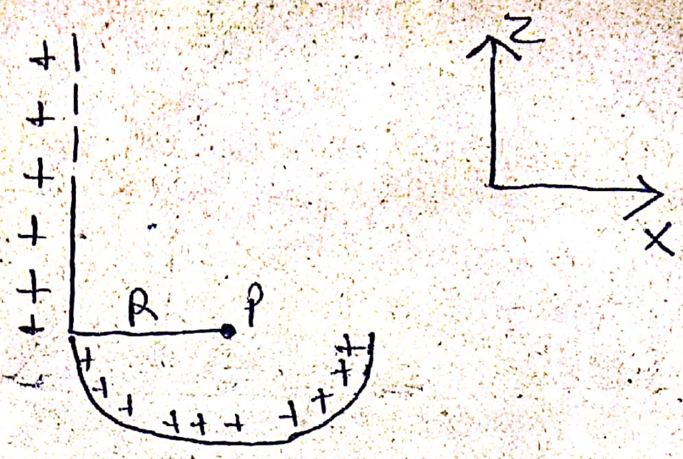
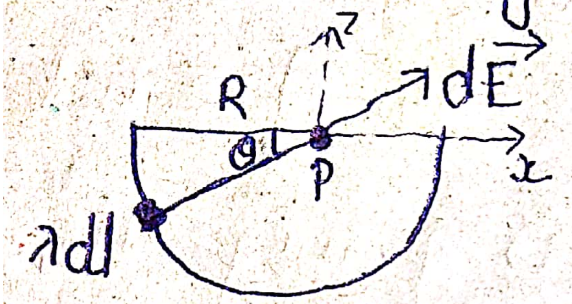



Dividing these problems into two Segment then finding E.F at point 'P' Individually.

E.F at 'P' by Semicircular region.




$$d\vec{E} = dE\cos\theta\,\hat{x} + dE\sin\theta\,\hat{z}.$$

$$dl = r\,d\theta$$

$$dE\cos\theta = \frac{1}{4\pi\epsilon_0}\frac{\lambda dl}{r^2}\cos\theta$$

Total $E_x$, by Integrating we get

$$E_x = \frac{\lambda r}{4\pi\epsilon_0 r^2}\int_0^{\pi}\cos\theta\,d\theta$$

$$\boxed{E_x = 0}$$

Similarly

Net $E_z = \frac{\lambda r}{4\pi\epsilon_0 r^2}\int_0^{\pi} \sin\theta \, d\theta$

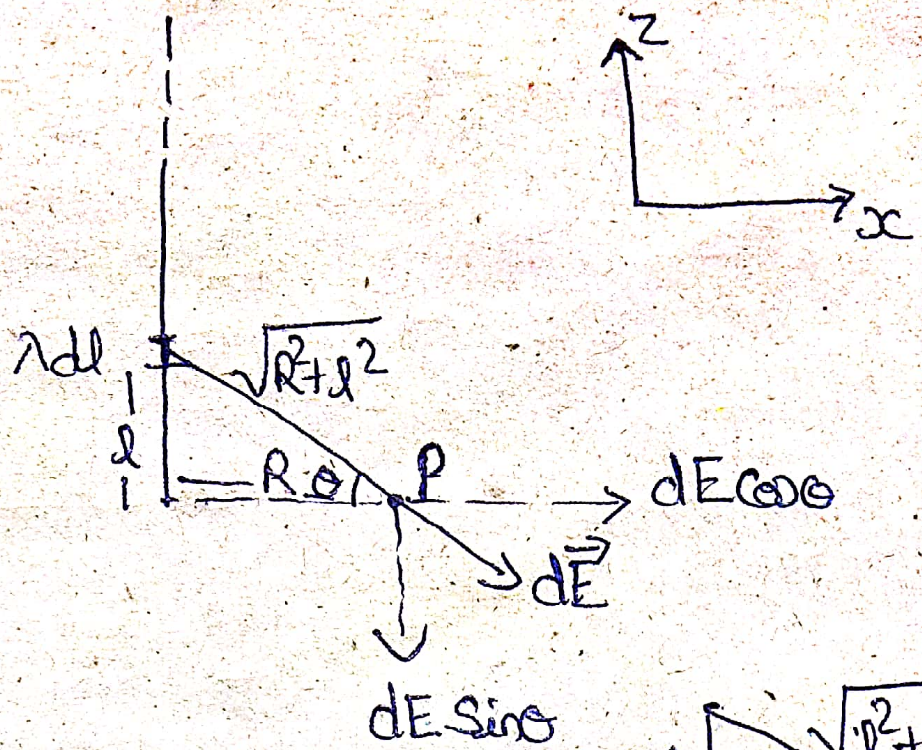
$$\boxed{E_z = \frac{K2\lambda}{r}\hat{z}}$$

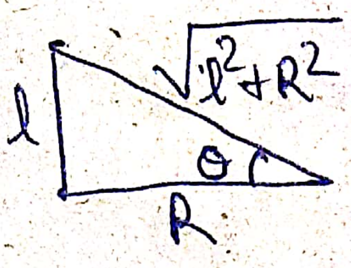
So,

Net E.F by Semicircular wire is

$$\boxed{E_z = \frac{2K\lambda}{r}\hat{z}}$$

Now E.F due to Semi-Infinite wire is




In Z direction

$$E_Z = \frac{1}{4\pi\epsilon_0} \cdot \lambda \int_0^\infty \frac{dl \cdot l}{(l^2+R^2)^{3/2}}$$

Put $l = R\tan\theta$

$$E_z = \frac{K\lambda}{R}(-\hat{z})$$

Similarly

$$E_x = \frac{K\lambda}{R}(\hat{x})$$

Now Net E.F at point P is

(i) $$\vec{E} = \left(\frac{2K\lambda}{R} - \frac{K\lambda}{R}\right)\hat{z} + \frac{K\lambda}{R}\hat{x}$$

$$\boxed{\vec{E} = \frac{K\lambda}{R}\left(\hat{z}+\hat{x}\right)}$$

Option B