CHEM 455 Quiz 1 (Equal to one HW grade) Mon. May 16, 2005

Your Name: Key SID: _____

Sign Again if you want your graded quiz left in the hallway: _____

I have neither given nor received assistance of any kind on this quiz: _____

Circle the correct answer:

1) A detailed study of the infrared spectrum of a diatomic molecule can lead directly to all of the following pieces of information EXCEPT the:

(A) translational energy of the molecule

+3 (B) force constant of the bond

(C) relative distribution of molecules among the allowed rotational levels

(D) average bond distance

(E) relative isotopic abundance

2) In comparison with HCl, the frequency for the transition of DCl from the ground vibrational state to the first excited vibrational state is:

(A) higher for DCl

(B) lower for DCl

+3 (C) sometimes higher and sometimes lower for DCl, depending on the temperature and the concentration

(D) the same for both DCl and HCl

(E) not determinable

3) What is the wavelength of electrons with a mass of 9.1×10^{-31} kilogram and a speed of 1.0×10^{6} meters per second (Planck's constant = 6.62×10^{-34} J · s; speed of light = 2.99×10^{8} m/s)

+4 $\lambda = \frac{h}{p} = \frac{6.62 \times 10^{-34}\ J\text{-}s}{9.1 \times 10^{-31}\ kg \times 1 \times 10^{6}\ m/s} = 7.3 \times 10^{-10}\ m$

Wavelength:
7.3 Å