Packet 7B

1. What is the wavelength of light that is emitted from a hydrogen atom if the following transitions occur:

a)
$$n = 3 \rightarrow n = 1$$

b) $n = 5 \rightarrow n = 2$
c) $n = \infty \rightarrow n = 1$

2. What wavelength of light is needed to excite electrons from the ground state to the following excited states:

a)
$$n = 1 \rightarrow n = 5$$

b) $n = 1 \rightarrow n = 9$
c) $n = 1 \rightarrow n = \infty$

3. The work function of titanium is 6.93×10^{-19} J. What is the velocity of the electron that is ejected from the surface of the metal if it absorbs a photon with a $\lambda = 110$ nm?

4. What is the wavelength of an electron moving at 2.00×10^6 m/s?

5. What is the wavelength of a basketball of a mass of 620 g moving at 10 m/s?

6. What is the wavelength of a soccer ball moving at 25.0 m/s? The mass of a soccer ball is 0.45 kg.

7. An electron has a wavelength of 146 nm, what is the velocity of the electron?

8. A BB has a mass of 0.12 g and a wavelength of 3.00×10^{-9} m. What is the velocity of the BB?

9. A neutron has a mass of 1.67×10^{-27} kg and a velocity of 4.00×10^4 m/s. What is the wavelength of the moving neutron?

10. Look up the second ionization energy for Helium and calculate the Rydberg constant for the $\rm He^+$ ion.