

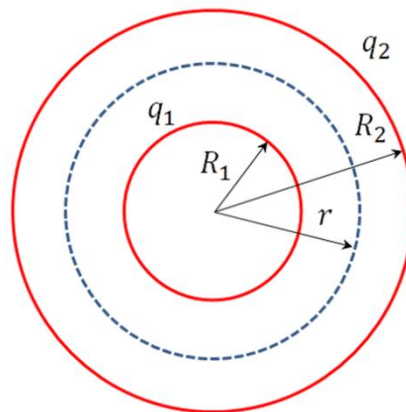
### Answer on Question #73800, Physics / Electromagnetism

**Question.** Two concentric thin metallic spheres having radii  $30\text{ cm}$  and  $20\text{ cm}$  carry  $10\text{ }\mu\text{C}$  and  $5\text{ }\mu\text{C}$ , charges respectively. Calculate the electric potential at a distance of  $25\text{ cm}$  from the centre of the spheres.

**Given.**  $R_1 = 20\text{ cm} = 0.2\text{ m}$ ;  $R_2 = 30\text{ cm} = 0.3\text{ m}$ ;  $r = 25\text{ cm} = 0.25\text{ m}$ ;  $q_1 = 5\text{ }\mu\text{C} = 5 \cdot 10^{-6}\text{ C}$ ;  $q_2 = 10\text{ }\mu\text{C} = 10 \cdot 10^{-6}\text{ C}$ .

**Find.**  $\varphi$ —?

**Solution.**



The electric potential at a distance of  $r = 25\text{ cm}$  from the centre of the spheres

$$\begin{aligned}\varphi &= \varphi_1 + \varphi_2 = \frac{1}{4\pi\epsilon_0} \frac{q_1}{r} + \frac{1}{4\pi\epsilon_0} \frac{q_2}{R_2} = \frac{1}{4\pi\epsilon_0} \left( \frac{q_1}{r} + \frac{q_2}{R_2} \right) = \\ &= \frac{1}{4 \cdot 3.14 \cdot 8.85 \cdot 10^{-12}} \left( \frac{5 \cdot 10^{-6}}{0.25} + \frac{10 \cdot 10^{-6}}{0.3} \right) = 480 \cdot 10^3\text{ V} = 480\text{ kV}.\end{aligned}$$

**Answer.**  $\varphi = 480\text{ kV}$ .

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