

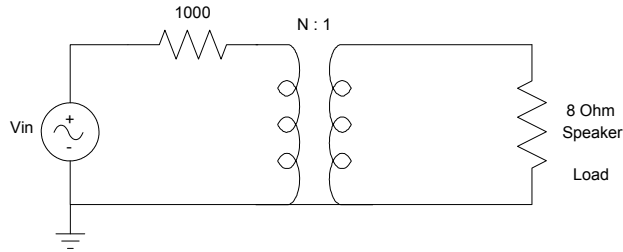
ECE 331 - Homework #4

Ideal Transformers, Transformer Testing, Transformer Design, Auto-Transformers
Due Wednesday, February 19th, 4PM

1) The following circuit uses a transformer to buffer a transistor amplifier to an 8 Ohm speaker.

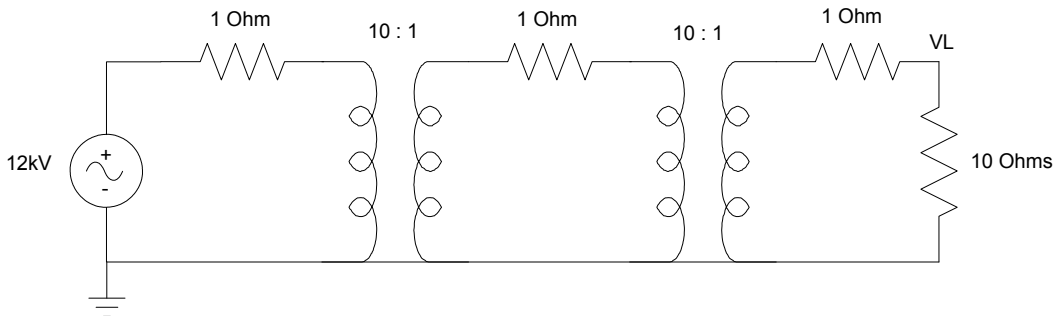
1a) Determine the turns ratio for this amplifier to be 90% efficient.

1b) For the turn ration of part a), determine the voltage, V_{in} , to drive the speaker at 10 Watts.



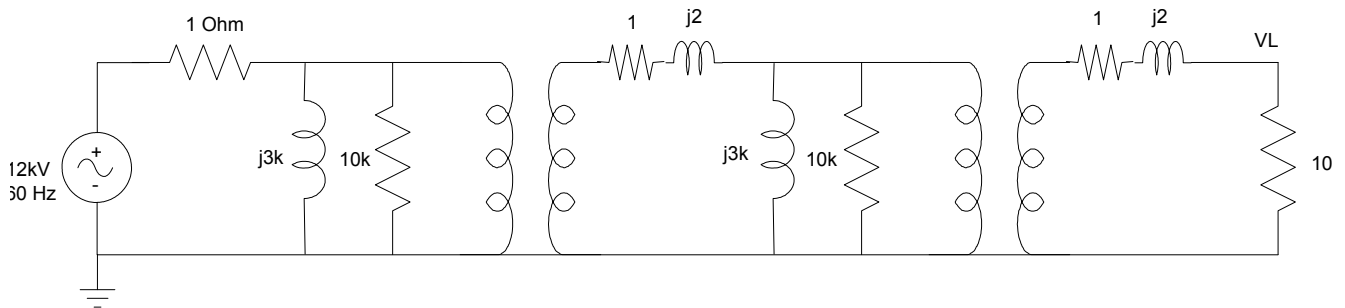
2) The following circuit uses ideal transformers.

- Determine the voltage at the 10 Ohm load (V_L), and
- Determine the efficiency of this system.



3) The following circuit uses a more accurate model of a transformer:

- Determine the voltage at the 10 Ohm load (V_L), and
- Determine the efficiency of this system.



4) A 10kVA transformer has the following open-circuit and short-circuit test results:

Open-Circuit Test

- $V_{in} = 12\text{kV}$
- $I_{in} = 1\text{A}$
- $P_{in} = 1\text{ Watt}$

Short-Circuit Test:

- $V_{in} = 24\text{V}$
- $I_{in} = 2\text{A}$
- $P_{in} = 40\text{W}$

Determine a model for this transformer.

5) For problem #4, what current would you expect if you ran the short-circuit test at 12kV?

6) The following auto-transformer steps 12kV down to 240V. Determine the currents I_1 , I_2 , and I_3

