Problem 4) Find out electric field intensity at point A (0, 1m, 2m) due to a point charge –20μC situated at point B($\sqrt{2}$m, 0, 1m).

Solution:-

$$E = \frac{KQ}{|\vec{r}|^3}\vec{r} = \frac{KQ}{|\vec{r}|^2}\hat{r} \Rightarrow \vec{r} = \text{P.V. of A} - \text{P.V. of B} \quad \text{(P.V. = Position vector)}$$

$$= \left(-\sqrt{2}\hat{i} + \hat{j} + \hat{k}\right) |\vec{r}| = \sqrt{(\sqrt{2})^2 + (1)^2 + (1)^2} = 2$$

$$E = \frac{9 \times 10^9 \times (-20 \times 10^{-6})}{8}\left(-\sqrt{2}\hat{i} + \hat{j} + \hat{k}\right) = -22.5 \times 10^3 \left(-\sqrt{2}\hat{i} + \hat{j} + \hat{k}\right) \text{ N/C.}$$