

Roll No.

24327

**B. Tech 6th Semester (ECE)
Examination – May, 2018**

VLSI DESIGN

Paper : EE-306-F

Time : Three Hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) List out the advantage of BICMOS technology. 4
- (b) Define term "diffusion process." 2
- (c) Why NAND gates are preferred over NOR gates in VLSI Technology. 5
- (d) What is Tally Circuits ? Why these circuit are required ? 5
- (e) Differentiate between combination and sequential circuits. 4

SECTION - A

2. (a) Explain the structure and operation of Enhancement type N-MOSFET. 10
- (b) Describe the various steps in fabrication of a CMOS. 10
3. (a) Derive expression for NMOS transistor current equation in different region. 12
- (b) Draw and explain the MOS Transistor model. 08

SECTION - B

4. (a) Show that pull up to pull down ratio for an NMOS Inverter driven by another NMOS Inverter is 4 : 1. 10
- (b) Describe the working of CMOS Inverter with help of transfer curve. 10
5. (a) Describe the Lamda based rules. 10
- (b) Define the term 'Super Buffers.' Also draw and explain the circuit of Inverting type NMOS super buffer. 10

SECTION - C

6. (a) Discuss the concept of two phase clocking. Also explain the clock skew phenomena accruing in circuits. 14
- (b) Compare the NAND-NAND and NOR-NOR logic Implementation Technique. 06

7. Realize the following function using CMOS logic circuits. 20

(a) NAND Gate

(b) XNOR Gate

(c) $Y = \overline{(A \cdot B) + C}$

SECTION – D

8. Explain the different types of data object and data types used in VHDL. 20

9. Write a short note on : 20

(a) FPGA

(b) Operators

(c) Test benches
