

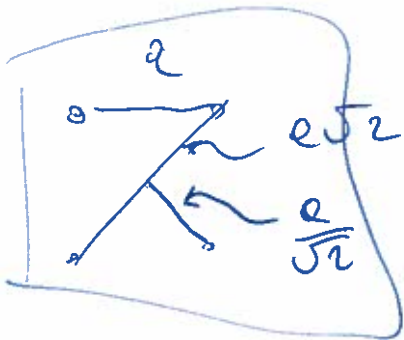
15-3-19

P. 1

$$1) \quad \dot{E}_n = 0 + \frac{qq}{4\pi\epsilon_0 a} + \left( \frac{qq}{4\pi\epsilon_0 a} + \frac{qq}{4\pi\epsilon_0 \sqrt{2}} \right) +$$

$$+ \left( 2 \frac{qq}{4\pi\epsilon_0 a} + \frac{qq}{4\pi\epsilon_0 \sqrt{2}} \right) + 4 \frac{\left(\frac{q}{2}\right)^2 \sqrt{2}}{4\pi\epsilon_0 a}$$

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$$\bar{E}_n = \frac{qq}{4\pi\epsilon_0} \left( \frac{4}{a} + \frac{2}{a\sqrt{2}} + \frac{4\sqrt{2}}{2a} \right) =$$

$$= \frac{q^2}{4\pi\epsilon_0} \left( \frac{4}{a} + \frac{6\sqrt{2}}{2a} \right) = \frac{q^2}{4\pi\epsilon_0 a} (4 + 3\sqrt{2})$$

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$$V(P) = 4 \frac{q \sqrt{2}}{4\pi\epsilon_0 a} \quad (\text{rispetto a } \infty)$$

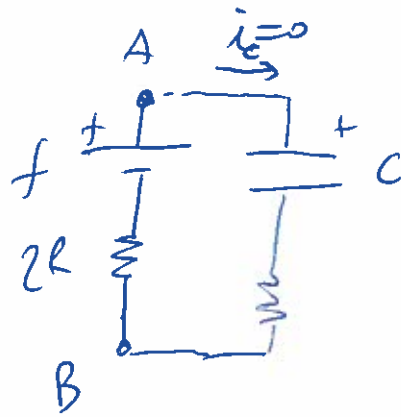
$$U_p(P) = \frac{q}{2} 4 \frac{q \sqrt{2}}{4\pi\epsilon_0 a}$$

$$\frac{1}{2} m v_f^2 = U_p(P) = \frac{q^2 \sqrt{2}}{2\pi\epsilon_0 a}$$

$$v_f = \sqrt{\frac{q^2 \sqrt{2}}{m \pi\epsilon_0 a}}$$

2)

AB (A)



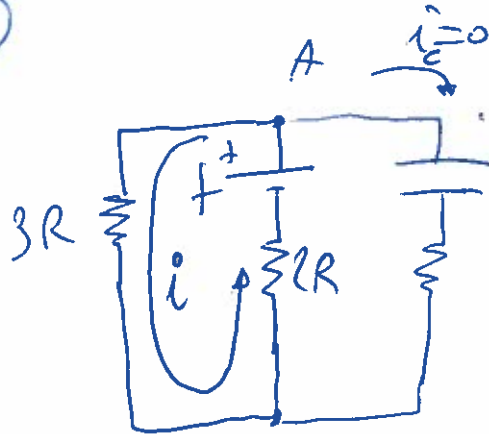
$$i_c = 0$$

$$C = \frac{q}{V_c}$$

$$V_c = f \quad q_0 = Cf \quad U_c = \frac{1}{2} Cf^2$$



AB (B)



$$i_c = 0$$

$$i = \frac{f}{5R}$$

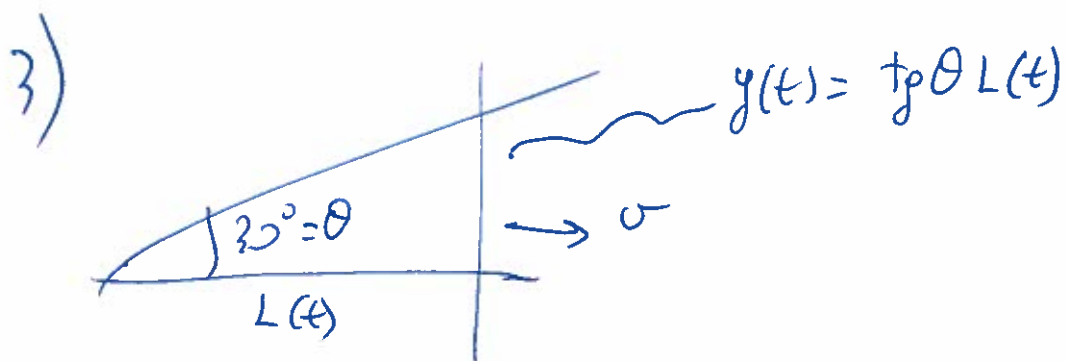
$$\Delta V_c = V_{AB} = 3R i = 3R \cdot \frac{f}{5R} = \frac{3}{5} f$$

affine

$$= f - 2R i = f - 2R \frac{f}{5R} = \frac{5f - 2f}{5} = \frac{3}{5} f$$

$$q_{FIN} = C V_c = C \frac{3}{5} f \quad U_{cFIN} = \frac{1}{2} C V_c^2 = \frac{1}{2} C \left(\frac{3}{5}\right)^2 f^2$$

$$\Delta U_c = U_{cFIN} - U_c = \frac{1}{2} C f^2 \left(\frac{3}{5}\right)^2 - \frac{1}{2} C f^2 = \frac{1}{2} C f^2 \left(\frac{9}{25} - 1\right) = \frac{1}{2} C f^2 \left(-\frac{16}{25}\right) = -\frac{1}{2} C f^2 \left(\frac{4}{5}\right)^2$$



$$i = \frac{f_{em}}{R} \quad f_{em} = - \frac{d}{dt} \phi(\vec{B})$$
 corrente  
 $\downarrow$

$$\phi(B) = \frac{1}{2} B L(t) y(t) = \frac{1}{2} B L(t) L(t) t p_0$$

$$= \frac{1}{2} B L^2(t) t p_0$$

$$\frac{d}{dt} \phi(B) = \frac{1}{2} B t p_0 2 L(t) \frac{dL(t)}{dt} = \frac{1}{2} B t p_0 2 v L(t)$$

$$f_{em} = - v B t p_0 L(t)$$

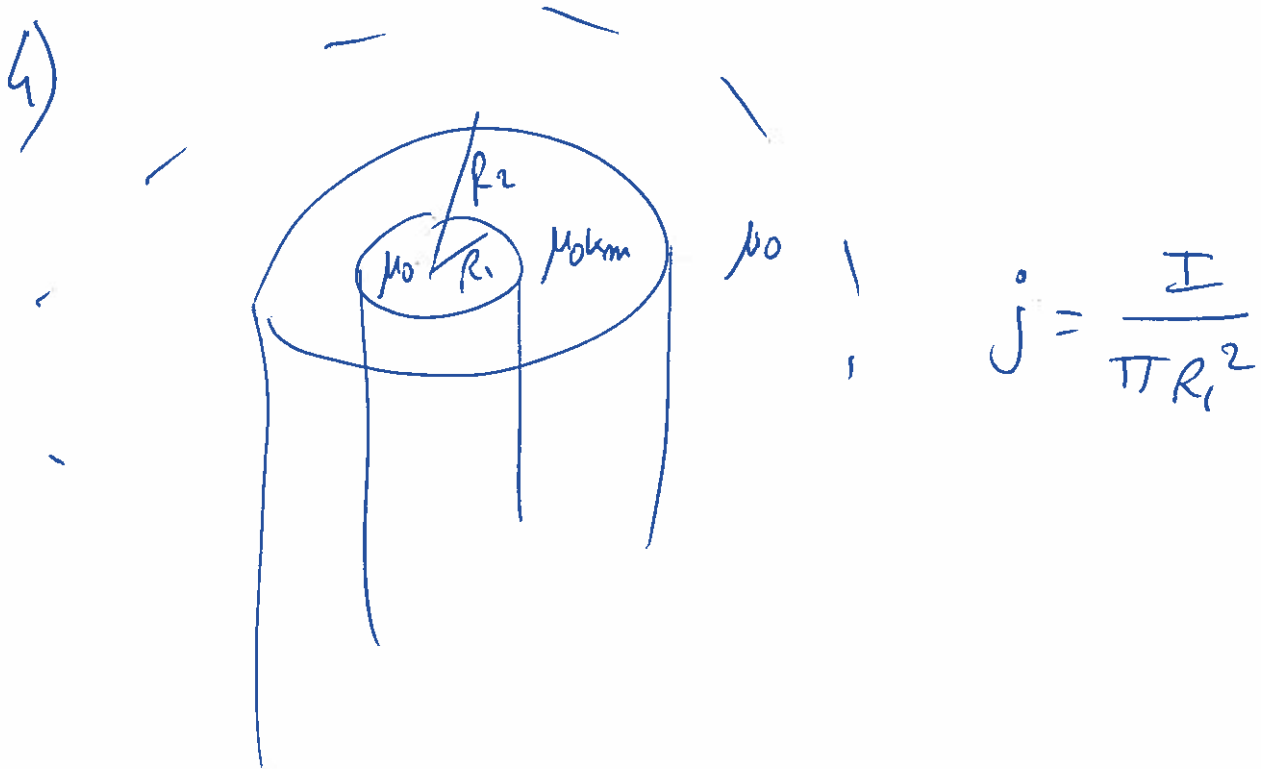
$$i(t) = - \frac{1}{R} \frac{1}{2} B t p_0 2 v L(t)$$

$$i @ L = - \frac{B t p_0 2 v L}{2 R}$$

$i < 0$ , per cui gira in senso orario

$$i @ 2L = - \frac{B t p_0 2 v 2L}{2 R}$$

oppure  $f_{em} = \oint \vec{E} \cdot d\vec{l} = \int_0^{t p_0 L} \vec{v} \times \vec{B} \cdot d\vec{l} = - v B t p_0 L(t)$



ogni AMPERE per  $H$

$$\oint \vec{H} \cdot d\vec{l} = I_{enc}$$

per  $0 < r < R_1$   $2\pi r H(r) = \frac{I}{\pi R_1^2} \cdot \pi r^2$

$$H(r) = \frac{I}{2\pi R_1^2} \cdot r$$

per  $R_1 < r < R_2$   $2\pi r H(r) = I$

$$H(r) = \frac{I}{2\pi r}$$

per  $r > R_2$   $2\pi r H(r) = I$

$$H(r) = \frac{I}{2\pi r}$$

$B = \mu_0 H$  für  $0 < r < R_1$

$M = 0 \Rightarrow H = 0$

$B = \mu_0 \kappa_m H$  für  $R_1 < r < R_2$

$M = \chi_m H = (\kappa_m - 1) H$

$B = \mu_0 H$  für  $r > R_2$

$M = 0 \Rightarrow H = 0$

~~Handwritten scribble~~

