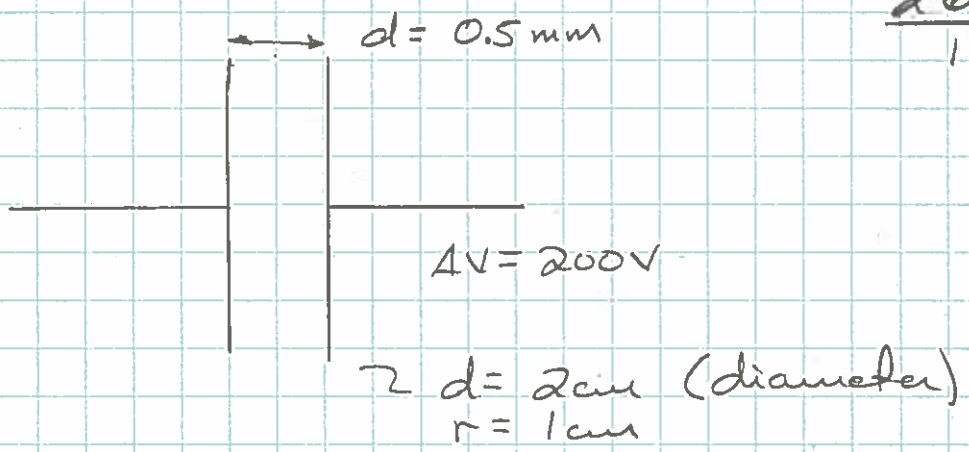

$$C = \frac{\varepsilon_0 A}{d} = \frac{\varepsilon_0 \pi r^2}{d} = 5.561 \times 10^{-12}\ F$$

a.) Stored energy, $U_c = \frac{1}{2} C (\Delta V)^2 = 1.112 \times 10^{-7}\ J.$

b.) Energy Density:

$$u = \frac{U_c}{\text{Volume}} = \frac{U_c}{d A} = \frac{U_c}{d \pi r^2} = 0.708\ \frac{J}{m^3}$$