**Assignment 1**

**Problem\_1**

Multiply, subtract, and add in binary:

|  |  |  |
| --- | --- | --- |
| 1 1 0 1 1  X 1 0 1 1 | 1 1 1 1 (Sub)  −1 0 1 0 | 1 1 1 1 (Add)  +1 0 1 0 |

**Problem 2:**

Convert (7813.400)9 to hexadecimal (base 16). Carry out your answer to 3 places past the decimal point.

**Problem\_3**

1. Write a Boolean equation in sum-of-products and product-of-sums canonical form for each of the following truth tables (C) and (D)
2. Simplify the obtained solution using the rules of Boolean Algebra
3. Use Karnaugh maps to verify your answers
4. Draw the corresponding circuits for each design

Table

Description automatically generated with medium confidence

**Problem\_4**

1. Write Boolean equations for the circuit shown below.
2. Derive the truth table
3. Minimize the obtained equation by rules of Boolean algebra.
4. Verify the solution using Karnaugh maps

Diagram

Description automatically generated

**Problem\_5**

1. Simplify the following Boolean equations using Boolean theorems.
2. Check for correctness using a truth table and K-map (You may not need to consider all combinations, just consider few remarkable values)Logo, company name

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**Problem\_6**

1. Find a minimal Boolean equation for the function shown below
2. Check for correctness using a truth table and K-map (You may not need to consider all combinations, just consider few remarkable values)
3. Remember to take advantage of the don’t care entries.

A picture containing shape

Description automatically generated

**Problem 7:**

A switching circuit has three inputs (*A*, *B*, *C*) and one output (*Z*). If *A*= 0, the output *Z* is the exclusive-OR of *B* and *C*. If *A* = 1, the output is the equivalence of *B* and *C*.

Equivalence of *B* and *C is defined as: (B⊕C)’*

1. Find the truth table for Z.
2. Write the minterm expansion for Z in decimal form and in terms of A, B, C.
3. Write the maxterm expansion for Z in decimal form and in terms of A, B, C.
4. Verify the minterm result by mean of KMap
5. Draw the corresponding circuit