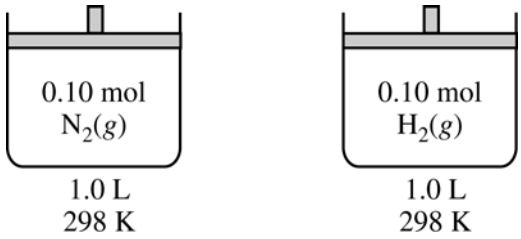

6. Consider two containers of volume 1.0 L at 298 K, as shown above. One container holds 0.10 mol $N_2(g)$ and the other holds 0.10 mol $H_2(g)$. The average kinetic energy of the $N_2(g)$ molecules is 6.2×10^{-21} J. Assume that the $N_2(g)$ and the $H_2(g)$ exhibit ideal behavior.

   (a) Is the pressure in the container holding the $H_2(g)$ less than, greater than, or equal to the pressure in the container holding the $N_2(g)$? Justify your answer.

   (b) What is the average kinetic energy of the $H_2(g)$ molecules?

   (c) The molecules of which gas, N_2 or H_2, have the greater average speed? Justify your answer.

   (d) What change could be made that would decrease the average kinetic energy of the $N_2(g)$ molecules in the container?

   (e) If the volume of the container holding the $H_2(g)$ was decreased to 0.50 L at 298 K, what would be the change in each of the following variables? In each case, justify your answer.

      (i) The pressure within the container

      (ii) The average speed of the $H_2(g)$ molecules