## Brigham Young University - Idaho

Department of Computer Science and Electrical Engineering

## **ECEN 160 – Fundamentals of Digital Systems**

## Practice Exam #2

Select the <b>best</b> multiple choice answer
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1) How mar	ny <b>different numbers</b> ca	an be obtained using <b>e</b>	eight binary bits?
A.	512 <sub>10</sub>	E.	128 <sub>10</sub>
B.	511 <sub>10</sub>	F.	127 <sub>10</sub>
C.	256 <sub>10</sub>	G.	64 <sub>10</sub>
D	25510	Н	6340

2) What is the largest decimal number that can be represented using six binary bits?

A.	512 <sub>10</sub>	E.	12810
B.	511 <sub>10</sub>	F.	12710
C.	256 <sub>10</sub>	G.	6410
D.	255 <sub>10</sub>	H.	6310

3) What is the minimum number of binary bits required to represent 294<sub>10</sub>?

A. 9<sub>10</sub> B. 8<sub>10</sub> C. 7<sub>10</sub> D. 6<sub>10</sub>

4) Any Boolean expression can be implemented using nothing but which of the following logic gates?

- A. AND gates
- B. NOR gates
- C. XOR gates
- D. NOT gates

5) Which Truth Table represents Y = A'BC + ABC' + AB'C'?

A.	A B C   Y	B.	A B C   Y	C.	A B C   Y
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
	1 1 1   0		1 1 1   1		1 1 1   0

- D. None of the above.
- 6) Find the simplest logic equation.

\ <i>P</i>	AΒ				
CD \	• •	01			
00	+ 1   +	0	1	1	
01		0	0	0	
11	1	1	0	0	:
:	1	_ :	0	1	  -

- A. A'C' + B'C'D' + A'CD'
- B. A'C' + B'D' + A'CD'
- C. A'C + B'D' + AC'D'
- D. AC' + B'D' + A'CD'

- E. AC' + B'D' + A'C'D
- F. AC' + B'C'D' + A'CD' + AB'D'
- G. A'C' + A'B'D' + A'CD'
- H. AC' + A'B'D' + A'CD' + AB'D'

7) Find the simplest logic equation.

- A. F = A + A'C
- B. F = A + C
- C. F = AB' + C
- D. None of the above.

- 8) When doing bubble matching, we often use alternate gate symbols. What is the alternate gate symbol for a AND gate?
  - A. A NOT symbol with a bubble on the input and no bubble on the output
  - B. An AND symbol with bubbles on the inputs
  - C. A NOR symbol with bubbles on the inputs
  - D. An OR symbol with no bubbles on the inputs
- 9) Using only NOR gates, how many NOR gates would be required to perform the OR operation if two inputs are required?
  - A. One
  - B. Two
  - C. Three
  - D. Four
- 10) Find the simplest logic equation using hazard free design.

\ <i>I</i>	AΒ				
=	00				
00	++   0   ++	1	1	0	
01	1	1	1	0	
11		0	1	1	
10	0	0	0		

- A. A'B'C' + A'BC' + ABD
- B. A'B'C' + A'BC' + BC'D + ABD
- C. BC + ACD
- D. B'C' + ACD

- E. BC' + A'C'D + ABD + ACD
- F. B'C' + ABD + BC'D
- G. A'C' + A'B'D' + A'CD'
- H. A'C'D' + A'C'D + ABD
- 11) The 8-bit 2's-complement system is to be used to **add** the signed binary numbers 1111 0011 and 0000 0100. Determine, in decimal, the sign and value of each number and their sum.
  - A. 5 and -12, -6
  - B. -115 and -116, too big to fit in 8 bits (overflow)
  - C. 4 and -13, -9

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- D. -4 and -13, -17
- 12) How many 4-bit ALUs would need to be cascaded together to perform a 12-bit addition in a single operation?
  - A.
  - B. 2
  - C. 3
  - D. 6

- 13) The 1s'-complement of the binary number 0 1001 0101<sub>2</sub> is:
  - A. 1 0100 1000
  - B. 1 0110 1000
  - C. 1 0110 1011
  - D. 1 0110 1010
- 14) 10011 is the 5 bit 2's complement representation of
  - A. -13<sub>10</sub>
  - B. -21<sub>10</sub>.
  - C. -9<sub>10</sub>
  - D. -8<sub>10</sub>
- 15) Find the additive inverse (-x) of the 4-bit 2's complement number: 1101.
  - A. 0101
  - B. 0100
  - C. -1101
  - D. 0011
- 16) A full-adder has the following inputs: A = 1, B = 0, Cin = 1. The outputs will be:
  - A. Sum = 1; Cout = 0
  - B. Sum = 1; Cout = 1
  - C. Sum = 0; Cout = 1
  - D. Sum = 0; Cout = 0
- 17) A three-line-to-eight line decoder has inputs CBA where A=LSB. The output AND gates are labeled Q0 through Q7. One would normally expect the output of AND gate Q4 to be active when the inputs are:
  - A. C'BA
  - B. CB'A'
  - C. CB'A
  - D. CBA'