# Circuits & Electronics PhD Qualifying

## Topics Covered:

### ELECTRONICS:
- Basic diode circuits (clippers, choppers), ideal diode model, diode model using the standard diode \( v-i \) characteristic equation.
- Bipolar transistor circuits, biasing, small signal analysis, small signal parameters.
- MOS transistor circuits, biasing, small signal analysis, small signal parameters.

### CIRCUITS:
- Circuits I: Resistive circuits, KVL, KCL based theorems (node voltage, mesh current), dependent sources, basic op amp circuits, basic BJT circuits, introduction to capacitors and inductors.
- Circuits II: First and second order circuit analysis using differential equations, steady state analysis of RLC circuits, introduction to Laplace transform theory, RLC circuit analysis using Laplace, transfer functions, frequency response, Fourier transform introduction.

## References:

### Electronics:
- “Introduction to Electronic Circuit Design,” Spencer & Ghausi, Prentice-Hall.
- Or any other basic electronics circuit analysis textbook

### Circuits:
- “The Analysis & Design of Linear Circuits,” by Thomas and Rosa (any of the 7 editions), Wiley.
- Or any other basic circuit analysis textbook

## Tools allowed during the exam (remember all exams are now closed book):

- 2 Sheets of 8.5 x 11 Paper Front and Back of Notes
- Scientific Calculator