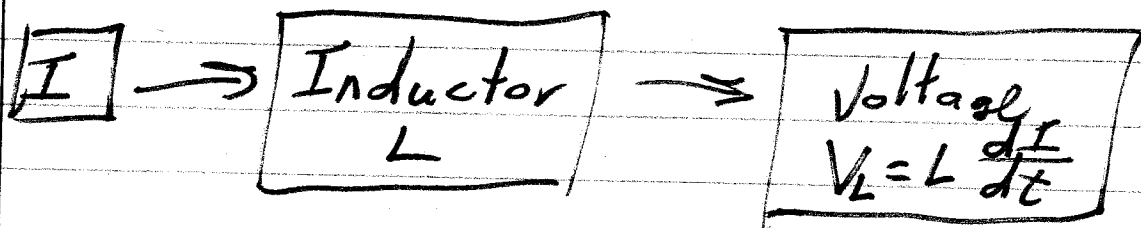
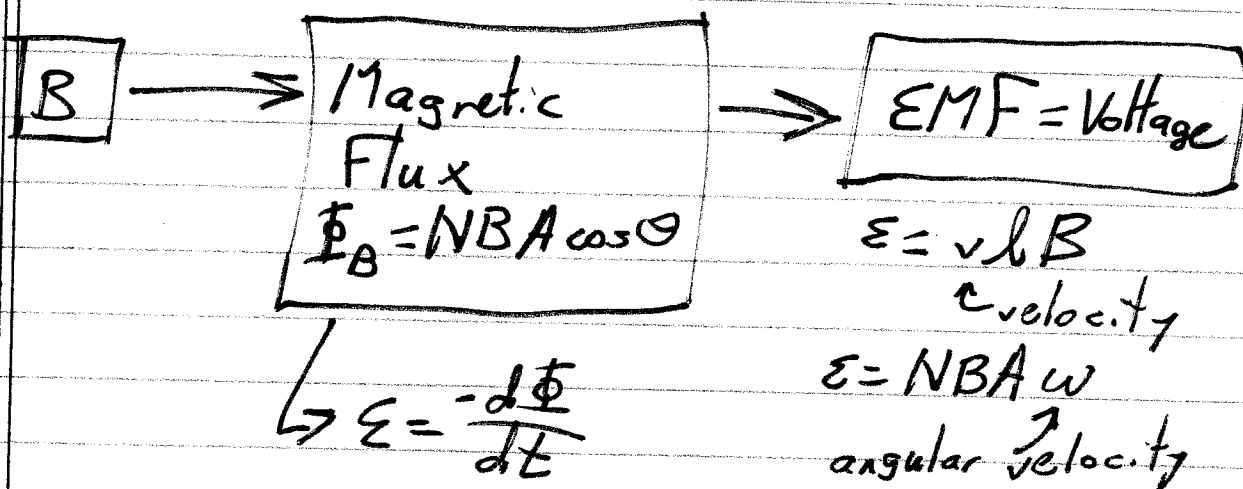
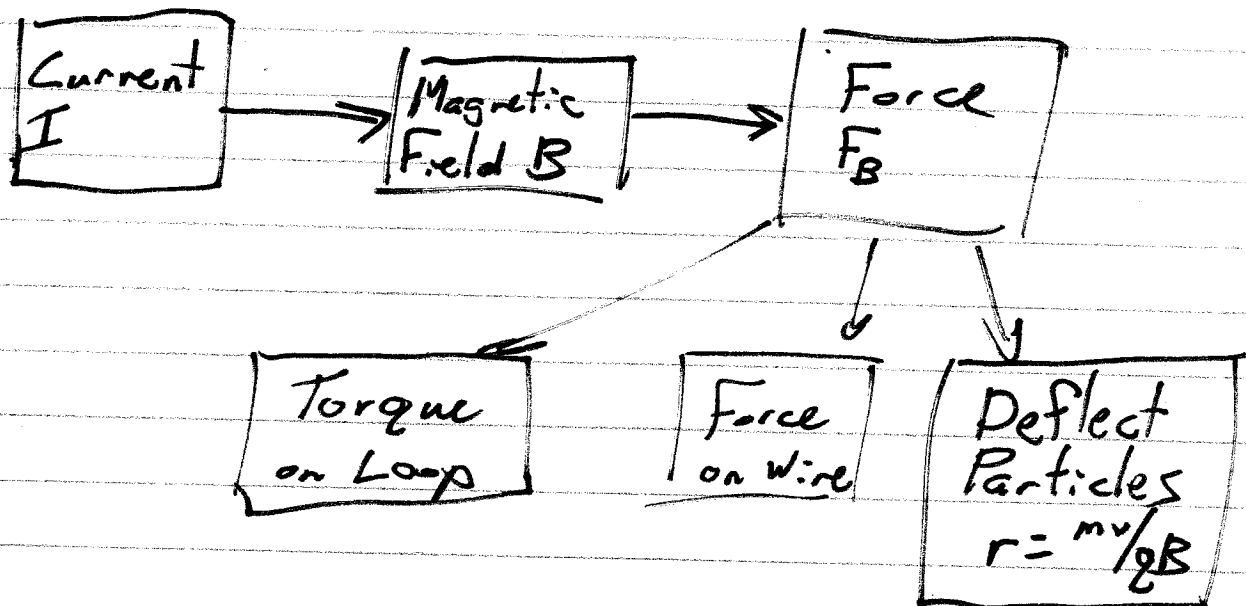


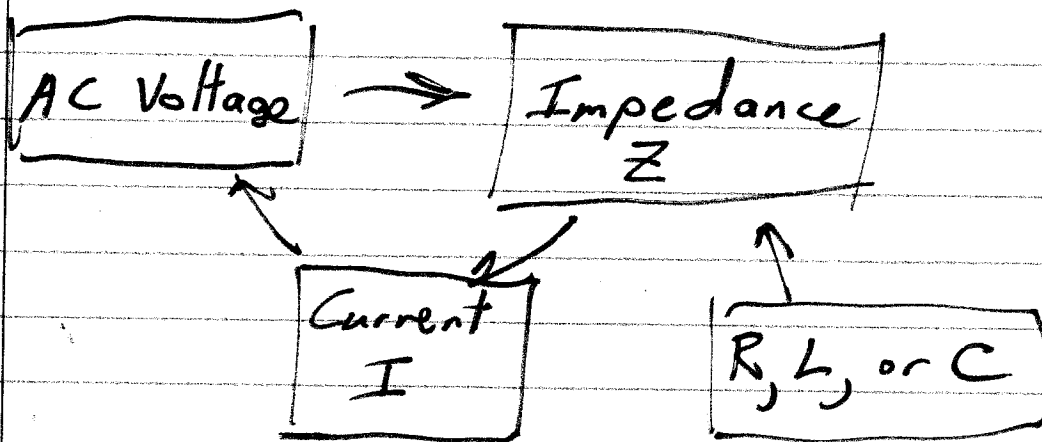
① Phys 2425 2014-10-27

Exam 2 Wed 10/29

Bring a pencil for scantron.



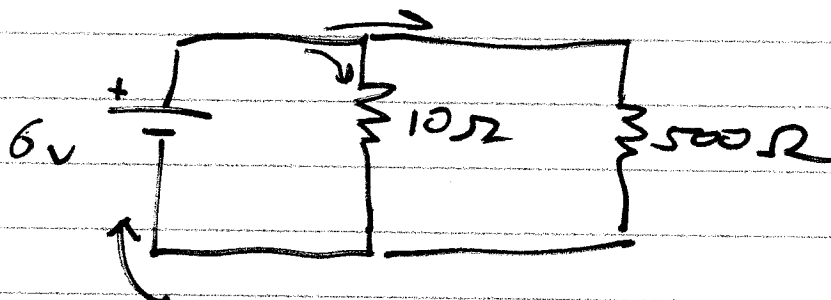
②



Chap 29-33

Practice Exam #11

Parallel Circuit w/ different Z's.



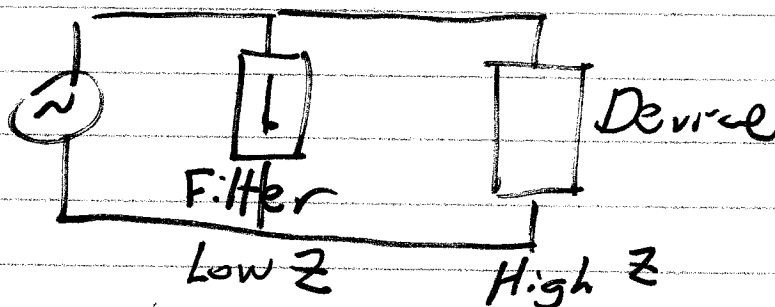
$I_T = 0.612 A$ $I_1 = 0.6 A$ $I_2 = 0.012 A$

98%

2%

$Z_R = R$
 $Z_L = 2\pi fL$

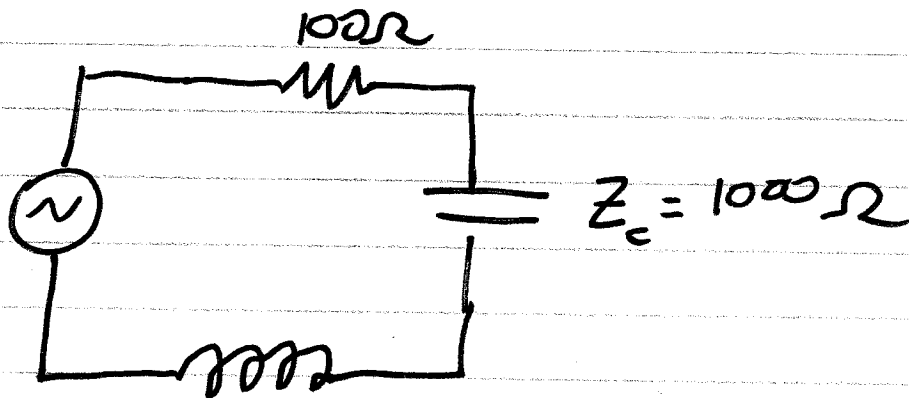
$Z_C = \frac{1}{2\pi fC}$



@ high-f

3

12 V
60 Hz



$$Z_L = 1000 \Omega$$

How much current flows? 0.12 A

$$\begin{aligned}
 X = Z_L - Z_c &= 0 \Omega \\
 R &= 100 \Omega
 \end{aligned}
 \left. \vphantom{\begin{aligned} X = Z_L - Z_c \\ R = 100 \Omega \end{aligned}} \right\} Z = 100 \Omega$$

Pythagorean

$$V_{net} = I Z_{net}$$

What is V_L ?

$$V_L = I_L Z_L = (0.12 \text{ A})(1000 \Omega) = 120 \text{ V}$$

$$V_c = 120 \text{ V}$$

What happens if f is increased?

$$Z_L \uparrow \quad Z_c \downarrow \quad X = (Z_L - Z_c) \uparrow \quad Z \uparrow \quad I \downarrow$$

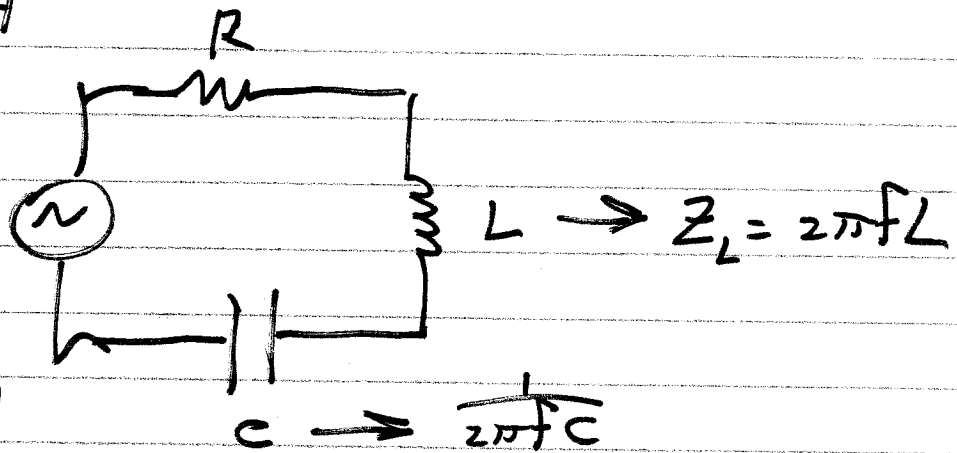
④

#16 HW4

$$V_0 = 105 \text{ V}$$

$$2\pi f = 325$$

$$V = 105 \sin(325t)$$



$$Z_L - Z_C = X \left. \vphantom{Z_L - Z_C} \right\} Z_{\text{net}}$$

R

$$V_0 = I_0 Z$$

$$V_{\text{rms}} = I_{\text{rms}} Z$$

$$P_{\text{ave}} \text{ for circuit} = P_{\text{ave}} \text{ for } R$$

$$P_{\text{ave}} = V_{\text{rms}} I_{\text{rms}} = I_{\text{rms}}^2 R$$

↑ resistor's voltage

$$f_R = \frac{1}{2\pi\sqrt{LC}}$$

5

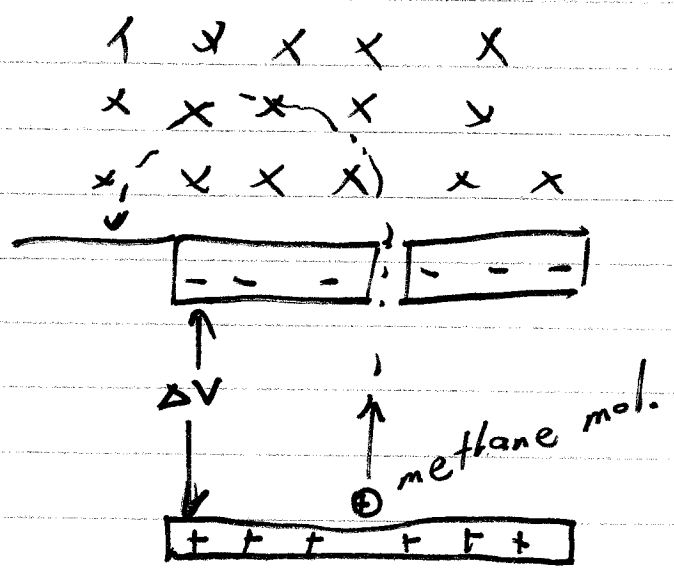
Ions of Methane are accelerated by ~~an~~ capacitor and sent into a mass spectrometer. The magnetic field makes the ions turn with a radius of 0.2 m. What is the voltage of the capacitor?

Ions: $m = 16 \text{ u}$ $1 \text{ u} = 1.67 \times 10^{-27} \text{ kg}$
 $q = +e$ $e = 1.6 \times 10^{-19} \text{ C}$
 Field: $B = 0.02 \text{ T}$

$$r = \frac{mv}{qB} \rightarrow v = 23950 \text{ m/s}$$

$$\text{Energy} = \frac{1}{2} m v^2 = 7.665 \times 10^{-18} \text{ J}$$

$$\text{Voltage} = \frac{\text{Energy}}{q} = 47.9 \text{ V}$$



6

