

ECE 6950 POWER ELECTRONICS TEST I TIPS

There will be 3 questions and you are to answer all. **BLUE BOOKS REQUIRED.** Areas to be covered:

1. Three-Phase, Two-Phase Transformations and Space Vectors
 - (a) Clark's Transformation
 - (b) Generalized $dq0$ Transformation
 - (a) Space Vectors
 - (c) Space Vectors for three-Phase System: 3-wire/4-wire
 - (c) Space Vector of Combined Currents and Voltages

2. Single-Phase Rectifiers With
 - (a) R Load (b) R - L Load

3. Three-Phase Rectifiers With
 - (a) R Load
 - (b) R - L Load

4. Power Definitions
 - (a) Phasors: Current, Voltage, and Impedance (b) Power
 - (c) Single-Phase/Three-Phase (d) Balance and Unbalance
 - (e) Sinusoidal and Non-sinusoidal

Examples

1. A three-phase bridge rectifier of Fig. P2 supplies a ripple-free load current. The rectifier has a three-phase source of 480 V rms line-to-line, 60 Hz, $R = 25 \Omega$ and $L = 50$ mH.
 - (a) Sketch the waveforms for v_o , v_{D3} and i_{ac} .
 - (b) Determine the average output current.

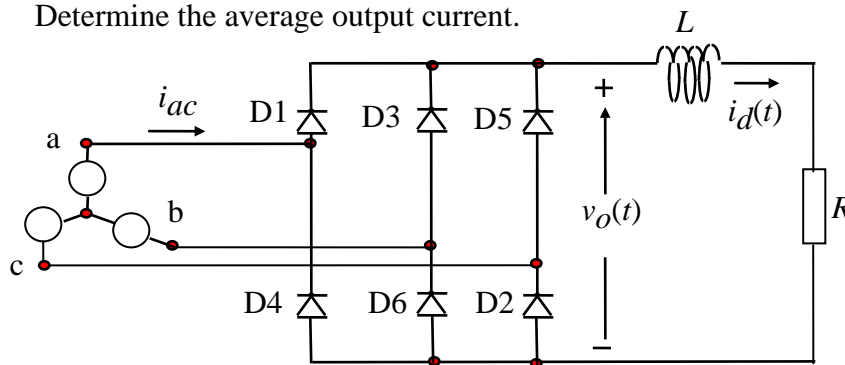


Fig. P2

2. A single-phase bridge rectifier is required to supply an average voltage $V_{dc} = 400$ V to a resistive load $R = 10 \Omega$. Determine the voltage and current ratings of the diodes and transformer.

3. Classroom examples.