Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

SECOND SEMESTER M.TECH (DEAC/MICROELECTRONICS)
DEGREE END SEMESTER EXAMINATION – APRIL / MAY 2017
SUBJECT: CAD TOOLS FOR VLSI DESIGN (ECE-5234)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates
- Answer **ALL** questions.
- Missing data may be suitably assumed.

1A. Find complement of the following function using Recursive algorithm F=wx'y+w'xy+yz'+wxy'+wy'z'

1B. Determine the prime implicants for the following function using iterated consensus method
F=x'z'+xyz'+xy'z'+xy'z

1C. Explain heuristic minimization. What are all the different types of heuristic minimizers available

(5+3+2)

2A. Find the essential prime implicant for the set of prime implicants F={C_1, C_2, C_3, C_4} where $C_1=x_1'x_3'x_4'$ $C_2=x_1x_2$ $C_3=x_3x_4$ $C_4=x_2x_3'x_4'$ using ESPRESSO algorithm.

2B. Find the test vector to test single stuck at faults for the circuit shown in Fig.Q2B using Boolean difference method.

2C. Explain Y chart

(5+3+2)

3A. Apply Hu algorithm for the given data flow graph shown in Fig.Q3A. Assume γ=4, P(0)=1,P(1)=3,P(2)=4,P(3)=2,P(4)=2. Determine the resource constraints. Draw the scheduled graph with resource constraints

3B. Explain ALAP algorithm

3C. Draw the stick diagram for the function F=(A'B+AB')'

(5+3+2)

4A. Find the test vector using Iterative test generator for the circuit shown in Fig.Q4A

4B. Find the sequence for the faulty and fault free circuit using signature analysis technique to test the single stuck at faults (α at SA_0, β at SA_1) shown in Fig.Q4B. Assume it's a 4 bit shift register and the third bit from MSB is connected as feedback to the one input of XOR gate.

4C. Find the collapse ratio for the given circuit shown in Fig.Q4C

(5+3+2)

5A. Implement full adder using 2 half adders and 1 OR gate using ACT3 logic module. Determine the number of logic modules required to implement.

5B. Implement F=a'cd+b'cd+a'b+bc' using 4*2*1 Altera max FPGA (use shared logic expander)

5C. Draw ROBDD for the function F=ab+bc+ca in the order of a-c-b

(5+3+2)

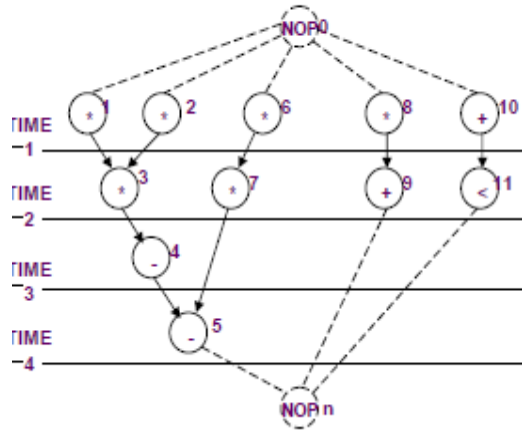

Fig Q3A

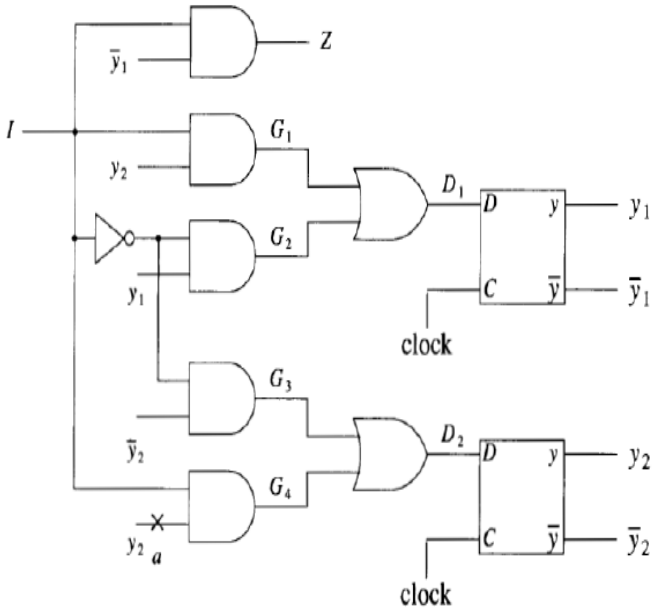

Fig Q4A

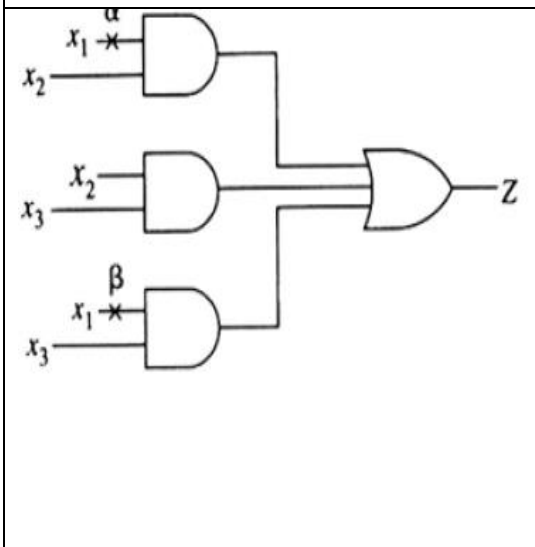

Fig Q4B

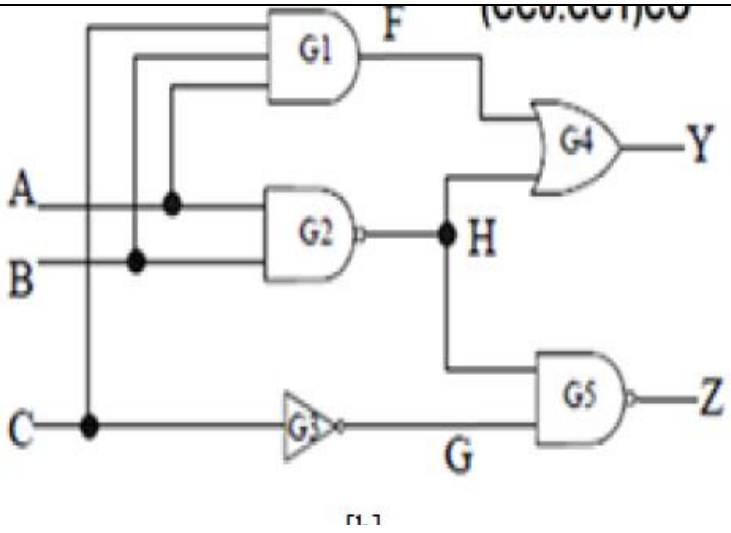

Fig Q4C

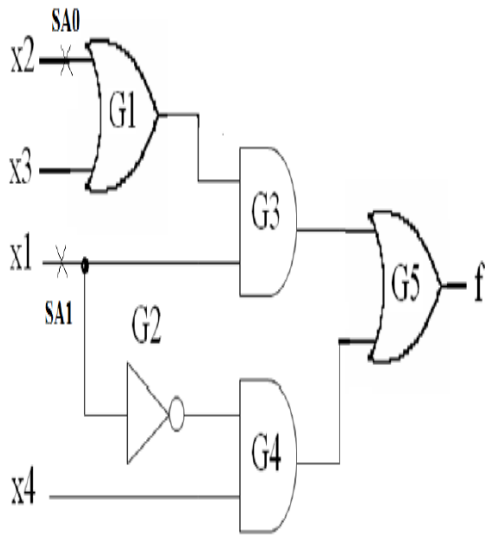

Fig Q2B