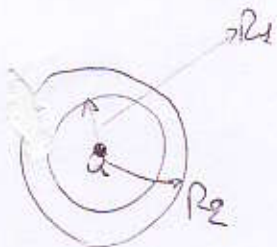


1)



$$0 < r < R_1$$

$$E = \frac{1}{4\pi\epsilon_0} \frac{Q}{r}$$

$$V = \frac{1}{4\pi\epsilon_0} \left(\frac{Q}{r} - \frac{Q}{R_1} + \frac{Q}{R_2} \right)$$

$$R_1 < r < R_2$$

$$E = 0$$

$$V = \frac{1}{4\pi\epsilon_0} \frac{Q}{R_2}$$

$$r > R_2$$

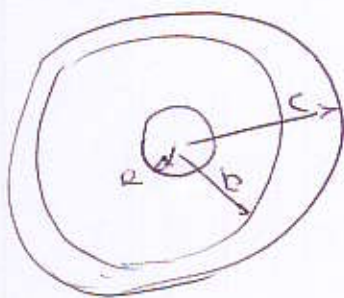
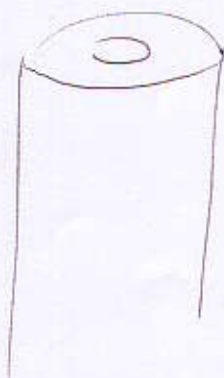
$$E = \frac{1}{4\pi\epsilon_0} \frac{Q}{r}$$

$$V = \frac{1}{4\pi\epsilon_0} \frac{Q}{r}$$

$$V_{R_1} = \frac{1}{4\pi\epsilon_0} \frac{Q}{R_2}$$

$$V_{R_2} = -\frac{1}{4\pi\epsilon_0} \frac{Q}{R_1}$$

2)



$$r < a$$

$$J = \frac{i}{\pi a^2}$$

$$\oint \mathbf{B} \cdot d\mathbf{l} = \mu_0 i \frac{\pi r^2}{\pi a^2}$$

$$\boxed{B = \frac{\mu_0 i r}{2\pi a^2}}$$

$$a < r < b$$

$$\boxed{B = \frac{\mu_0 i}{2\pi r}}$$

$$b < r < c$$

$$J = \frac{i}{\pi(c^2 - b^2)}$$

$$\oint \mathbf{B} \cdot d\mathbf{l} = \mu_0 i = \mu_0 \left(i \frac{\pi(r^2 - b^2)}{\pi(c^2 - b^2)} \right)$$

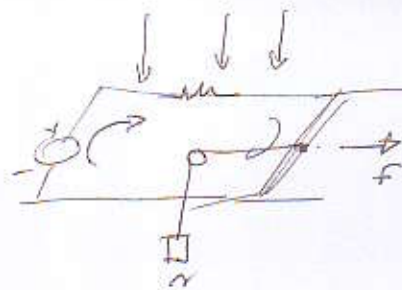
$$\boxed{B = \frac{\mu_0 i}{2\pi r} \left(\frac{r^2 - b^2}{c^2 - b^2} \right)}$$

(3)

$$i B b = m g$$

$$i = 18,6 \text{ A}$$

$$v = \frac{\mathcal{E} - R i}{B b} = 21.2 \text{ m/sec}$$



(4) $\oint \vec{B} \cdot d\vec{l} = \mu_0 i$

$$B = \frac{\mu_0 i}{2\pi h}$$