1. Consider the system:

(i)     $H + OH \leftrightarrow H2O$

(ii)    $H2 + O \leftrightarrow H2O$

(iii)   $H2 \leftrightarrow H + H$

(iv)   $O2 \leftrightarrow O + O$

(v)    $H + O \leftrightarrow OH$

(vi)   $H2 + O \leftrightarrow OH + O$

Write the equations for solving the rates of formation of each of the species present in the system. Are there any reactions that are superfluous in this system? Explain.

2. Consider the system:

(i)     $N2 + O \leftrightarrow NO + N$

(ii)    $O2 + N \leftrightarrow NO + O$

(iii)   $N2 \leftrightarrow N + N$

(iv)   $O2 \leftrightarrow O + O$

(v)    $N + OH \leftrightarrow NO + H$

(a) Write the expression for solving the rate of formation of each of the species.

(b) Which of the reaction are fast compared to the others?

(c) Is there a possibility of partial equilibrium assumption? If so reduce the expression from (a) using this.

(d) Is there a possibility of Quasi steady state assumption? If so reduce the expression from (a or c, whichever is shorter) using this.