Chemistry 141 Name

Dr. Cary Willard

Quiz 6A (20 points) April 8, 2013

Data: E = nhν, c=νλ, c=3.00 x 108 m/sec, h = 6.626 x 10−34 J sec

1. (11 points) A carbon-oxygen double bond in a certain organic molecule absorbs radiation that has a frequency of 6.04 x 1015 /sec
   1. What is the wavelength of this electromagnetic radiation in nanometers?
   2. What is the energy of one photon of this electromagnetic radiation?
   3. How much energy in kJ would be absorbed by 0.75 mol of this molecule? (Each molecule contains only one double bond.)
   4. A carbon oxygen bond in a different molecule absorbs radiation with a frequency equal to 5.4 x 1017 /sec. Is this radiation more or less energetic?
2. (3 points) What is the physical significance of the value of ψ2 at a particular point in an atomic orbital?
3. (3 points) Scientists use emission spectra to confirm the presence of an element in materials of unknown composition. Why is this possible?
4. (3 points) Explain using quantum why there are no 3f orbitals.

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Quiz 6B (20 points) April 8, 2013

Data: E = nhν, c=νλ, c=3.00 x 108 m/sec, h = 6.626 x 10−34 J sec

1. (11 points) A carbon-oxygen double bond in a certain organic molecule absorbs radiation that has a frequency of 8.04 x 1015 /sec
   1. What is the wavelength of this electromagnetic radiation in nanometers?
   2. What is the energy of one photon of this electromagnetic radiation?
   3. How much energy in kJ would be absorbed by 0.75 mol of this molecule? (Each molecule contains only one double bond.)
   4. A carbon oxygen bond in a different molecule absorbs radiation with a frequency equal to 5.4 x 1013 /sec. Is this radiation more or less energetic?
2. (3 points) What is the physical significance of the value of ψ2 at a particular point in an atomic orbital?
3. (3 points) Scientists use emission spectra to confirm the presence of an element in materials of unknown composition. Why is this possible?
4. (3 points) Explain using quantum why there are no 3f orbitals.