Equilibrium sheet II 2019 Name:_____

Show work for problems 2 – 4.

1. Write out the K_{EQ} expressions for each of the equilibrium systems below:

   a. $2\ NH_{3\ (g)} \rightleftarrows N_{2\ (g)} + 3\ H_{2\ (g)}$

   b. $H_{2\ (g)} + I_{2\ (g)} \rightleftarrows 2\ HI_{\ (g)}$

   c. $CH_3OH_{\ (g)} \rightleftarrows CO_{(g)} + 2\ H_{2\ (g)}$

2. Consider the rxn: $2NO + O_2 \rightleftarrows 2NO_2$
   Under certain condition the equilibrium [NO] is 0.0682M, the $[O_2]$ is 0.0341M and the $[NO_2]$ is 0.0682M. **Find the K_{eq}.**

3. Consider the rxn: $N_2O_4 + E \rightleftarrows 2NO_2$
   The initial $[N_2O_4]$ is 1.08M, once the reactions has proceeded for a period of time, the equilibrium $[NO_2]$ was found to be 0.96M. **Find the K_{eq}.**

4. $H_{2\ (g)} + I_{2\ (g)} \rightleftarrows 2\ HI_{\ (g)}$

   a. 0.80 moles of hydrogen and 1.65 moles of iodine in a 4.0 litre flask. At equilibrium, you discover that there are 1.40 moles of HI present.
   Calculate the Keq for this reaction.

   b. Assume the same temperature and pressure conditions as 4a above. If the same rxn was observed with different initial concentrations and the equilibrium concentrations of $[H_2]$ was found to be 0.20M and the [HI] to be 1.80M at equilibrium.
   Determine the equilibrium concentration of iodine (I_2).