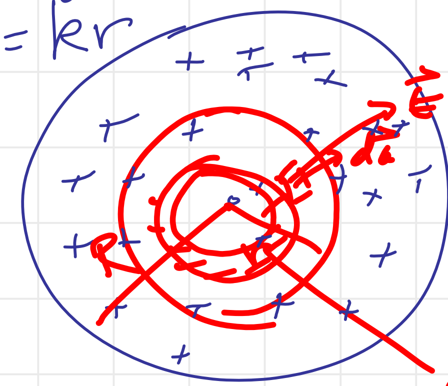
$\rho = kr$ ← constant

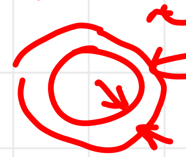
E inside sphere is



(1) $\frac{kr}{\epsilon_0}\hat{r}$ (2) $\frac{k}{4\pi\epsilon_0 r}\hat{r}$

✓ (3) $\frac{k}{4\epsilon_0} r^2 \hat{r}$ (4) none (5) don't know

$\rho\, d\tau = k\bar{r}\, d\tau$, $d\tau = 4\pi r^2 dr$



$$\oint \vec{E}\cdot d\vec{a} = \frac{Q_{encl}}{\epsilon_0}$$

$$\underbrace{\oint |\vec{E}||d\vec{a}|\cos\theta_0}_{\text{tile}} = \oint |\vec{E}||d\vec{a}| = |\vec{E}|\underbrace{\oint |d\vec{a}|}_{4\pi r^2}$$

$$Q_{encl} = \int \rho\, d\tau = \int_0^r k\bar{r}\, 4\pi \bar{r}^2 d\bar{r} = k4\pi \underbrace{\int_0^r \bar{r}^3 d\bar{r}}_{\frac{r^4}{4}}$$

$$|\vec{E}|\, \cancel{4\pi r^2} = \frac{k\cancel{4\pi}}{\epsilon_0}\frac{r^{\cancel{4}\,2}}{4} \Rightarrow E = \frac{k}{\epsilon_0}\frac{r^2}{4}\hat{r}$$

$\vec{\nabla} \times \vec{E}$ is

(1) $\frac{1}{4\pi\epsilon_0}\left[\int \rho\, d\tau\, \vec{\nabla} \times \frac{\hat{\mathscr{r}}}{\mathscr{r}^2} - \int \frac{\hat{\mathscr{r}}}{\mathscr{r}^2} \times \vec{\nabla} \rho\, d\tau\right]$

✓(2) $\frac{1}{4\pi\epsilon_0}\int \rho\, d\tau\, \vec{\nabla} \times \frac{\hat{\mathscr{r}}}{\mathscr{r}^2}$ (3) $\frac{-1}{4\pi\epsilon_0}\int \frac{\hat{\mathscr{r}}}{\mathscr{r}^2} \times \vec{\nabla} \rho\, d\tau$

(4) none (5) don't know

$$\vec{\nabla} \times \vec{F} = \begin{vmatrix} \hat{x} & \hat{y} & \hat{z} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ F_x & F_y & F_z \end{vmatrix}$$