Chapter 22 – Suggested problems

2, 8, 15, 24, 28, 30, 43, 61, 62, 65

Solutions of even suggested problems

(2) \( E = 6.16 \text{ N m}^2/\text{C} \)

(8) (a) \( \Phi = 452 \text{ Nm}^2/\text{C} \)
(b) \( \Phi = -881 \text{ Nm}^2/\text{C} \)
(c) \( \Phi = -429 \text{ Nm}^2/\text{C} \)
(d) \( \Phi = 723 \text{ Nm}^2/\text{C} \)
(e) \( \Phi = -158 \text{ Nm}^2/\text{C} \)

(24) \( E = 2.05 \times 10^5 \text{ N/C} \)

(28) (a) \( E = 662 \text{ N/C} \)
(b) \( E = 6.75 \times 10^{-3} \text{ N/C} \)
(c) No difference if sheet would be a conductor. The charge would automatically spread out evenly over both faces, giving it \( \frac{1}{2} \) charge density on either face as in the insulator, but same electric field. Far away both look like points with same charge.

(30) (a) \( 2.82 \times 10^5 \text{ N/C left} \)
(b) \( 3.95 \times 10^5 \text{ N/C left} \)
(c) \( 1.69 \times 10^5 \text{ N/C left} \)

(62) \[
\vec{E}_{\text{off-axis}} = \frac{\rho \vec{r}'}{2\varepsilon_0} = \frac{\rho (\vec{r} - \vec{b})}{2\varepsilon_0}, \quad \vec{E}_{\text{hole}} = \vec{E}_{\text{cylinder}} - \vec{E}_{\text{off-axis}} = \frac{\rho \vec{r}}{2\varepsilon_0} - \frac{\rho (\vec{r} - \vec{b})}{2\varepsilon_0} = \frac{\rho \vec{b}}{2\varepsilon_0}
\]