## **Question Paper**

Exam Date & Time: 02-Jan-2023 (10:00 AM - 01:00 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

Manipal School of Information Sciences (MSIS), Manipal First Semester Master of Engineering - ME (VLSI Design) Degree Examination - January 2023

High Level Digital Design [VLS 5001]

Marks: 100

3)

Duration: 180 mins.

Monday, January 1, 2023

Answer all the questions.

- <sup>1)</sup> Describe the general representation of a single precision <sup>(10)</sup> floating point numbers. Calculate the single precision floatingpoint notation for the decimal numbers +3.25 and -5.75
- <sup>2)</sup> Illustrate the function F (A, B, C, D) = (0,5,7,8,9,10,11,13) (10) using 8:1 multiplexer
  - (TLO 2.1) Solve the following circuit for minimal solution using Quine (10) Maclusky method and prime implicant chart, use Petrick's method if the problem becomes cyclic.F(a,b,c,d,e) =  $\Sigma(2,3,7,10,12,15,27) + \Sigma d(5,18,19,21,23)$

(TLO - 5.3)

(TLO - 2.1)

<sup>4)</sup> Design and draw the circuit for a divided by 4 clock frequency <sup>(10)</sup> circuit and explain its working principle

(TLO - 6.2)

<sup>5)</sup> Design and draw a combined Moore FSM for detecting the <sup>(10)</sup> sequences 001 and 100. Optimize the states using implication method and draw the circuit.

(TLO - 7.2)

<sup>6)</sup> Solve the following circuit for minimal solution using Tabular <sup>(10)</sup> method and prime implicant chart, use Branch method if the problem becomes cyclic. F (p, q, r, s) = $\Sigma m(0,2,5,6,7,8,10,12,13,14,15)$ 

(TLO - 5.2)

7)	Compare Brent Kung Adder, Sklansky Adder and Kogge Stone <sup>(10)</sup> Adder w.r.t. speed, area, and power
	(TLO - 3.2)
8)	Describe the Configurable Logic Blocks and Configurable I/O <sup>(10)</sup> Blocks in in a CPLD. List the important pros and cons of FPGAs. (6 + 4)Marks
	(TLO 9.2)
9)	Discuss the design of an asynchronous FIFO with a schematic <sup>(10)</sup> diagram.
	(TLO 11.2)
10)	Illustrate the AMBA AHB 4-beat incrementing burst transfer <sup>(10)</sup> with a timing diagram
	(TLO 12.2)

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