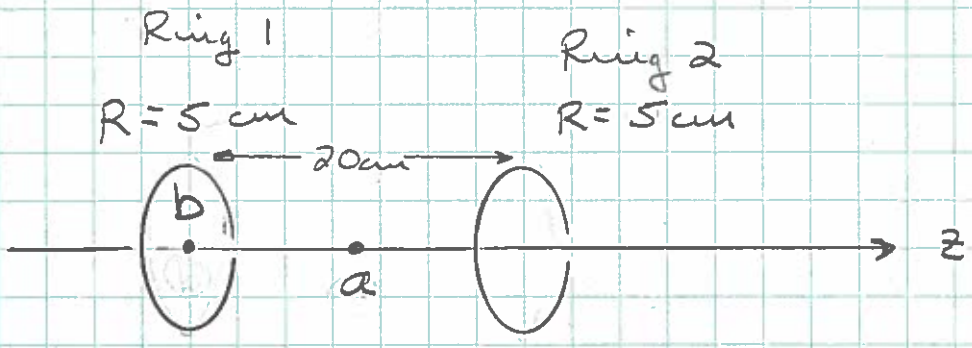

For a charged ring:

$$E_z = \frac{KzQ}{(z^2+R^2)^{3/2}} \quad \text{(field component)}$$

a.) at point a: $z_1 = +10\text{ cm}$

$$E_{z_1} = 1.286\times10^5\ \text{N/C}$$

$$z_2 = -10\text{ cm}$$

$$\Rightarrow E_{z_2} = -1.286\times10^5\ \text{N/C}$$

$$\therefore E_z = E_{z_1} + E_{z_2} = 0$$

b.) at point b:

$$z_1 = 0 \Rightarrow E_{z_1} = 0$$

$$z_2 = -20\text{ cm} \Rightarrow E_{z_2} = -4.104\times10^3\ \text{N/C}$$

$$\therefore E_z = E_{z_1} + E_{z_2} = -4.104\times10^3\ \text{N/C}$$