Q. M. H.W. # 8

Griffiths: 11.14, 11.16 (a), (b)

Liboff:

13.45 A hydrogen atom in the ground state is placed in a uniform electric field in the z direction,

$$\mathcal{E} = \mathcal{E}_0 e^{-t/\tau} \quad \leftarrow \mathcal{E} = \mathcal{E}_0 e^{-t/\tau}$$

which is turned on at $t = 0$. What is the probability that the atom is excited to the $2P$ state at $t \gg \tau$? $\leftarrow t >> \tau$

Ohanian:

22. Suppose that a hydrogen atom, initially in the ground state, is placed in an oscillating electric field $\mathcal{E}_0 \cos \omega t$ in the z direction, with $\hbar\omega \gg$ 13.6 eV. Calculate the rate of transitions to the continuum,

Assume that the electrons are ejected in the z-direction and that the rate of emission into other directions is equivalent to this.

Also this one:

Suppose "white" light with a constant energy density $u(\omega) = u_0$ is shined on a Hydrogen atom in its ground state. What is the total rate of transitions that the atom will make to higher $n=2$ states due to the light?