CENG 244 Introduction to Digital Systems

Exam 2 Topics & Notes

Topics and potential questions that you can expect on Exam #2 include:

Chapter 3 Gate-Level Minimization

1) Know how to make Karnaugh Maps (AKA: K-Maps) for 2, 3, & 4 variable Boolean functions
2) Know how to use K-Maps to simplify 2, 3, & 4 variable Boolean functions into sum-of-products form
3) Know how to use K-Maps to simplify 2, 3, & 4 variable Boolean functions into product-of-sums form
4) Know how to use K-Maps of 2, 3, & 4 variable Boolean functions with don't-care conditions
5) NAND and NOR logic gate circuit implementation

Chapter 4 Combinational Logic

1) Know how to find the Boolean function(s) from a combinational logic circuit
2) Know how to design a combinational logic circuit to implement Boolean function(s) from a truth table
3) Know how a half adder, full adder, binary adder, and adder-subtractor work (includes carry and overflow).
4) Know how a binary multiplier works.
5) Know how a magnitude comparator works.
6) Know how decoders work and how to use a one to implement a combinational circuit in sum-of-minterms form.
7) Know how encoders work.
8) Know how multiplexers work and how to use a one to implement a combinational circuit in sum-of-minterms form.

Notes:

(1) The use of calculators and electronic devices of any kind will not be permitted on the exam.

(2) The exam is closed book and closed notes.

(3) However, you may print out and use the following page. You may put equations, notes, or circuits **inside** the lower box. Rule- no worked problems or examples.

Table 2.1
Postulates and Theorems of Boolean Algebra

Postulate 2	(a)	$x + 0 = x$	(b)	$x \cdot 1 = x$
Postulate 5	(a)	$x + x' = 1$	(b)	$x \cdot x' = 0$
Theorem 1	(a)	$x + x = x$	(b)	$x \cdot x = x$
Theorem 2	(a)	$x + 1 = 1$	(b)	$x \cdot 0 = 0$
Theorem 3, involution		$(x')' = x$		
Postulate 3, commutative	(a)	$x + y = y + x$	(b)	$xy = yx$
Theorem 4, associative	(a)	$x + (y + z) = (x + y) + z$	(b)	$x(yz) = (xy)z$
Postulate 4, distributive	(a)	$x(y + z) = xy + xz$	(b)	$x + yz = (x + y)(x + z)$
Theorem 5, DeMorgan	(a)	$(x + y)' = x'y'$	(b)	$(xy)' = x' + y'$
Theorem 6, absorption	(a)	$x + xy = x$	(b)	$x(x + y) = x$

Equations/Notes: