



National Institute of Technology, Tiruchirappalli

Department of Computer Science and Engineering

CSPC33 Digital System Design /Cycle Test 1

Course/ Branch/Sem

: B.Tech/ CSE/III

Date : 20/09/2022

Duration

: 1 Hour

Max Marks : 20

B - Section

106121002

Answer All Questions

1. Write down the boolean expression of a 4-to-1 multiplexer and design only using the NAND gates. (4)
2. Minimize the expression $AB + \overline{A}C + BC = AB + \overline{A}C$. Use Boolean rules. (3)
3. Implement $F(A, B, C, D) = \sum m(0, 1, 5, 6, 8, 10, 12, 15)$ using 8:1 multiplexer. (2)
4. Design a combinational circuit whose input is a four-bit number and whose output is the 2's complement of the input number. Write down the truth table, simplify the boolean expression and draw the circuit diagram. (5)
5. Minimize the boolean function using K-map
 $F(A, B, C, D) = \sum m(1, 3, 4, 6, 8, 9, 11, 13, 15) + \sum d(0, 2, 14)$ (3)
6. Design a 4-to-16 decoder, using 2 to 4 decoders. (3)

Handwritten notes:
 $I_0 \overline{S_1} \overline{S_0} E$
 $I_1 \overline{S_1} S_0 E$
 $I_2 S_1 \overline{S_0} E$
 $I_3 S_1 S_0 E$