CHAPTER 7 HOMEWORK

CHM 1045 FALL 2013

NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE\_\_\_\_\_\_\_\_\_\_\_\_

1. Light with a wavelength of 478 nm lies in the blue region of the visible spectrum. Calculate the frequency of this light. (c = 3.00 x 108 m/s)

2. Explain why each of the following sets of quantum numbers would not be permissible for an electron, according to the rules for quantum numbers.

**a.** *n* = 1, *l* =0, *ml* = 0, *ms*= +1

**b.** *n* = 1, *l* =3, *ml*=+3, *ms* = -1/2

**c.** *n* = 3, *l* = 2, *ml*= +3, *ms* = - 1/2

**d.** *n* = 0, *l* = 1, *ml* = 0, *ms* =+1/2

**e.** *n* = 2, *l* = 1, *ml* = -1, *ms* = +3/2

3. Name each of the quantum numbers for an atomic orbital, define its meaning explain its allowed values.

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| 4. | Which type of electromagnetic radiation has the longest wavelength? | |
| A) | gamma rays |
| B) | x rays |
| C) | blue light |
| D) | red light |
| E) | microwaves |

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| 5. | What is the wavelength of light emitted when the electron in a hydrogen atom undergoes a transition from level *n* = 9 to level *n* = 2?  (*c* = 3.00  m/s, *h* = 6.63 10-34 J s), *RH* = 2.179 × 10-18 J) | |
| A) |  |
| B) |  |
| C) |  |
| D) |  |
| E) |  |

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| 6. | What is the wavelength of an electron traveling at 7.03% of the speed of light?  (*me* = 9.109 10-31 kg, *c* = 3.00  m/s, *h* = 6.63 10-34 J s) | |
| A) |  |
| B) |  |
| C) |  |
| D) |  |
| E) |  |