

Homework 13

→ Power out = power in

29-49

$P = 75 \text{ W}$, 12 V , $I_{in} = 22 \text{ A}$

(a)

$$\frac{V_s}{V_p} = \frac{N_s}{N_p} \quad \frac{I_s}{I_p} = \frac{N_p}{N_s}$$

$$P = I_p V_p$$

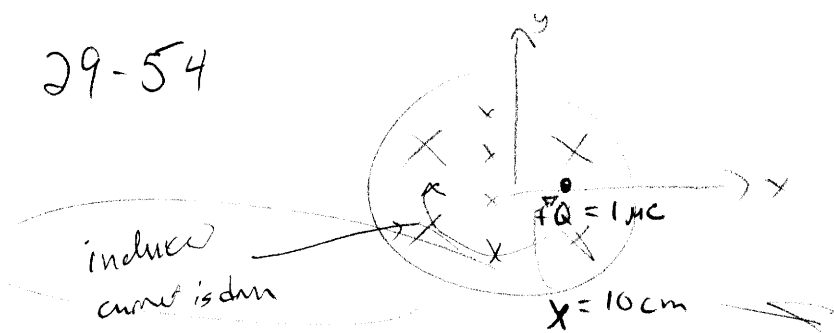
$$V_p = \frac{P}{I_p} = \frac{75 \text{ W}}{22 \text{ A}} = 3.409 \text{ V}$$

$3.409 \text{ V} \ll 12 \text{ V} \Rightarrow$ step down

(b)

$$\frac{V_s}{V_p} = \frac{12 \text{ V}}{3.409 \text{ V}} = 3.5$$

29-54



$$\frac{dB}{dt} = -0.1 \text{ T/s}$$

$$F = qE \quad E = ? \quad \oint \vec{E} \cdot d\vec{l} = -d \frac{\Phi_B}{dt}$$

$$\oint \vec{E} \cdot d\vec{l} = E 2\pi r$$

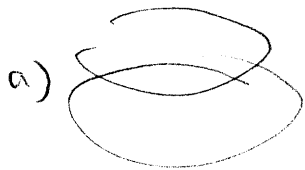
$$\frac{d\Phi_B}{dt} = \frac{d}{dt} (\pi r^2 B)$$

$$E 2\pi r = -\pi r^2 \frac{dB}{dt}$$

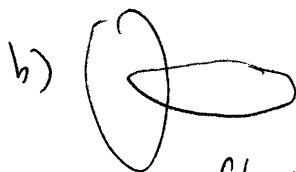
$$E = -\frac{r}{2} \frac{dB}{dt}$$

$$F = qE = (1 \times 10^{-6} \text{ C}) \frac{0.1 \text{ m}}{2} (-0.1 \text{ T/s}) = 5.0 \text{ nN} \quad \uparrow$$

ch 30 - Q 1

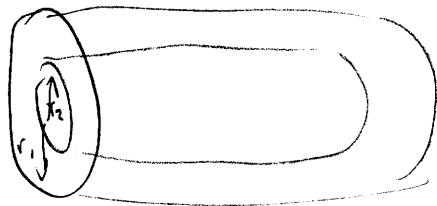


max flux



min flux

P 30-2



$$M = \frac{N_2 \Phi}{I} = \frac{N_2 (BA)}{I} = \frac{N_2 A}{I} \mu_0 I \frac{N_1}{l}$$
$$= \frac{N_2 \pi r_2^2}{I} \mu_0 I n_1$$

$$= \mu_0 n_1 n_2 \pi r_2^2$$

$$\frac{M}{l} = \mu_0 n_1 n_2 \pi r_2^2$$