AME 60636
Examination 1
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1. Find the most general stoichiometric balance for the reaction

$$\nu_1' H_2 + \nu_2' O_2 \leftharpoons \nu_3'' H_2O + \nu_4'' OH + \nu_5'' HO_2.$$

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

$$A + A \rightleftharpoons B + A.$$

The reaction is adiabatic and isobaric. At $t = 0$, $T = T_o$, $\overline{\rho}_A = \overline{\rho}_{Ao}$, and $\overline{\rho}_B = 0$. 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 $\overline{\rho}_A$ and T with respect to time. Define any additional appropriate constants you might need.

   (b) Find the equilbrium concentration of A.

   (c) Find the time scales of relaxation near equilibrium.

   (d) Make as much progress as possible in finding $\overline{\rho}_A(t)$ and $T(t)$.