# **Question Paper**

Exam Date & Time: 02-Jun-2022 (09:30 AM - 12:30 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

### INTERNATIONAL CENTRE FOR APPLIED SCIENCES II SEMESTER B.Sc.(Applied Sciences) in Engg. END SEMESTER THEORY EXAMINATION-MAY/JUNE 2022

Switching Circuits and Logic Design [ICS 122 - S2]

Marks: 50

Duration: 180 mins.

#### Answer all the questions.

#### Missing data if any suitably assumed.

1)	i) Simplify the following expression using consensus theorem g(a,b,c,d)=a'c'd'+a'bd+bcd+acd'+b'cd' ii) Express DeMorgan's theorem in terms of logic gates. iii) Write the prime implicants, essential prime implicants and simplified expression for the following function. $F(a, b, c, d)= \sum m(1, 3, 4, 5, 10, 11, 12, 13, 14, 15)$	(10)
2)	Define multiplexer and design the following multiplexers i. using 2-to-1 multiplexers to build a 4-to-1 multiplexer. ii. using 4-to-1 multiplexers to build a 16-to-1 multiplexer. Write behavioural Verilog code for 3 to 8 decoders with active high enable input and active low output. Use case Statement.	(10)
3)	Design a circuit for BCD adder using 4-bit binary adder and derive its SOP expression which is used as correction circuit. Explain its operation in detail.	(10)
4)	Design a circuit and write verilog code for the following i) 4-bit binary into equivalent grey code ii) 4-bit grey code into equivalent binary	(10)
5)	With neat circuit diagram along with truth table and transistor states illustrate how to realize NOT, NAND and NOR gates using CMOS transistor.	(10)

-----End-----