CH 221
Sample Quiz #3 Name: _____ Lab Section: _____

Be sure to show all work, use the correct number of significant figures, circle final answers and use correct units in all problems.

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1. **Circle** the color of light with the lowest energy: (1 point)

   orange blue red green yellow

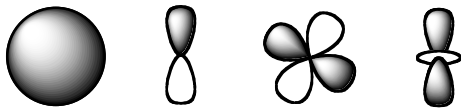
2. **Circle** the color of light with the smallest frequency: (1 point)

   orange blue red green yellow

3. Match the names on the left with their scientific discovery on the right: (1 point each)

Einstein	_____	a) received Nobel Prize for the photoelectric effect
Planck	_____	b) light is quantized; radiant energy consists of packets called photons
Schrödinger	_____	c) worked for Nazi Germany, the uncertainty principle
Heisenberg	_____	d) developed quantum mechanics
de Broglie	_____	e) 7 page thesis, particles as waves

4. Use the diagram below to answer the following questions: (2 points)



I II III IV

   The number that corresponds to a *p* orbital is: _____

   The number that corresponds to an orbital with no planar nodes is: _____

5. Use the information below to answer the following questions. (2 points) *Use 1s, 2p, 3d, etc. for your answers.*

   What type of orbital is designated $n = 2, l = 0, m_l = 0$? _____

   What type of orbital is designated $n = 4, l = 1, m_l = -1$? _____

6. If the de Broglie wavelength of an electron is 112 nm, what is its velocity in m/s? The mass of an electron is $9.11*10^{-31}$ kg. (5 points) *(Note to physics fans: no relativity in this problem!)*

7. If an FM radio station operates at a frequency of 92.3 megahertz (MHz, or 92.3 x 10^6 Hz), calculate the **wavelength** of its signal in meters and the **energy** of one photon in Joules. (4 points) (+1 bonus if you can name the Portland-area radio station using this information! ☺)

CH 221
Sample Quiz #6 Name: _____ Lab Section: _____
Answers

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1. **Circle** the color of light with the lowest energy: (1 point)

   red

2. **Circle** the color of light with the smallest frequency: (1 point)

   red

3. Match the names on the left with their scientific discovery on the right: (1 point each)

   a

   b

   d

   c

   e

4. Use the diagram below to answer the following questions: (2 points)

   II

   I

5. Use the information below to answer the following questions. (2 points) *Use 1s, 2p, 3d, etc. for your answers.*

   What type of orbital is designated $n = 2, l = 0, m_l = 0$? **2s**

   What type of orbital is designated $n = 4, l = 1, m_l = -1$? **4p**

6. If the de Broglie wavelength of an electron is 112 nm, what is its velocity in m/s? The mass of an electron is $9.11*10^{-31}$ kg. (5 points) *(Note to physics fans: no relativity in this problem!)*

   6490 m/s

7. If an FM radio station operates at a frequency of 92.3 megahertz (MHz, or 92.3×10^6 Hz), calculate the **wavelength** of its signal in meters and the **energy** of one photon in Joules. (4 points) (+1 bonus if you can name the Portland-area radio station using this information! ☺)

   3.25 m
   6.12×10^{-26} J