CENG 244 Introduction to Digital Systems

Exam 3 Topics & Notes

Topics and potential questions that you can expect on Exam #3 include:

Chapter 5 Synchronous Sequential Logic

1) Know how to identify a synchronous sequential logic circuit
2) Understand operation of *SR* and *D* latches
3) Understand operation of *D, JK,* & *T* flip-flops, e.g., characteristic equations & tables as well as excitation tables
4) Know how to analyze a clocked sequential circuit, e.g., find state & output equations from state tables and/or state diagrams
5) Be able to determine flip-flop input equations (AKA excitation equations) & design a clocked sequential circuit, e.g., need state table for circuit & excitation table for flip-flop

Chapter 6 Registers and Counters

1) Understand operation of parallel-load and shift registers
2) Understand operation of serial adder
3) Understand operation of universal shift registers
4) Understand operation of binary & BCD ripple counters
5) Understand operation of binary, up-down binary, binary /w parallel load, and BCD synchronous counters
6) Understand operation and be able to design counters (e.g., counters with arbitrary sequence)
7) Understand operation of ring counters
8) Understand operation of switch-tail ring counters and Johnson counters

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: