

C 22582

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Name.....

Reg. No.....

**SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE [2014 SCHEME]
EXAMINATION, APRIL 2017**

Electronics and Communication Engineering

EC 14 603—VLSI DESIGN

Time : Three Hours

Maximum : 100 Marks

*Answer any eight questions.
Each question carries 5 marks.*

1. (a) Give the principle of constant field scaling and its effect on device characteristics.
(b) Discuss the operation of CMOS ring oscillator. Estimate its frequency.
(c) Explain the problem of charge sharing and how it is overcome.
(d) Discuss the operation of differential sense amplifier.
(e) Explain the operation of ROM using pseudo NMOS logic.
(f) Explain the logic behind carry look ahead adder.
(g) Discuss the process of molecular beam epitaxy.
(h) Outline the various types of photoresists.
(i) Write short notes on multi-level metallization.
(j) Explain the layout process using cell hierarchy.

(8 × 5 = 40 marks)

2. (a) (i) Obtain the d.c. transfer characteristics of pseudo NMOS inverter. (8 marks)
(ii) Outline the reason for power dissipation and various sources that lead to power dissipation. (7 marks)

Or

- (b) (i) Discuss the various factors that account to robustness of CMOS inverter. (8 marks)
(ii) Explain channel length modulation and body effect. (7 marks)
3. (a) (i) Draw and explain the architecture of Carry Select Adder. Outline how it does increase the speed of operation. (10 marks)
(ii) Explain the structure of 6T SRAM cell. (5 marks)

Or

Turn over

- (b) (i) Explain the architecture of 4×4 array multiplier with neat diagram. (10 marks)
(ii) Draw and explain the structure of 4 : 1 Multiplexer using transmission gate. (5 marks)
4. (a) (i) Explain in detail the Deal - Grove model of oxidation process. (10 marks)
(ii) Write short notes about ion implantation. (5 marks)

Or

- (b) Define etching. Explain the principles of wet and ion etching. Differentiate the key points between them. (5 marks)
5. (a) (i) Explain the steps involved in twin tub process of CMOS fabrication. (10 marks)
(ii) Discuss the lambda based design rules. (5 marks)

Or

- (b) (i) Draw the stick diagram of NAND gate. (5 marks)
(ii) Explain the principle of silicon on insulator isolation. (10 marks)
- [4 × 15 = 60 marks]