Name:

Homework for Lecture 3

Consider an atom diffuses in a 3D simple cubic lattice by a random walk mechanism. The atom jumps $4x10^{-5}$ times per second at 300K and $2x10^{4}$ times per second at 600K. Assuming that the vibrational frequency (ν) of the atom keeps constant for all the temperatures considered.

1). (15 points) At what temperature will the jumping be increased to 1.6×10^{7} times per second?

2). (15 points) Considering the distance (r) that the atom can move away from its original position in 1 minute at two different temperatures, 300 K and 1200 K, what is the ratio of "r" at 1200K to that at 300K?