

Your name: _____ ID: _____

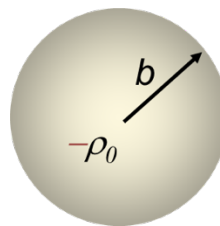
Nov. 2nd, 2020

EE214000 Electromagnetics, Fall, 2020

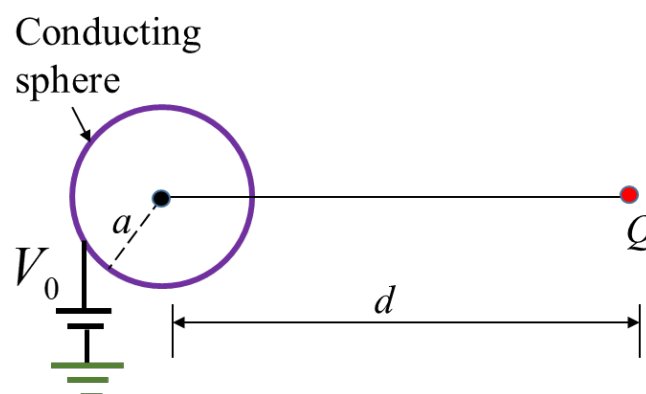
Quiz #9-1, Open books, notes (30 points), due 11 pm, Wednesday, Nov. 4th, 2020
(請上傳至 iLMS 作業區)

Late submission won't be accepted!

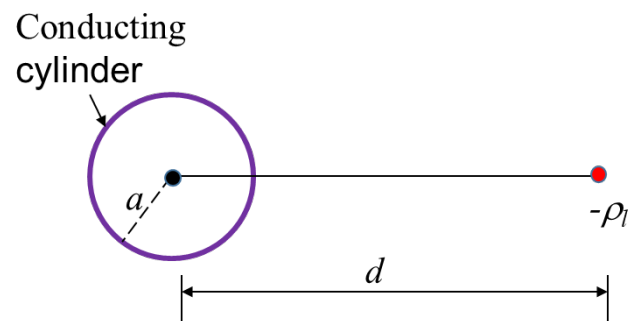
1. Continue the charge ball calculation in the lecture to determine the electric potential and electric field outside the ball ($R > b$). Verify the results by using the Gauss-law calculations. (9 points)



2. A conducting sphere of radius a is maintained at a constant voltage of V_0 . A point charge of Q is placed at a distance d from the center of the conducting sphere, where $d > a$. Find out the locations and values of the image charges that can replace the spherical boundaries. (8 points) What is the total charge induced on the surface of the sphere? (4 points)



3. An infinitely long conducting cylinder of radius of a is installed in parallel with an infinitely long wire with a line charge density of $-\rho_l$, as shown below. The separation of the two objects is d .



- (a) What is the electric potential on the conduction cylinder? (3 points)
- (b) What is the capacitance per unit length of this signal line? (3 points)
- (c) What is the total surface charge per unit length along the longitudinal direction induced on the conducting cylinder? (3 points)