**IB Physics**

**27A-G Group Quiz**

Name

**Show your work, and circle your answers and use sig figs to receive full credit.**

**Numerical Questions:**

1. What is the wavelength of a 3.40 GHz light wave?

2. What is the frequency of a light wave with a wavelength of 570. nm?

3. What is 13.6 eV in J?

4. What is 1.56x10-18 J in eV?

5. What is the wavelength of a 7.40 eV photon?

6. What is the energy of a 108 nm photon in eV? in J?

7. The range of human eyesight (the visible spectrum) is 380 nm (violet) to 740 nm (red). What are those energies in eV?

8) 312 nm light ejects photo-electrons from a metal with a work function of 2.56 eV. What is the stopping potential of the photo-electrons?

9) Light ejects photo-electrons with a stopping potential of 4.12 V from a metal with a work function of 2.10 eV. What is the wavelength of the light?

10) 117. nm light ejects photo-electrons that have a stopping potential of 3.56 V from a metal. What is the work function of the metal in electron volts?

**Conceptual Questions:**

27B: How did Max Planck’s interpretation of the energies of particles in their random thermal oscillations differ from a classical view? Initially, did he think that this was real, or was it in his opinion, a mathematical trick?

27C: How did Einstein’s photon theory come from Planck’s quantum theory, and how was it different from the prevailing wave theory of light?

27D: How do the photon and wave theory of light differ in explaining bright vs. dim light?

27D: How do photon and wave theory differ in explaining color?

27D1: List the four common photon interactions with matter. For each one, tell what it is (What happens) and also why it is something that a wave just wouldn’t do.

27E: What is the photoelectric effect? Why do the photoelectrons not have all the same KE? How did Einstein propose to measure the kinetic energies of photoelectrons?

27E: The photon and wave theories of light have different predictions about whether brightness or wavelength affects the energy of the ejected photoelectrons. What are they and why are they that way?