8.1

E, S, ES and P are all in liquid environment, so according to the law of mass action, the rate of changes of them can be calculated as follows:

S: $\frac{\mathrm{dS}}{\mathrm{dt}} = -k1[E][S] + k2[SE]$

SE: $\frac{\mathrm{dSE}}{\mathrm{dt}} = \mathrm{k1[S][E]} - \mathrm{k2[SE]} - \mathrm{k3[SE]}$

E: $\frac{\mathrm{dE}}{\mathrm{dt}} = (k2 + k3)SE - k1[S][E]$

P: $\frac{\mathrm{dP}}{\mathrm{dt}} = k3[SE]$

([E] means the Molarity of E, similarly for S, SE, and P)

Answer for 8.2 is in attachments