Name:_____
CHM 115 Quiz #5

1) (1 pt) Circle the appropriate word:
If blue light is higher frequency than red light, then a red photon has MORE/***LESS*** energy than a blue photon.

2) (1 pt) Circle the correct equation:

$c = \nu / \lambda$ $\quad$ $\boldsymbol{\nu = c / \lambda}$ $\quad$ $\lambda = \nu / c$ $\quad$ $\nu = \lambda / c$

3) (2 pts) There were three experimental phenomenon whose results could not be explained by the wave theory of light and led to the development of quantum mechanics. Name two of them:

_____Photoelectric Effect_____

_____Blackbody Radiation_____

4) (2 pts) Given that the energy released when en electron jumps between energy levels is given by:

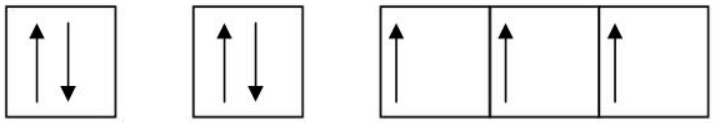
$$\Delta E = -(R_H)\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$$

Which of the following two transitions would release more energy (show calculation for full credit): from n = 3 to n = 2, or from n = 4 to n = 3?

$\Delta E = -R_H\,(1/4 - 1/9) = -0.139\,R_H$ larger energy released compared to
$\Delta E = -R_H\,(1/9\text{-}1/16) = -0.0486\,R_H$

5) (2pts) Fill in the orbital diagram for an atom of nitrogen and label the orbital boxes:

Fill in electrons →
&
Label the boxes →



6) (2 pts) Write the electronic configuration (i.e. He: $1s^2$) for an atom of oxygen

O: $1s^2\ 2s^2\ 2p^4$

Bonus: (1pt) What's the 3rd experiment that the wave theory of light couldn't explain:
Hydrogen emission line spectra

Name:_____
CHM 115 Quiz #5

1) (1 pt) Circle the appropriate word:
If blue light is higher frequency than red light, then a blue photon has ***MORE***/LESS energy than a red photon.

2) (1 pt) Circle the correct equation:

c = ν/ λ λ = ν / c ***ν = c / λ*** ν = λ / c

3) (2 pts) Given that the energy released when en electron jumps between energy levels is given by:

$$\Delta E = -(R_H)\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$$

Which of the following two transitions would release more energy (show calculation for full credit): from n = 3 to n = 2, or from n = 4 to n = 3?

$\Delta E = -R_H\,(1/4 - 1/9) = -0.139\,R_H$ larger energy released compared to
$\Delta E = -R_H\,(1/9\text{-}1/16) = -0.0486\,R_H$

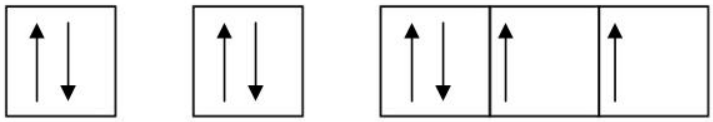
4) (2 pts) There were three experimental phenomenon whose results could not be explained by the wave theory of light. Name two of them:

___*Photoelectric Effect*_____

___*Blackbody Radiation*_____

5) (2pts) Fill in the orbital diagram for an atom of oxygen and label the orbital boxes:

Fill in electrons →
&
Label the boxes →



1s 2s 2p

6) (2 pts) Write the electronic configuration (i.e. He: $1s^2$) for an atom of nitrogen

N: $1s^2\ 2s^2\ 2p^3$

Bonus: (1pt) What's the 3rd experiment that the wave theory of light couldn't explain:
Hydrogen emission line spectra