

Name: _____

Test #1 - Points: 52 (15 of 15%)

Read both sides! Closed book. No Calculator. No aids. Just you.

1. [Points: 2] Convert binary **010110010101011110111101111** to hexadecimal:

2. [Points: 15] Perform the indicated 12-bit hexadecimal arithmetic. Show the 12-bit result value and indicate by **check marks** the correct "ON" states of the Zero, Carry, Sign, and Overflow flags after the arithmetic. Indicate by **check marks** if the 12-bit result is correct for signed two's complement arithmetic (**OK-SIGN**) and/or correct for unsigned arithmetic (**OK-UNSIGN**). **Leave flags that are OFF blank:**

9BA + B11 = _____ Z___ C___ S___ O___ OK-SIGN___ OK-UNSIGN___

801 + 7FF = _____ Z___ C___ S___ O___ OK-SIGN___ OK-UNSIGN___

796 + 514 = _____ Z___ C___ S___ O___ OK-SIGN___ OK-UNSIGN___

FFF + FFF = _____ Z___ C___ S___ O___ OK-SIGN___ OK-UNSIGN___

800 + 800 = _____ Z___ C___ S___ O___ OK-SIGN___ OK-UNSIGN___

3. [Points: 6] Convert the following decimal values into 16-bit word, 2's Complement encoded values in hexadecimal:

a) **1196 = _____** b) **-1197 = _____** b) **-1 = _____**

4. [Points: 4] (a) If a CPU has a clock frequency of 3.3333+ GHz, how long (in ns) does one access cycle take?

_____ (b) If a memory has an access time of 25ns, how many accesses can you make in one second

(give the answer in MHz)? _____

5. [Points: 4] (a) A computer has a 24-bit word size. Using this word size, what is the largest size memory it can

address, in MiBi? _____ (b) Convert the decimal fraction **0.6875** to binary: _____

6. [Points: 2] What is the minimum number of binary bits needed to represent 32,770 items? _____
7. [Points: 1] ASCII character 'A' has hex value 0x41. Give the Unicode hex value: _____
8. [Points: 1] What is the largest power-of-ten you can store in an IEEE 754 32-bit floating point number? _____
9. [Points: 2] What are the smallest and largest decimal integers an 10-bit word can hold using a two's complement signed representation? Smallest: _____ Largest: _____
10. [Points: 3] (a) How many Kilo (K) are in a Giga (G)? _____ (b) Express the binary prefix *tera* as a power of two: _____ (c) By what order of magnitude (power of 10) is something that runs in nanoseconds faster than something that runs in milliseconds? _____
11. [Points: 2] What is the standards group responsible for the Internet standards? Give the full name and the 4-letter acronym. _____
12. [Points: 2] Given the binary digits **111(-2)**, convert to decimal from base "-2": _____
13. [Points: 1] If you sort a file containing lines of mixed-case ASCII text, which lines sort first in the file, Upper Case or Lower Case? _____
14. [Points: 4] (a) True/False: $(a'b')' == ab$ _____
(b) True/False: $(a' + b')' == a + b$ _____
15. [Points: 3] Write the simplest IF statement (simplify the Boolean logic) for the following programming problem specification: "Call the ADD routine **unless**: the COST is greater than zero and the CODE is 'sold'."
