NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI
Cycle Test 1 – JULY, 2023 SESSION

Department : Department of Computer Science and Engineering
Date & Time of CT-I : 07/09/2023 11:00 am to 12:00 pm   Venue: CSED
Sub Code & Title : CSPC33 Digital Systems Design   Max. Marks: 20
Faculty Name : R. Leela Velusamy

Note to Student: Detailed answer is expected

Answer all questions

1. What is the range of decimal value represented by a 16-bit binary number denoted as a) sign-magnitude form, b) unsigned form c) twos complement form? (3)

2. Find the 16's complement of the number BCD3F. (1)

3. a) Analyze the circuit given in Figure 1 and derive the Boolean function for the output X (2)
   b) Rewrite the Boolean function in sum of minterms and   product of Maxterms. (3)
   c) Implement the function after **simplification** using two level NAND – AND gates. (2 + 2)

4. Consider a four bit adder with carry lookahead. Derive the Boolean expression for the carry bits C_1, C_2, and C_3 in terms of carry generate G_i and carry propagate P_i. (3)

5. Draw a four-to-online multiplexer with an enable input and the corresponding truth table. (4)
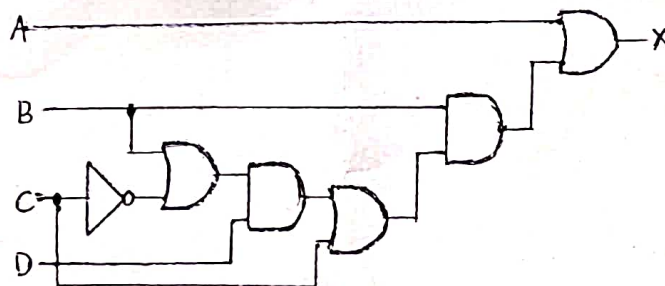

Figure 1

*****Best Wishes*****