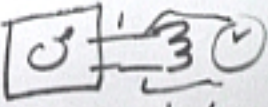
250

$$L = \frac{\Phi_M}{I} \qquad \mathcal{E} = -\frac{d\Phi_M}{dt}$$



$$I(t) = bt$$

$$L = \frac{d\Phi_M/dt \leftarrow \mathcal{E}}{dI/dt \leftarrow b}$$

$$L = \left|\frac{\mathcal{E}}{b}\right|$$

$$P = I^2 R = \frac{V^2}{R} = IV$$

$$P = \frac{dU}{dt} \Rightarrow dU = P\,dt$$

$$\int_0^U dU = \int_0^I IV\,dt$$

$$U = \int_0^I I L\,dI$$

$$U_M = \frac{1}{2} L I^2$$

U_E $\quad U_M = \frac{U_M}{Vol}$

$$L = \frac{\Phi_M}{I}$$

$$\oint \vec{B} \cdot d\vec{s} = \mu_0 I_c$$

$$BW = \mu_0 I n w$$

$$B = \mu_0 n I$$

$$\Phi_M = NBA$$

$$= N \mu_0 n I A n h$$

$$\Phi_M = \mu_0 n^2 I (Ah)$$

$$L = \frac{\Phi_M}{I} = \mu_0 n^2 (A\ell)$$

$$= \mu_0 n^2 (Vol)$$

$$U_M = \frac{1}{2} L I^2 = \frac{1}{2} \mu_0 n^2 (Vol) \frac{B^2}{\mu_0^2 n^2}$$

$$\Rightarrow u_m = \frac{U_M}{Vol} = \frac{B^2}{2\mu_0}$$

$$u_M = \frac{B^2}{2\mu_0} \quad u_E = \frac{1}{2}\varepsilon_0 E^2$$

$$L = \frac{\Phi_M}{I} = \mu_0 n^2 A l$$

$$= \mu_0 n^2 (Vol)$$

$$U_M = \frac{1}{2} L I^2 = \frac{1}{2} \mu_0 n^2 (Vol) \frac{B^2}{\mu_0^2 n^2}$$

$$= \frac{1}{2} (\mu_0 n^2 (Vol)) \frac{B^2}{\mu_0^2 n^2}.$$

$$\Rightarrow u_m = \frac{U_M}{Vol} = \frac{B^2}{2\mu_0}$$

$$u_M = \frac{B^2}{2\mu_0} \qquad u_E = \frac{1}{2} \varepsilon_0 E^2$$

$$L = \frac{N\Phi_B}{I} = \mu_0 n^2 (Al)$$

$$= \mu_0 n^2 (Vol)$$

$$U_M = \frac{1}{2} L I^2 = \frac{1}{2} \mu_0 n^2 (Vol) \frac{B^2}{\mu_0^2 n^2}$$

$$= \frac{1}{2} (\mu_0 n^2 (Vol)) \frac{B^2}{\mu_0^2 n^2}$$

$$\Rightarrow u_m = \frac{U_M}{Vol} = \frac{B^2}{2\mu_0}$$

$$u_M = \frac{B^2}{2\mu_0} \quad u_E = \frac{1}{2}\varepsilon_0 E^2$$

$$\oint \vec{B} \cdot d\vec{s} = \mu_0 I_c$$

$$B = \frac{\mu_0 I}{2\pi r}$$

$\vec{I}_d$

displacement

$$I_d = \varepsilon_0 \frac{d\Phi_{mE}}{dt}$$

$L =$

$$B = \mu_0 n I$$

$$\Phi_{M,1} = BA$$

$$= \mu_0 n I A$$

$N : n \cdot w$

$$\Phi_M = \mu_0 n^2 I (Aw)$$

$$L = \frac{\Phi_M}{I} = \mu_0 n^2 (Aw)$$

$L =$

$$B = \mu_0 n I$$

$$\phi_{M,1} = BA$$

$$= \mu_0 n I A$$

$$N : n \cdot w$$

$$\phi_M = \mu_0 n^2 I (Aw)$$

$$L = \frac{\phi_M}{I} = \mu_0 n^2 (Aw)$$

$$L = (4\pi \times 10^{-3})\left[\frac{300}{.25}\right]^2 [4 \times 10^{-4} \times .25]$$

$N = 300$ $\quad n = \frac{300}{.25}$

$w = .25\,m$

$A = 4 \times 10^{-4}\,m^2$

$$L = (4\pi \times 10^{-3})\left[\frac{300}{.25}\right]^2 [4\times10^{-4} \times .25]$$

$N = 300$ $\quad n = \frac{300}{.25}$

$\ell = .25\,m$

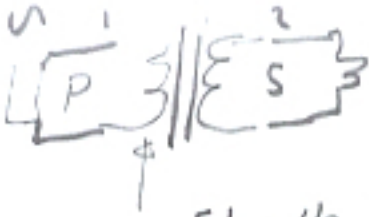
$A = 4\times10^{-4}\,m^2$

$$L = 1.8\times10^{-4}\,H$$ ⊡

$$\frac{\Phi_M}{I} = L \Rightarrow \Phi_M = LI \qquad -50\,A/s$$

$$\mathcal{E} = -\frac{d\Phi_M}{dt} = L\left(\frac{dI}{dt}\right)$$

9x10^-5 V $\quad \mathcal{E} = 1.8\times10^{-4}(50)$



Step up / Step down

$M_{12} = \mu_0 n_1 n_2 (\text{volume})$

$= M_{21}$

$\mathcal{E}_1 = -N_1 \frac{d\Phi_M}{dt}$ $\mathcal{E}_2 = -N_2 \frac{d\Phi_M}{dt}$

$$\frac{\mathcal{E}_1}{\mathcal{E}_2} = \frac{-N_1 \, d\Phi_M/dt}{-N_2 \, d\Phi_M/dt}$$

$$\Rightarrow \frac{\mathcal{E}_1}{\mathcal{E}_2} = \frac{N_1}{N_2} \cdot \frac{d\Phi_M}{dt}$$

$$\mathcal{E}_2 = \mathcal{E}_1 \frac{N_2}{N_1} \quad \not\propto$$

$$\frac{d\Phi_M}{dt} = 0$$

$\varepsilon_2 = \varepsilon_1 \frac{N_2}{N_1}$ ✗

$\frac{d\Phi_M}{dt} = 0$

3.11 E

$P_{in} = P_{out}$ $\left(\frac{N}{N}\right)$

$\left(\frac{P_{in}}{P_{out}}\right) \frac{\varepsilon_1 I_1}{\varepsilon_2 I_2} = \frac{N_P}{N_S} \cdot \frac{I_1}{I_2}$

$\frac{I_S}{I_P} \frac{I_2}{I_1} = \frac{N_P}{N_S} \left(\frac{N_1}{N_2}\right)$

$\varepsilon_S \uparrow I_S \downarrow \; / \; \varepsilon_S \; I \uparrow$