Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.TECH(ECE-VLSI)/SEM-1/MVLSI-102/2011-12

2011

VLSI DEVICES AND MODELLING

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Group A is Compulsory and answer any four questions from Group B

GROUP – A

1. What is Punch-through ?

2. What is channel-length modulation ?

3. Mention the differences between EMOS and DMOS.

4. What are the limitations in increasing the power supply to reduce delay ?

5. What is body effect ? 2 + 2 + 3 + 3 + 4

GROUP – B

6. a) What is mobility degradation ?

   b) How is the current effected due to vertical electric field in channel area of sub-micron devices ? 4 + 10

7. a) What are the benefits of scaling ?

   b) How do you scale channel dimension, doping concentration, terminal voltages on the basis of constant field approximation ? 4 + 10

8. a) What is drain induced barrier lowering ?

   b) Explain the action of double gate MOSFET with proper diagram. 7 + 7

9. a) Indicate the three regions of operations of a n-MOS transistor and explain them in detail.

   b) How would they differ in case of p-MOS ? 10 + 4

10. a) Illustrate the impact of Short-Channel effect on the threshold voltage.

    b) Write the SPICE code for designing a NAND gate using CMOS. 4 + 10