

Answer on Question #73119, Physics / Electromagnetism

A disk with a uniform positive surface charge density lies in the x-y plane, centered on the origin. The disk contains $2.5 \times 10^{-6} \text{ C/m}^2$ of charge, and is 7.5 cm in radius. What is the electric field at $z = 15 \text{ cm}$?

Solution:

Used the formula:

$$E = \frac{\delta}{2\epsilon_0} \left(1 - \frac{z}{\sqrt{z^2 + r^2}} \right)$$
$$E = \frac{2.5 \cdot 10^{-6} \text{ C/m}^2}{2 \times 8.85 \cdot 10^{-12} \text{ F/m}} \left(1 - \frac{0.15 \text{ m}}{\sqrt{(0.15 \text{ m})^2 + (0.075 \text{ m})^2}} \right) = 1.5 \cdot 10^4 \text{ N/C}$$

Answer: $1.5 \cdot 10^4 \text{ N/C}$

Answer provided by <https://www.AssignmentExpert.com>