ECE3221 – Quiz # 3 **May 24, 2018** **Adam Wilson**

Name: _____ Student #: _____ Signature: _____

Calculators not allowed

1. (1 mark) When a program is run, the control unit begins a repetitive sequence called _____Fetch and Execute_____ that continues until the processor is halted.

2. (1 mark) A faster clock speed translates into a faster computer. Give one example of a limitation that may prevent the clock speed of a computer from being increased to 10x the normal clock rate.

_____Temperature of processor, speed (access time) of memory_____

3. (1 mark) A technique used to improve the efficiency of input (or output) operations of computer system by allowing writes (or reads) to (or from) memory directly without continual CPU interaction is called:

_____Direct memory access (DMA)_____

4. (4 marks) Complete the table below by showing the corresponding signed binary representation of each of the supplied signed decimal values:

Signed Decimal Value	Sign and Magnitude (8 bit)	2's Complement (8 bit)
+15	0000 1111	0000 1111
-15	1000 1111	1111 0001
+33	0010 0001	0010 0001
-33	1010 0001	1101 1111

5. (2 marks) Convert the following values to 8-bit binary and use 8-bit binary arithmetic to perform the addition. Show the answer in both binary and decimal:

95_{10} = 0 1 0 1 1 1 1 1_2
\+ -36_{10} = 1 1 0 1 1 1 0 0_2
59_{10} = 1 0 0 1 1 1 0 1 1_2

30_{10} = 0 0 0 1 1 1 1 0_2
\+ 34_{10} = 0 0 1 0 0 0 1 0_2
64_{10} = 0 1 0 0 0 0 0 0_2

6. (1 mark) Convert the following decimal value to BCD (show result in binary):

94058390_{10} = 1001 0100 0000 0101 1000 0011 1001 0000_2

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7. (2 marks) The ASCII character 'G' is 0x47 in hex and the ASCII character 'g' is 0x67 in hex. What operation (include operation and operand) could be performed on the bits of the ASCII character 'G' and 'g' to ensure that the result of the operation produces the same letter but with the opposite case (ie: 'g' input produces 'G' output and 'G' input produces 'g' output):

XOR the input with the 0x20 (or $0010\ 0000_2$) to toggle bit 5 (the 6th bit)

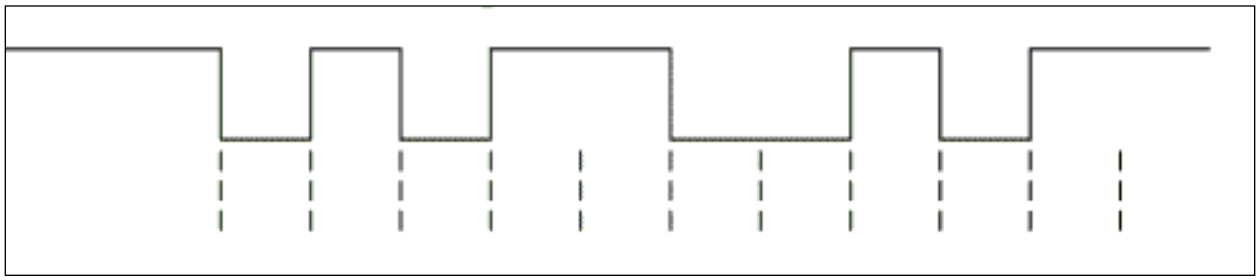

Figure 1 - Asynchronous serial transmission of ASCII character

8. (2 marks) The above diagram in Figure 1 shows the timing diagram for an asynchronous RS232 data transmission of an ASCII character (7 data bits). What is ASCII character is being transmitted (refer to the attached ASCII table)?

ASCII Character 'M' = 0x4D = 1001101_2

9. (1 mark) What type of parity is being used in the data transmission in Figure 1(even, odd or none)?

even parity – the total number of 1's including the parity bit is 4 (an even number)