Physics 100
Laser Module

Homework #3

Remember that you can consult with each other on how to approach problems, but that you should write up solutions on your own. *Please write explanations in **<u>words</u>** for your solutions - do not just write equations and numbers.*

1. Suppose that a discharge tube of hydrogen gas at low pressure is excited by a high voltage. There are then 10^{12} transitions per second from the n = 3 to the n = 2 state
    a. Find the energy, wavelength and color of the emitted radiation.
    b. If this light could be collected with 50% efficiency and focused down onto a 1 mm^2 area, find the intensity of the light at the focus.
    c. What energy and average pulse power would a 1 nsec (10^{-9} s) pulse of this light need to have to be equal to the total energy delivered by the continuous beam of part b in 1 minute.