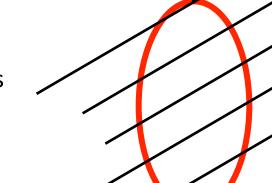
Problem 24.1

A loop of radius .2 meters rotated in an electric field. The maximum electric flux $5x10^5$ N • m^2/C . What is the electric field?



In general, the electric flux is:

$$\Phi_{E} = \vec{E} \bullet \vec{A}$$
$$= EA \cos \theta$$

The flux will be maximum when the cosine is 1, or when the angle between the line of E and the line of the area vector (defined to be perpendicular to the face of the surface, which is to say, normal to the surface) is 0. That is:

$$\Phi_{E} = E \quad A \quad \cos \theta$$

$$(5x10^{5} \text{ N} \bullet \text{m}^{2}/\text{C}) = E(\pi(.2 \text{ m})^{2})\cos 0^{\circ}$$

$$\Rightarrow E = 4.14x10^{6} \text{ N/C}$$