Answer on Question #65024-Physics-Other

An electric field having an intensity of 275 N/C runs directly along the x-axis of a coordinate system. A thin rectangular sheet having a length of 1.00 m and a height of 0.500 m is oriented in various ways to investigate the electric flux. Find the electric flux when: (a) the sheet is parallel to the plane formed by the y and z axes (i.e., the normal to the plane is in the direction of the x axis); (b) the sheet is parallel to the plane formed by the x and y axes; and (c) the normal to the sheet makes a 30° angle relative to the x axis.

Solution

(a)

$$\Phi = EA \cos\theta = EA \cos 0° = EA = Elh = 275(1)(0.5) = 137.5 \frac{Nm^2}{C}.$$

(b)
$$\Phi = EA \cos\theta = EA \cos 90° = 0.$$

(c)

$$\Phi = EA \cos\theta = EA \cos 30° = Elh \cos 30° = 275(1)(0.5) \cos 30° = 119 \frac{Nm^2}{C}.$$