B. Tech. Sem -VI (E & TC Engg.) (2014 COURSE) (CBCS) :
SUMMER - 2019
SUBJECT : VLSI DESIGN

Day : Monday
Date : 27/05/2019

S-2019-2779

Time : 02.30 PM TO 05.30 PM
Max. Marks : 60

N. B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.
4) Use of non-programmable calculator is **ALLOWED**.
5) Assume suitable data, if necessary.

Q. 1 **a)** How will you define concept of modularity, regularity, locality and design hierarchy? Discuss using suitable example. **(05)**

b) Draw stick diagram of 2-input NAND. **(05)**

OR

Q. 1 **a)** What are the benefits of VLSI? Discuss VLSI design flow. **(05)**

b) Why layout design rules are used? Which are the layout design rules? **(05)**

Q. 2 **a)** What is scaling? Compare full scaling and constant voltage scaling. **(05)**

b) For CMOS inverter, V_{DD}=5V, $V_{90\%}$=4.5V, $V_{10\%}$=0.5V, $\mu_n C_{ox}$=20μA/V^2, $(W/L)_n$=5, $V_{T,n}$=0.8V. Using average current method, calculate τ_{fall} if C_{Load}=10pF. **(05)**

OR

Q. 2 **a)** What is channel length modulation? Explain channel length modulation using Current-Voltage characteristics of MOSFET. **(05)**

b) For CMOS inverter, V_{DD}=5V, $\mu_n C_{ox}$=110μA/V^2, $\mu_p C_{ox}$=50μA/V^2 , $(W/L)_n$=8, $(W/L)_p$=25, $V_{T,n}$=0.8V and $V_{T,p}$= - 1V. Calculate τ_{PLH} and τ_{PHL} if C_{Load}=100fF. **(05)**

Q. 3 **a)** What is the difference between Signal and Variable used in VHDL? Explain with example. **(05)**

b) Write VHDL code for full adder using dataflow model. **(05)**

OR

Q. 3 Draw the block diagram of 16 X 1 MUX using 4 X 1 MUX and 2 X 1 MUX as component. Write VHDL code for the same. **(10)**

P. T. O.

Q. 4		Design a state machine for sequence detector to detect a sequence " 1011" . Write VHDL code for the same.	**(10)**

OR

Q. 4	**a)**	What are the different methods of configuring CPLD and FPGA?	**(05)**
	b)	Write VHDL code for 4-bit down counter.	**(05)**
Q. 5		How Voltage Scaling is used for low power operation? Discuss using suitable example.	**(10)**

OR

Q. 5		What are the different factors affecting power consumption? Explain using suitable equations.	**(10)**
Q. 6		Using suitable example, explain how physical defects result in logical faults. List physical defects, electrical faults and logical faults.	**(10)**

OR

Q. 6		How BIST is implemented?	**(10)**

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