

Series 2

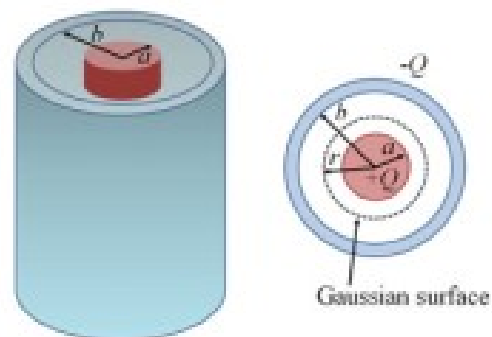
Exercise 1:

A conducting sphere of radius R carries a net positive charge $2Q$. A conducting spherical shell of inner radius R_1 ($R_1 > R$) and outer radius R_2 carries a net negative charge $-Q$. This shell is concentric with the conducting sphere.

- a- Determine the distribution of the electric charges on conductors (conducting spherical and conducting spherical shell) .
- b- Determine the electric field strength and electric potential in all regions.

Exercise 2:

Consider a solid cylindrical shape conductor with radius a and charge Q , which is coaxial with a cylindrical shell of negligible thickness, radius $b > a$, and opposite charge $-Q$, as shown in Fig. Find the capacitance of this cylindrical capacitor if its length is ℓ .



Exercise 3:

Consider the electric circuit of four capacitors $C_1 = 1.0 \text{ pF}$, $C_2 = 0.5 \text{ pF}$, $C_3 = 1.5 \text{ pF}$ and $C_4 = 2.0 \text{ pF}$ connected to a battery of $\Delta V = 2.0 \text{ V}$, as shown in Fig.

- Calculate the charge stored in each capacitor and the voltage across capacitors.

