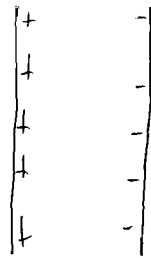


①

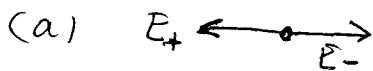


$$\sigma_+ = +6.8 \mu\text{C}/\text{m}^2$$

$$E_+ = \frac{\sigma_+}{2\epsilon_0} = \frac{6.8 \times 10^{-6} \text{ C}/\text{m}^2}{2(8.85 \times 10^{-12})} = 3.84 \times 10^5 \text{ N/C}$$

$$\sigma_- = -4.3 \mu\text{C}/\text{m}^2$$

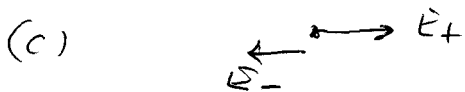
$$|E_-| = \frac{|\sigma_-|}{2\epsilon_0} = 2.43 \times 10^5 \text{ N/C}$$



$$\text{Net } E = E_+ - E_- = 1.4 \times 10^5 \text{ N/C to the left.}$$



$$\text{Net } E = E_+ + E_- = 6.3 \times 10^5 \text{ N/C to the right}$$



$$\text{Net } E = E_+ - E_- = 1.4 \times 10^5 \text{ N/C to the right.}$$

② for long rod $E = \frac{1}{4\pi\epsilon_0} \frac{2\lambda}{r}$



$$E_1 = \frac{1}{4\pi\epsilon_0} \frac{2\lambda}{d/2} \quad \text{in } +x \text{ direction}$$

$$E_2 = \frac{1}{4\pi\epsilon_0} \frac{2(2\lambda)}{d/2} \quad \text{in } +x \text{ direction}$$

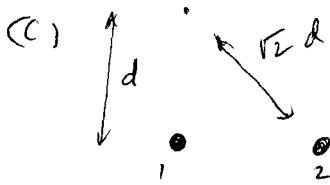
$$E = E_1 + E_2 = \frac{1}{4\pi\epsilon_0} \left(\frac{4\lambda}{d} + \frac{8\lambda}{d} \right) = \frac{12\lambda}{4\pi\epsilon_0 d} \quad \text{in } +x \text{ direction}$$



$$E_1 = \frac{1}{4\pi\epsilon_0} \frac{2\lambda}{2d} \quad +x \text{ dir.}$$

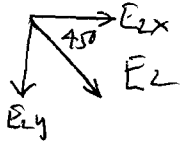
$$E_2 = \frac{1}{4\pi\epsilon_0} \frac{2(2\lambda)}{d} \quad -x \text{ dir.}$$

$$E = E_1 + E_2 = \frac{1}{4\pi\epsilon_0} \left(\frac{\lambda}{d} - \frac{4\lambda}{d} \right) = -\frac{1}{4\pi\epsilon_0} \frac{3\lambda}{d} \quad \underline{-x \text{ dir.}}$$



$$E_1 = \frac{1}{4\pi\epsilon_0} \frac{2\lambda}{d} \quad \text{in } +y \text{ direction}$$

$$E_2 = \frac{1}{4\pi\epsilon_0} \frac{2(2\lambda)}{d\sqrt{2}} \quad \text{toward \#2}$$



$$E_{2x} = E_2 \cos 45^\circ = \frac{1}{4\pi\epsilon_0} \frac{4\lambda}{d\sqrt{2}} \frac{\sqrt{2}}{2} = \frac{1}{4\pi\epsilon_0} \frac{2\lambda}{d}$$

$$E_{2y} = -E_2 \sin 45^\circ = -\frac{1}{4\pi\epsilon_0} \frac{2\lambda}{d}$$

$$E_x = E_{1x} + E_{2x} = \frac{1}{4\pi\epsilon_0} \frac{2\lambda}{d}$$

$$E_y = E_{1y} + E_{2y} = \frac{1}{4\pi\epsilon_0} \frac{2\lambda}{d} - \frac{1}{4\pi\epsilon_0} \frac{2\lambda}{d} = 0$$