PHYSICS III
Dr. Joenathan – Winter 2000

HOMEWORK V
Chapter 23; 5, 13, 19, 32

23-5.

(a)

$$A = 0.960m^2\,\hat{j};\quad E = E\cos(50.0^0)\,\hat{i} + E\sin(50.0^0)\,\hat{j}$$

$$\Phi_E = E\cdot A = \left(E\sin(50.0^0)\right)(0.960m^2) = 350.N - m^2/C$$

$$\therefore E = \frac{\Phi_E}{A\sin(50.0^0)} = \frac{350.N - m^2/C}{(0.960m^2)\sin(50.0^0)} = 476N/C$$

(b)

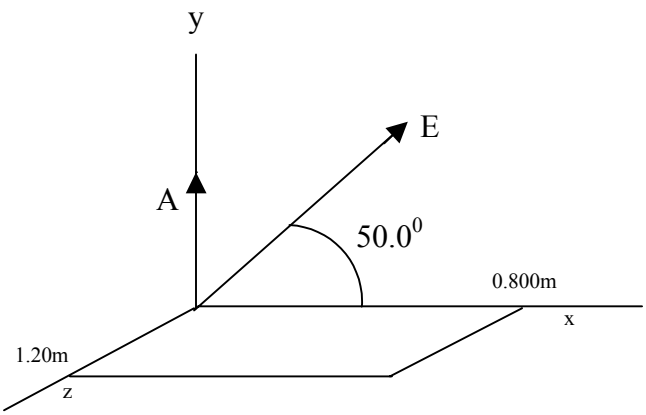
$$\Phi_E = EA\cos\theta$$

$$\cos\theta = \frac{\Phi_E}{EA} = \frac{100.N - m^2/C}{(476N/C)(0.960m^2)} = 0.219$$

$$\theta = 77.4^0$$

This is the angle between $\Phi_E = E$ *and* A *when* $100.\frac{N-m^2}{C}$.

Since the angle between E *and* A *was initially* 40.0^0, *the rectangular surface must be rotated an additional* 37.4^0.



23-13.

(a)

$$E_+ = \frac{\sigma}{2\varepsilon_0}\hat{j}; \quad E_- = \frac{\sigma}{2\varepsilon_0}\hat{j}$$

$$E = E_+ + E_- = \frac{\sigma}{\varepsilon_0}\hat{j}$$

(b)

$$E_+ = \frac{\sigma}{2\varepsilon_0}\hat{j}; \quad E_- = +\frac{\sigma}{2\varepsilon_0}\hat{j}$$

$$E = E_+ + E_- = 0$$