Final Exam - CSc 137

(Include the Test question along with solution)

Name: _____

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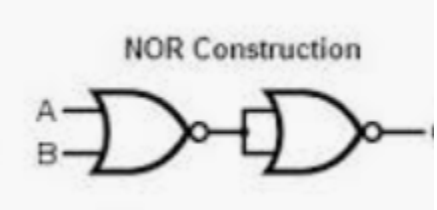
1. What is the 16-bit FP number representation of 10.3 in hex with 1-bit sign, 4-bit biased exponent, and 11-bit fraction, where bias = 7? Please identify the key components of FP number representation (20 pts)

2. Indicate which single logic gate is represented by the NOR gate construction below? (20 pts)
(Hint: Generate the truth table)



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3. Design a Moore sequence recognizer that detects the Non-overlapping sequence “010”. Use binary encoded state labels and design and draw the circuit schematic. (i.e. FSD, Next state generator Table (shows transition from current state to next state), Output Generator Table and schematic circuit. Please use output label as Y and input label as Z. Your inputs to D flip-flops will be D0 and D1. (20 pts)

4. Consider a 8-bit data bus SDRAM. Given that the clock frequency of the bus is 400MHz, what is the peak memory bandwidth in megabyte per second (MBs)? (20 pts)

5. Computation is performed by a RISC ISA. A = B * (C + D). What is the value in R3 after the execution of code line #6: (M[B] = 10; M[C] = 5; M[D] = 15) ie: Code line # 6 has been completed. (20 pts)

R3 has a value of _____

RISC-ISA: Example of assembly program

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#1. LD    R1,   (C)
#2. LD    R2,   (D)
#3. ADD   R3,   R1, R2
#4. LD    R4,   (B)
#5. MUL   R5,   R3, R4
#6. ST    (A),  R5
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