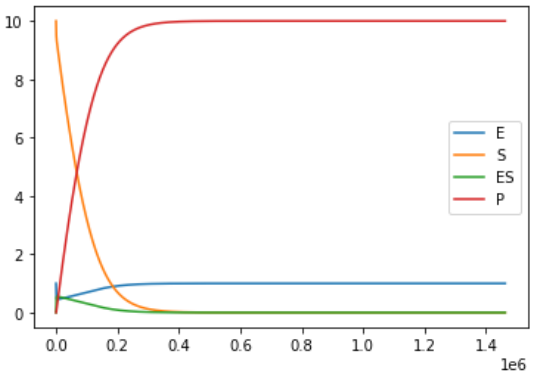
Question 2

1. Let e = [E], s = [S], c = [ES], p = [P]. According to law of mass action, we have four equations below:

$$\begin{cases} \dfrac{ds}{dt} = k_2 * c - k_1 * s * e \\ \dfrac{de}{dt} = (k_2 + k_3) * c - k_1 * s * e \\ \dfrac{dc}{dt} = k_1 * s * e - (k_2 + k_3) * c \\ \dfrac{dp}{dt} = k_3 * c \end{cases}$$

2. None
   Failed to finish this question. Only know how to solve single ODE using Runge-Kutta method. If using MATLAB ode45, the equation can be easily solved.

3. None
   Based on equations, a simulation for the process can be achieved using Python. The result is as below:



   The x-ray is time, the y-ray is concentration of substances E, S, ES and P.