COMP311 In-Class Problems 8/21/25   Name: _____

Question 1: Bitwise Operations.   Fill in the following blanks using the options below. n is an integer. There are multiple correct answers for each question.

First blank: `AND`, `OR`, `XOR`
Second blank: `n`, $\neg n$, $0b000...000, 0b111...11$.

1.1. n _____ _____ = n

1.2. n _____ _____ = $0b000...000$

1.3. n _____ _____ = $0b111...11$

Question 2: Address Calculation   I have a 10-element integer array whose base address is 20. What is the address of element 9?

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Question 3: Size of Memory Address   If the size of our memory is 4 GB, how many bits do we need to address our memory? (1GB $= 2^{30}$ bytes)

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Question 4: A Three-Switch Function   What function is realized if all three switches are in series? Or all three are in parallel?

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Question 5: Pondering Truth Tables   Answer the following about truth tables.

5.1. A truth table for 3 input variables has how many rows?

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5.2. a truth table for 4 input variables has how many rows?

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5.3. Write a general expression for the number of rows given n input variables.

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