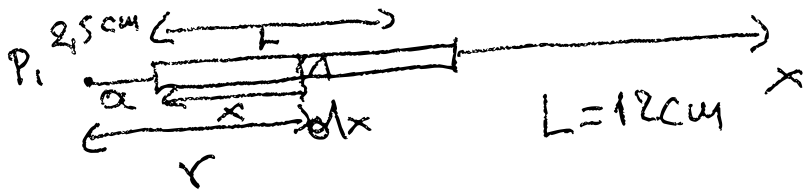


30.24. GEJ114 H.



$$dq = \frac{Q}{L} \cdot dx \quad r = L + a - x$$

$$dV = \frac{1}{4\pi\epsilon_0} \cdot \frac{dq}{r} \Rightarrow dV = \frac{1}{4\pi\epsilon_0} \frac{\frac{Q}{L} dx}{L + a - x} \Rightarrow$$

$$\Rightarrow dV = \frac{Q}{4\pi\epsilon_0 \cdot L} \cdot \frac{dx}{L + a - x}$$

$$V_{P_1} = \frac{Q}{4\pi\epsilon_0 L} \cdot \int_0^L \frac{dx}{L + a - x} \Rightarrow$$

$$\Rightarrow V_{P_1} = \frac{Q}{4\pi\epsilon_0 L} \left[-\ln(L + a - x) \right]_0^L \Rightarrow$$

$$V_{P_1} = \frac{Q}{4\pi\epsilon_0 L} \left[-\ln(L + a + L) + \ln(L + a) \right] \Rightarrow$$

$$V_{P_1} = \frac{Q}{4\pi\epsilon_0 L} \ln \left[1 + \frac{L}{a} \right] \Rightarrow$$

$$V_{P_1} = \frac{56,1 \times 10^{-15} \cdot 8,99 \cdot 10^9}{0,12} \cdot \ln \left[1 + \frac{0,12}{0,025} \right] = 7,38 \times 10^{-3} \text{ V}$$