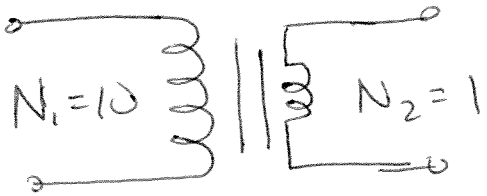
Physics 161 Quiz – Magnetic Flux and Transformers

Name KEY

Lab Time _____

1. [2 PTS] Draw and label a picture of a 10:1 transformer.



*Needs to be hooked to AC source to work

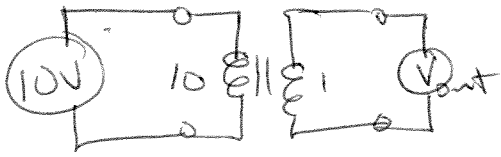
or any multiple such that $\frac{N_1}{N_2} = 10$

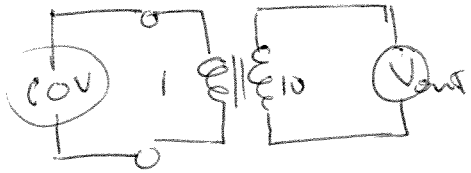
2. [3 PTS] The transformer above is hooked to a 9 volt battery. What are the possible output voltages?

Transformers need changing flux — they do not work w/ DC

$V_{out} = 0$

3. [3 PTS] The transformer above is hooked to a 60 Hz 10 V rms function generator. What are the possible output voltages?





$\frac{V_1}{N_1} = \frac{V_2}{N_2}$ $V_{out} = \left(\frac{1}{10}\right)10V = 1V$ or $V_{out} = \left(\frac{10}{1}\right)10V = 100V$

4. [2 PTS] The primary coil of a transformer draws 4.0 A rms current when plugged into a 120 V outlet. The secondary voltage is 40 V. What current does the secondary coil of the transformer deliver to the load?

$P = IV$

$P_1 \geq P_2$

$(4A)(120V) = I_2(40V)$

$(4A)3 = I_2 = 12\,A \cdot rms$