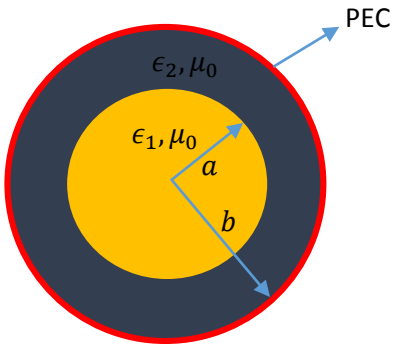
HW 4

1)



Consider the circular waveguide given in the figure. The borders are made of PEC. Derive the dispersion relation for LSE and LSM modes by using:

- Vector potential method
- Transverse resonance technique

2) In question 1, assume $a = 5\ cm, b = 10\ cm, \epsilon_1 = 2\epsilon_0, \epsilon_1 = 3\epsilon_0$ and then plot $\omega - \beta$ diagram:
   - Using matlab
   - Using HFSS or CST

   Then compare the results by plotting them into the same figure.

   .