Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/M.Tech(ECE)/SEM-1/MVLSI-103/2012-13

2012

DIGITAL IC DESIGN

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
(Objective Type Questions)

1. Answer any *five* of following : 5 × 2 = 10

   a) Draw the layout of 2 input and gate.

   b) Draw a 1 bit full adder using dynamic logic.

   c) Write the program of master slave flip-flop using VHDL.

   d) What is bootstrap capacitance ?

   e) Draw the symbols of inverter, AND, OR, XOR gates in BDD.

   f) How the following Boolean function can be realized with TG.

   $$F = A + BC$$

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Describe the operation (Read and write) of 1bit SRAM Cell.

3. Write the program of parity generator using VHDL code.

4. What are the rules for layout ? Draw the layout for 1bit full adder.

5. Draw the circuit diagram of a dynamic shift register with enhancement load and explain its operation.

6. Design the state diagram for handshaking mechanism of a communication system.

GROUP – C
(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) How many types of VHDL programming are there ?

   b) Design a seven segment display to glow 2012 and write down its program in VHDL. 5 + (5 + 5)

8. a) What is logic optimization ? Why is it needed ?

   b) Design a mod 10 counter using an optimized logic method and justify your chosen method.

(4 + 2) + (7 + 2)

9. a) What is cascading problem in dynamic CMOS logic ? How is this problem removed ?

b) Design the following function using Domino logic :

$$F1 = A' + BCD + D'$$

$$F2 = DE' + (A + C' G + HF1)'$$

$$F3 = (IJK' + (F1' F2)' + AB'C$$

(3 + 3) + 9

10. a) Draw the layout for 2bit full adder.

b) Descibe read and write operations of a DRAM cell.

9 + (3 + 3)

11. a) Design the ROBDD of 4 bit full adder.

b) Explain with illustrations Moore's and Mealy machines.

9 + (3 + 3)