1. The fundamental vibrational frequencies for the hydrogen, $^{1}H_2$, and deuterium, $^{2}H_2$, molecules are 4401 and 3115 cm^{-1}, respectively. The depth of the potential energy well describing the ground electronic state for both of these molecules is identical, $D_e = 7.677 \times 10^{-19}$ J. Using this information, calculate the bond dissociation energy for both molecules. Make a drawing showing how D_e and the zero point energy can be used to estimate the bond energy.

b) Which molecule has the weaker bond?

c) Which bond has the highest force constant?