An infinite cylindrical rod has a uniform volume charge density p (where $p > 0$).

The cross section of the rod has a radius r_o.

Find the magnitude of the electric field, E, at a distance, r, from the axis of the rod. Assume that $r < r_o$

$E = \frac{rp}{2\varepsilon_o}$ Answer

If you repeated the calculation for $r = r_o$, you would find that the magnitude of the electric field on the surface of the rod is:

$$E_{surface} = \rho \frac{r_o}{2\varepsilon_o}$$

Rewrite the expression for $E_{surface}$ in terms of λ, the linear charge density of the rod.

Express the answer in terms of λ, r_o, and ε_o. The answer should not contain the variable p.

$E_{surface}$ = _____