Question Paper

Exam Date & Time: 08-Jul-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]

Marks: 50 **Duration: 180 mins.**

Answer all the questions.

Missing data may be assumed suitably.

1)	Simplify the following expressions using algebraic manipulation. i) f= x2x3'x4+x1x3x4+x1x2'x4 ii) f= (x1'+x2+x3). (x1'+x2'+x4'). (x1'+x3+x4) Find the minimum cost SOP and POS expression for the following function using K-map and design the circuit using only NOR gates. i) F(w, x, y, z)= ∑m(0, 1, 3, 4, 7, 11, 13, 15)+D(9, 12, 14)	(10)
2)	Design and write verilog code for the following 1) 4-bit Adder/Subtractor. 2) 4-to-16 decoder constructed using 2-to-4 decoders	(10)
3)	Write down the implications of "delay issues" in 4-bit adder circuit and explain how it can be rectified by re-designing it as "carry look ahead adder". Illustrate the functionality of it using two 4-bit numbers A=1101 and B=1011.	(10)
4)	Design SR and D FF's using NAND gates. Derive the expression for both FF's with their characteristics table.	(10)
5)	With neat circuit diagram along with truth table and transistor states, illustrate how to realize NAND, NOR and AND gates using a NMOS transistor.	(10)

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