

BIM-2nd Semester (NCCS College)

Assignment-3 (Unit-4 Combinational Logic)

Deadline: August 11, 2023

1. Difference between combinational and sequential circuit. Explain the design procedure of Combinational Circuit.
2. Design the full adder circuit using 3 to 8 decoder and explain the working principle.
3. What is decoder? Design BCD to Decimal Decoder with truth table and logic diagram.
4. Design a combinational circuit with four inputs and one output. The output is equal to 1 when (i) all the inputs are equal to 1 or (ii) none of the inputs are equal to 1 or (iii) an odd number of inputs are equal to 1.
5. Design a combinational circuit whose input is a four-bit number and output is 2's complement of the input number.
6. Implement the following function: $F = \sum(0,1,3,4,5,8,9,10,15)$ using
 - i) Decoder
 - ii) Multiplexer
7. Design a decoder with three input lines but with only six output lines. If the value of the input corresponds to 6 or 7, then all output line should be asserted to signal an error.
8. Define Half-subtractor with truth table and logic diagram.
9. Implement a full subtractor with two half subtractor and one OR Gate.
10. Implement 8 x 1 MUX using 4 x 1 MUX.
11. Difference between MUX and DEMUX. Difference between Encoder and Decoder.