

Assignment 1

1. (a) Perform the following using BCD arithmetic. [3+3]

i. $(1263)_{10} + (9687)_{10}$

ii. $(7672)_{10} + (3378)_{10}$

- (b) Convert the following: [2+2]

i. $(997)_{10} = (\quad)_{16}$

ii. $(654)_{10} = (\quad)_2$

2. (a) Express the following functions in sum of minterms and product of maxterms. [4+4]

i. $(xy + z)(y + xz)$

ii. $B'D + A'D + BD$.

- (b) Obtain minimal SOP expression for the complement of the given expression:

$$F(A,B,C) = \text{sum}(1, 2, 5, 7) .$$

Draw the circuit using NOR - gates. [3+3]

3. (a) Perform the subtraction with the following binary numbers by taking the 2's complement method: [2+2]

i. $11010 - 10110$

ii. $11011 - 1001$

- (b)

Use DeMorgan's Theorems to simplify the following expressions:

1) $\overline{\overline{(a+d)} \cdot \overline{\overline{(b+c)}}}$

2) $\overline{\overline{(a \cdot b \cdot \overline{c})} + \overline{\overline{(\overline{c} \cdot d)}}$

3) $\overline{\overline{a+d} \cdot \overline{\overline{b+c}} \cdot \overline{\overline{c+d}}}$

[2x 3=6]

4. Express AND and OR gates as a combination of NAND gates [2 + 2]

5. $(11100)_{\text{Gray Code}} = (\quad ? \quad)_2$ [2]