Chemistry 141 - 4080 Name .

Dr. Cary Willard

Quiz 7A (20 points) October 11, 2007

c = λν = 3.00 x 108 m/sec, E = hν, h = 6.626 x 10-34 J sec

1. (9 points) The energy of electromagnetic radiation from light can be used to break chemical bonds. If 941 kJ/mol are required to break N≡N bonds.
   1. What is the energy to break one N≡N bond?
   2. What is the frequency of this radiation?
   3. What is the wavelength of this radiation in nm?
2. (6 points) Given a single electron atom with the following energy levels, determine the E for a transition from
   1. n=4 to n=2

— n = 6, −1 Joules

— n = 5, −2 Joules

— n = 4, −6 Joules

— n = 3, −12 Joules

— n = 2, −21 Joules

— n = 1, −35 Joules

* 1. n=3 to n=5

1. (2.5 points) What are some properties of light that make us believe it has some particle nature?
2. (2.5 points) What are some properties of electrons that make us believe they have some wave nature?

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Quiz 7B (20 points) October 11, 2007

c = λν = 3.00 x 108 m/sec, E = hν, h = 6.626 x 10-34 J sec

1. (9 points) The energy of electromagnetic radiation from light can be used to break chemical bonds. If 495 kJ/mol are required to break O=O bonds.
   1. What is the energy to break one O=O bond?
   2. What is the frequency of this radiation?
   3. What is the wavelength of this radiation in nm?
2. (6 points) Given a single electron atom with the following energy levels, determine the E for a transition from
   1. n=5 to n=2

— n = 6, −1 Joules

— n = 5, −2 Joules

— n = 4, −6 Joules

— n = 3, −12 Joules

— n = 2, −21 Joules

— n = 1, −35 Joules

* 1. n=4 to n=5

1. (2.5 points) What are some properties of light that make us believe it has some particle nature?
2. (2.5 points) What are some properties of electrons that make us believe they have some wave nature?