Digital Circuits and Systems

ECS 326/676

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Question 1

Convert the binary number 1011011_2 to its equivalent decimal, octal, and hexadecimal forms.

Question 2

Perform the subtraction $110101_2 - 10101_2$ and express the result in hexadecimal.

Question 3

Perform the addition of 101110_2 and 110111_2 and express the result in both binary and hexadecimal.

Question 4

Using Boolean algebra, prove that $A + AB = A$.

Question 5

Simplify the expression $(A' + B' + C)(A + B + C)(A' + B)$ **using Boolean algebra.**

Question 6

Check if the Boolean equation
$(A \cdot B) + A' = (A + B) \cdot (A' + B')$ **is correct or not.**

Question 7

Find the complement of the Boolean function
$F = (A + B)(C + D)(A' + B')$**.**

Question 8

Find the complement of the Boolean function $F = A \cdot (B + C) + A' \cdot (B \cdot C)$ using Boolean algebra and draw its corresponding logic circuit.

Question 9

Derive the complement of $F = AB + A'B'C$.

Question 10

Derive a minimal SOP (Sum of Products) form for the Boolean function $F(A, B, C, D) = \Sigma(0, 1, 6, 7, 10, 11)$.