

Quiz #2
Name _____

Week: Sept. 5 -Sept. 7
Chemistry 331

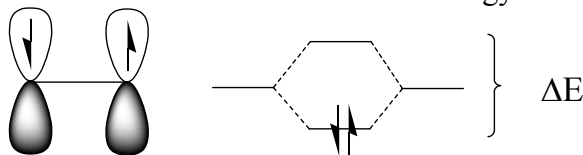
Equations:

$$\mu = \frac{m_1 m_2}{m_1 + m_2}, \quad \nu = \frac{1}{2\pi} \sqrt{\frac{k}{\mu}}, \quad E = \frac{h^2 n^2}{8mL^2}$$

1. The vibrational frequency of O_2 is approximately 1580 cm^{-1} . Estimate the vibrational frequency of $^{18}\text{O}_2$.

Frequency in cm^{-1} = _____.

2. Treat the p-electrons of the molecule ethylene as a particle in a box. Assume that the box is $L = 3 \text{ \AA}$. There are two p-electrons as shown in the figure below. Using the particle-in-a-box model calculate the energy difference ΔE .



Transition Energy in Joules = _____.

Transition Energy in cm^{-1} = _____.

