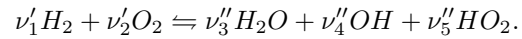
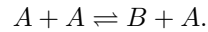


AME 60636
Examination 1
Prof. J. M. Powers
6 March 2009

1. Find the most general stoichiometric balance for the reaction



2. Species A and B have identical molecular masses and undergo a reversible reaction described by



The reaction is adiabatic and isobaric. At $t = 0$, $T = T_o$, $\bar{\rho}_A = \bar{\rho}_{Ao}$, and $\bar{\rho}_B = 0$. The reaction has $\mathcal{E} = 0$ and $\beta = 0$. It has collision frequency factor a , constant c_P , and is exothermic.

- (a) Write appropriate simple ordinary differential equations for the change of $\bar{\rho}_A$ and T with respect to time. Define any additional appropriate constants you might need.
- (b) Find the equilibrium concentration of A .
- (c) Find the time scales of relaxation near equilibrium.
- (d) Make as much progress as possible in finding $\bar{\rho}_A(t)$ and $T(t)$.