

53. Let $\Phi_0 = 10^3 \text{ N}\cdot\text{m}^2/\text{C}$. The net flux through the entire surface of the dice is given by

$$\Phi = \sum_{n=1}^6 \Phi_n = \sum_{n=1}^6 (-1)^n n \Phi_0 = \Phi_0(-1 + 2 - 3 + 4 - 5 + 6) = 3\Phi_0 .$$

Thus, the net charge enclosed is

$$q = \varepsilon_0 \Phi = 3\varepsilon_0 \Phi_0 = 3 \left(8.85 \times 10^{-12} \frac{\text{C}^2}{\text{N}\cdot\text{m}^2} \right) (10^3 \text{ N}\cdot\text{m}^2/\text{C}) = 2.66 \times 10^{-8} \text{ C} .$$