

**Physics 425, Spring 2012**

Assignment set #8

Due February 29:

18. Griffiths 9.29

Due March 2:

19. Consider a wave guide with a rectangular cross section of 10cm x 5cm. Which TE modes can propagate for angular frequency  $4\pi$  GHz? What are the 5 lowest cutoff frequencies for TE modes, and their corresponding mode numbers?

20. Consider a wave guide with a rectangular cross section made of four conducting walls at  $x = 0$ ,  $x = a$ ,  $y = 0$ , and  $y = b$ . For the TE (0, 1) mode (i.e.,  $m = 0$ ,  $n = 1$ ), find the surface charge density and surface current density at the four walls. At a given time ( $t = 0$ ), how are they distributed?

Due March 5:

Reading assignments: Chapter 10.1, 10.2.1 (potentials, Lorentz Gauge, retarded potentials)