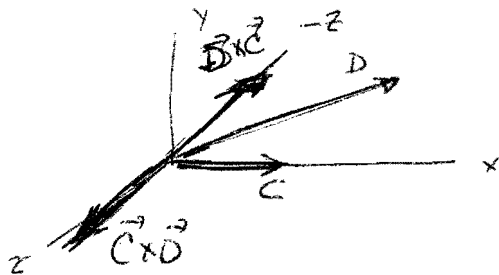17. RQ.30

$$|\vec{C} \times \vec{D}| = |\vec{C}| |\vec{D}| \sin 30° = (3)(15)(0.5) = 7.5$$
in $+z$ direction (by right-hand rule)

$$|\vec{D} \times \vec{C}| = 7.5 \quad \text{in} \quad -z \text{ direction}$$

17. RQ.31

$$|\vec{B}| = \frac{\mu_0}{4\pi} |q| \frac{|\vec{v} \times \hat{r}|}{r^2} = \frac{\mu_0}{4\pi} |q| \frac{v \sin\theta}{r^2}$$

$$= \frac{(10^{-7})(1.6 \times 10^{-19})(4 \times 10^{6})}{(0.05)^2} \sin\theta$$

$$= (2.56 \times 10^{-17}) \sin\theta$$

at P_1 $\theta = 30°$ $B = 1.28 \times 10^{-17} T$ into page
(because q is negative)

P_2 $\theta = 0$ so $B = 0$

P_3 $\theta = 30°$ $B = 1.28 \times 10^{-17} T$ out of page

P_4 $\theta = 150°$ $B = 1.28 \times 10^{-17} T$ out of page

P_5 $\theta = 180°$ $B = 0$

P_6 $\theta = 150°$ $B = 1.28 \times 10^{-17} T$ into page

17.P. 43

(a),(b) $E = \frac{1}{4\pi\epsilon_0}\frac{q}{r^2} = (9\times10^9)\frac{1.6\times10^{-19}}{(5\times10^{-10}m)^2} = 5.8\times10^9 \, N/C$

$\vec{E}$ at A is to the left (toward the electron)

$|\vec{B}| = \frac{\mu_0}{4\pi}|q\frac{\vec{v}\times\hat{r}}{r^2}| = (10^{-7})(1.6\times10^{-19})\frac{(3\times10^8)\sin 60°}{(5\times10^{-10})^2}$

$= 0.17 \, T$

$\vec{B}$ at A is out of the page