The University of Alabama in Huntsville
ECE Department
EE 202 – 02
Fall 2013
Test 1
October 1, 2013

Name: _____

$x + 0 = x$	$x \cdot 1 = x$
$x + x' = 1$	$x \cdot x' = 0$
$x + x = x$	$x \cdot x = x$
$x + 1 = 1$	$x \cdot 0 = 0$
$(x')' = x$	
$x + y = y + x$	$xy = yx$
$x + (y + z) = (x + y) + z$	$x(yz) = (xy)z$
$x(y + z) = xy + xz$	$x + yz = (x + y)(x + z)$
$(x + y)' = x'y'$	$(xy)' = x' + y'$
$x + xy = x$	$x(x + y) = x$

1. (1 point) The decimal number system is said to be of base, or _____, 10 because it uses 10 digits and the coefficients are multiplied by powers of 10.
2. (1 point).Positive integers (including zero) can be represented as _____ numbers.
3. (1 point) A _____ code is one in which only one bit in the code group changes in going from one number to the next.
4. (1 point) The _____ principle states that every algebraic expression deducible from the postulates of Boolean algebra remains valid if the operators and identity elements are interchanged.
5. (1 point) Boolean functions expressed as a sum of minterms or product of maxterms are said to be in _____ form.

6. (10 points) Convert (36245_7) to decimal:

7. (5 points) Convert 00101010011100101010001111001010101001 to hexadecimal

8. (5 points) We can perform logical operations on strings of bits by considering each pair of corresponding bits separately (called bitwise operation). Given two eight-bit strings A = 10110001 and B = 10101100, evaluate the eight bit result after an XOR operation.

9. (20 points) Convert decimal +37 and +82 to binary, using the 8-bit signed-2's-complement representation. Then perform the binary equivalent of (-37) + (-82). Convert the answer back to decimal and verify that it is correct. Convert the answer back to decimal and verify that it is correct or explain why it is not.

10. (5 points) Convert F(A, B, C, D) = Σ(0, 1, 2, 4, 7, 10, 13, 14) to the other canonical form.

11. (10 points) Formulate a weighted binary code for the decimal digits, using weights 8,-4,-2,1

12. (10 points) Reduce ABC'D + A'BD + ABCD to two literals using Boolean algebra.

13. (10 points) Find the complement of (u + xw)(x + u'v).

14. (20 points) Draw the logic diagram corresponding to the following Boolean expression without simplifying it and obtain its truth table.

F = (AB + A'B')(CD' + C'D)
