

## IT 327 – Lab #3

### Transformers and Inductors

#### Background

Transformers are used in many applications in the world of electronics, including stepping voltage up and current down (or vice versa), impedance matching, and providing DC isolation. Inductors are used for phase shifting, oscillators, high-frequency blocking, filtering, integrating, differentiating, delays, energy storage, etc.

#### Objective

The objective of this lab is to give the student experience with some of the applications of transformers and with how both inductors and transformers are manufactured.

#### Equipment Required

Oscilloscope, function generator, transformers, inductors (335 CTB).

#### Procedures – Transformers

Be sure to take plenty of pictures and include them in your write-up with an appropriate caption.

1. Set the function generator to sine wave output, 60 Hz, maximum amplitude. Measure this amplitude with the oscilloscope. Apply this signal to the primary side of the transformer and measure the voltage out of the secondary side. Then take a picture. Assume the input ampacity to be 1.0 Amps; calculate the output ampacity.
2. Set the function generator output amplitude to 5 V<sub>p-p</sub>, leaving it on sine wave, 60 Hz. Apply this signal to the secondary of the transformer and measure the voltage out of the primary side. Then take a picture. Assume the input ampacity to be 1.0 Amps; calculate the output ampacity.

#### Procedures - Inductors

3. Measure the resistance of the inductor and take a picture. Assuming the inductance to be equal to the rated value of the inductor (27 mH), calculate the inductor Q at 1.0 MHz.
4. Apply a sine wave signal at the maximum amplitude to the inductor. Measure the applied voltage and the resulting current (and take a picture) at the following frequencies:  

200 Hz   2 kHz   20 kHz   200 kHz        2 MHz
5. Calculate the expected current for the above frequencies. Plot the calculated and measured current at all the above frequencies. Also calculate the difference between the calculated and measured values.

Be sure to include all of the pictures you took in your write-up with an appropriate caption.

#### Conclusion

Summarize your calculations and observations on both the transformer and the inductor.