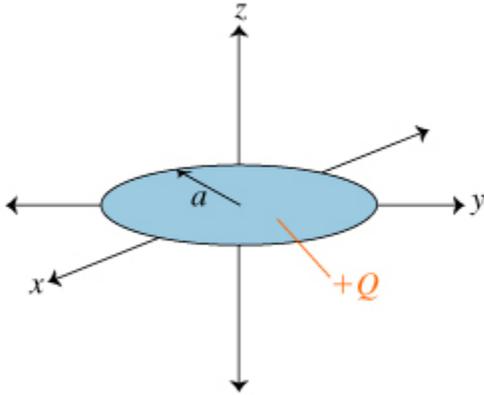


PROBLEM

A disk of radius a has a total charge Q uniformly distributed over its surface. The disk has negligible thickness and lies in the xy plane. Throughout this problem, you may use the variable k in place of $\frac{1}{4\pi\epsilon_0}$.



PART A

What is the electric potential $V(z)$ on the z axis as a function of z , for $z > 0$?

Express your answer in terms of Q , z , and a . You may use k instead of $\frac{1}{4\pi\epsilon_0}$.

ANSWER: $\frac{2kQ}{a^2} \sqrt{z^2 + a^2} - z$

PART B

What is the magnitude E of the electric field on the z axis, as a function of z , for $z > 0$?

Express your answer in terms of some or all of the variables Q , z , and a . You may use k instead of $\frac{1}{4\pi\epsilon_0}$.

ANSWER: $\frac{2kQ}{a^2} \left(1 - \frac{z}{\sqrt{z^2 + a^2}} \right)$