Quiz 11.1 – Molecular Spectroscopy

Name: _____

Lineshapes

Find the doppler broadening width (in cm^{-1}) for two gas samples, with $v_{avg} = 425\ ^{m}/_{s}$ and $v_{avg} = 1650\ ^{m}/_{s}$

An O_2 gas molecule at standard temperature and pressure will undergo a collision about every $100\ ps$. Find the lifetime broadening width (in cm^{-1}), assuming that the excited state lifetime is limited by molecular collisions.

An O_2 gas molecule under very low pressures (say, within a nebular cloud in space) may undergo a collision about every $5\ s$. Find the lifetime broadening width (in cm^{-1}), assuming that the excited state lifetime is limited by molecular collisions.