NAME:	Quiz #11a: Phys270

1. [10 pts] A proton's energy is 1.5 MeV below the top of a 15-fm-wide energy barrier. What is the probability that the proton will tunnel through the barrier?

NAME:	Quiz #11b: Phys270

1. [10 pts] An electron is confined in a harmonic potential well that has a spring constant of 1.5 N/m.

a. [7 pts] What are the first two energy levels of the electron?

b. [3 pts] What wavelength photon is emitted if the electron undergoes a transition from the n=2 to n=1 state?

NAME:	Quiz #11c: Phys270

1. [10 pts] An electrical discharge in a neon-filled tube maintains a steady population of  $1.0 \ge 10^8$  atoms in an excited state with a lifetime of  $\tau$ =30 ns. How many photons are emitted per second from atoms in this state?

NAME:	Quiz #11d: Phys270

[10 pts] Consider a hydrogen atom in an orbital anglular momentum state of *l*=3.
a. [5 pts] What is the minimum angle between *L* and the z-axis?

b. [5 pts] What is the maximum angle between  $\vec{L}$  and the z-axis?