

## **Ph.D. Qualifying Exam Electronics**

**Examiner:** Dr. B. Johnson, SEM 324

### **Sample Texts:**

The exam topics are covered in most texts for a first course in circuit analysis with active devices. Examples of suitable texts are:

D. Neamen, *Electronic Circuit Analysis and Design*, 2<sup>nd</sup> Edition, McGraw-Hill, 2001

A. Hamby, *Electronics*, 2<sup>nd</sup> Edition, Prentice-Hall, 2000

R. Jaeger and N. Blalock, *Microelectronic Circuit Design*, 2<sup>nd</sup> Edition, McGraw-Hill, 2004

### **Exam Rules:**

The duration of the exam is three hours.

The exam is closed book. The student should bring up to three sheets both sides of equations and notes. Equations will be furnished upon request.

The student will be asked to solve 5 out of 6 questions.

### **Exam Topics:**

The questions will be selected from among the first 10 to 12 chapters of an introductory electronics textbook. Areas include:

1. Thevenin/Norton, KVL, KCL
2. Semiconductor properties
3. Diodes and diode circuits
4. BJT's and BJT circuits with emphasis on analog behavior
5. FET and FET circuits with coverage of both amplifier design and analysis and CMOS digital circuit design and analysis
6. Discrete amplifier types (e.g., CE, CB, and CC)
7. Operational amplifier circuits
8. Differential amplifiers and current sources and mirrors
9. Small signal models
10. Frequency behavior of active devices
11. Feedback and filter design and analysis