Printed Pages : **EEC027**

(Following Paper ID and Roll No. to be filled in your Answer Books)

PAPER ID : **Roll No.** | | | | | | | | | | |

B.TECH

Theory Examination (Semester-VI) 2015-16

VLSI DESIGN

Time : 3 Hours ***Max. Marks : 100***

SECTION-A

1. Attempt all parts. All parts carry **equal** marks. Write answer of each part in short**. (2 x 10 =20)**

   a. What are the different MOS layers?

   b. Define rise time and fall time.

   c. What is body effect coefficient?

   d. How do you prevent Latch up problem?

   e. Write a note on CMOS transmission gate logic.

   f. List any two types of layout design rules.

   g. What is DIBL?

   h. Write an equation for combinational zero controllability and combinational one controllability for two input AND gate.

   i. List the design guidelines for I_{DDQ} testing.

   j. Draw an structure of Transmission Gate.

SECTION-B

Attempt any **five** questions from this section. **(10 x 5 = 50)**

2. Derive drain current of MOS device in different operating regions.
3. Size the transistors of CMOS three input NAND gate for logic ratio of 3/1.
4. Explain in detail Standard Cell Based Design ASICs
5. Enlist the main features of the follwoing

   (i)PLA

   (ii)ASIC

6. Explain Built-in Self-Test.
7. Derive the expression for Dc characteristics of CMOS inverter.
8. Explain in detail about various types of Routing.

9. Discuss the principle of constant field scaling and also write its effect on device characteristics

SECTION-C

Attempt any **two** questions from this section. **(15 x 2 = 30)**

10.

a) Calculate the threshold voltage for a transistor at 300K for a process with a Si substrate with NA-1.80´1016, a Sio2 gate oxide with thickness 200Å.Assume fms=-0.9V;Qfc=0.

b) Explain lambda based design rules

11.

a) Explain the gate, source/drain formation and isolation steps of CMOS fabrication process with neat diagrams.

b) Implement the following function using CMOS f(A,B,C)=A'BC+AB'C+ABC'

12.

a) Explain neatly the ASIC design flow.

b) Describe Twin-Tub process in detail.