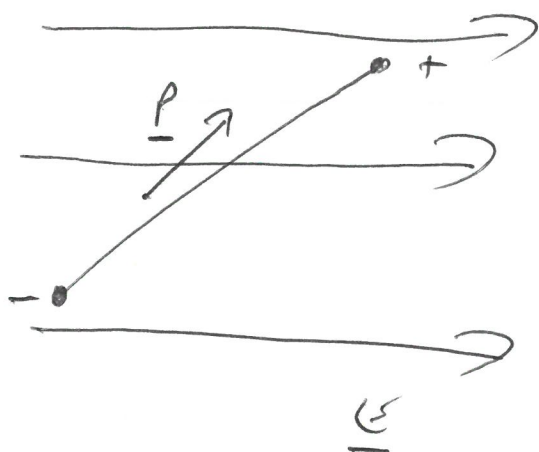


EMI Lec 8

Ex 8-1



$$p = 0.02 \text{ C m} \\ = 0.02 \times 1.6 \times 10^{-19} \times 10^{-9} \text{ C m}$$

$$p = 3.2 \times 10^{-30} \text{ C m}$$

$$E = 3 \times 10^3 \text{ N C}^{-1}$$

$$(a) |\underline{\tau}| = |\underline{p} \wedge \underline{E}| = p E \sin \theta$$

$$= 3.2 \times 10^{-30} \times 3 \times 10^3 \sin 20^\circ$$

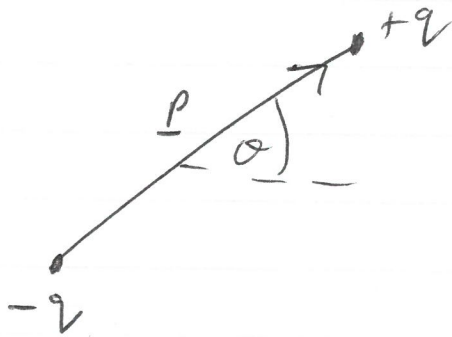
$$= 9.6 \times 10^{-27} \sin 20^\circ \text{ N m}$$

$$(b) \text{ P.E.}, U = -\underline{p} \cdot \underline{E} = -p E \cos \theta$$

$$= -9.6 \times 10^{-27} \cos 20^\circ \text{ J}$$

N.B. C m \rightarrow Coulomb metre.

Ex 8.2



$$\underline{E} = E \underline{i}$$

Q1 $\underline{r} = r \cos \theta \underline{i} + r \sin \theta \underline{j}$

Q2 $\underline{C} = \underline{r} \wedge \underline{E} = \begin{vmatrix} \underline{i} & \underline{j} & \underline{k} \\ r \cos \theta & r \sin \theta & 0 \\ E & 0 & 0 \end{vmatrix}$

$$\underline{C} = \underline{i} ((r \sin \theta \times 0) - 0) - \underline{j} ((r \cos \theta \times 0) - E r \sin \theta) + \underline{k} (r \cos \theta \times 0 - E r \sin \theta)$$

$$\therefore \underline{C} = -r E \sin \theta \underline{k}$$