EELE 354: Electric Power Applications

Test 2: Study Topics

Date of Test: Monday, 12/01/2014

- Open book exam
- You may use homework solutions
- No other notes allowed

Topics to Study:

• Alternating Current

– How an alternating voltage (and thus current) is generated
- Faraday's Law (see lecture notes)

– Effective (Root-Mean Square), Average, and Instantaneous Current and Voltage values

– Inductance
- Physical description of device and operation
- Response to DC step-changes (see lecture 9)
  - Time constant
- Reactance equation (X_L)

– Capacitance
- Physical description of device and operation
- Response to DC step-changes (see lecture 10)
  - Time constant
- Reactance equation (X_C)

-AC Circuits
- Be able to analyze series and parallel, RL and RC, circuits.
  - Find impedance (complex number representation, as well as magnitude and phase representation)
  - Solve for current and voltage magnitudes
  - Solve for real, reactive and total power
  - Draw phasor diagrams

- Transformers
  - Physical description of device and operation
  - Ideal transformer operation (assumes 100% efficient)
    - Turns - current relationship
    - Turns - voltages relationship
  - Sources of transformer power loss and inefficiency
    - Might be asked qualitatively, but not quantitatively
  - Special transformers
    - Center-tapped Transformer
    - Autotransformer

Course Material to Review

Note: Obviously the material covered on this test builds on the material on the first test. To that extent, you should have a good grasp on concepts covered on the first test as well as the specific material listed below.

• Lectures
– Lectures 9 - 11: Alternating Current
– Lectures 12, 13, 15: AC Circuits
– Lecture 16: Transformers

• Book Chapters:
– Chapter 7 - Alternating Current
– Chapter 8 - AC Circuits
– Chapter 9 - Conductor Types and Sizes
– Chapter 11 - Wiring Applications
– Chapter 12 – Transformers

• Homeworks:
– Homework 4 - Alternating Current and Reactive Components
– Homework 5 - AC Circuits
– Homework 6 – Transformers, but no Three-Phase Circuits, note: I have posted HW6 problems, **and the solution for HW6** for you to use as review material. Please work the problems and then check your answers. Turn in HW 6 on the assigned due date and you will receive full credit for HW6.

• Labs:
– Lab 6 - AC Circuits
– Lab 7 - AC Power
– Lab 8 - Wiring Branch Circuits
– Lab 9 - Single-Phase Transformers