$$\frac{dN_1}{dt} = r_1 N_1 \left(1 - \frac{N_1 + \alpha_{12} N_2}{K_1}\right)$$

$$\frac{dN_2}{dt} = r_2 N_2 \left(1 - \frac{N_2 + \alpha_{21} N_1}{K_2}\right)$$

(1) Set $\frac{dN_1}{dt} = 0$, solve for N_1^*

$$0 = r_1 N_1 \left(1 - \frac{N_1 + \alpha_{12} N_2}{K_1}\right) \Rightarrow \frac{0}{r_1} = \frac{r_1 N_1}{r_1} \Rightarrow \boxed{1a)\ N_1^* = 0}$$

$$\frac{0}{r_1 N_1} = \frac{1}{N_1}\left(1 - \frac{N_1 + \alpha_{12} N_2}{K_1}\right) \Rightarrow 0 = 1 - \frac{N_1 + \alpha_{12} N_2}{K_1} \Rightarrow \frac{N_1 + \alpha_{12} N_2}{K_1} = 1$$

$$\Rightarrow N_1 + \alpha_{12} N_2 = K \Rightarrow \boxed{1b)\ N_1^* = K_1 - \alpha_{12} N_2}$$

(2) Set $\frac{dN_2}{dt} = 0$, get N_2^*

$$0 = r_2 N_2 \left(1 - \frac{N_2 + \alpha_{21} N_1}{K_2}\right) \Rightarrow 0 = r_2 N_2 \Rightarrow \boxed{2a)\ N_2^* = 0}$$

$$0 = 1 - \frac{N_2 + \alpha_{21} N_1}{K_2} \Rightarrow \frac{N_2 + \alpha_{21} N_1}{K_2} = 1 \Rightarrow N_2 + \alpha_{21} N_1 = K_2 \Rightarrow \boxed{2b)\ N_2^* = K_2 - \alpha_{21} N_1}$$