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Third Semester M.Tech. Degree Examination, June/July 2023
Synthesis and Optimization of Digital Circuit

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the architectural level, logic level and geometric level synthesis with relevant diagram. (10 Marks)
 b. What are the general approaches to optimization? (10 Marks)

OR

- 2 a. Compare the different hardware description languages used for synthesis. (10 Marks)
 b. Write the structural and behavioral representation of half adder in VHDL. (10 Marks)

Module-2

- 3 a. Explain Greedy algorithm. (10 Marks)
 b. For a function $f = ab + bc + ac$, find the Boolean difference, consensus and smoothing with respect to 'a'. (10 Marks)

OR

- 4 a. Explain data path synthesis and control unit synthesis. (10 Marks)
 b. Discuss strategies for architectural optimization. (10 Marks)

Module-3

- 5 a. Explain Heuristic logic minimization. (10 Marks)
 b. Explain how Tautology plays an important role in all algorithms for logic optimization. (10 Marks)

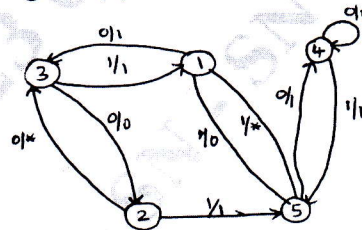
OR

- 6 a. Explain optimization of logic networks with an example. (10 Marks)
 b. Explain single vertex optimization with an example. (10 Marks)

Module-4

- 7 a. For the state diagram shown in Fig.Q.7(a) find minimum state diagram. (10 Marks)

Fig.Q.7(a)



- b. Explain finite state machine decomposition. (10 Marks)

OR

- 8 a. Explain implicit state minimization. (10 Marks)
 b. Explain retiming algorithms which address the problem of minimizing the cycle time. (10 Marks)

Module-5

- 9 a. Write the pseudocode for the ASAP and ALAP algorithm. (10 Marks)
 b. Explain integer linear programming model for resource constrained scheduling problem. (10 Marks)

OR

- 10 a. Discuss sharing and binding for resource dominated circuits. (10 Marks)
 b. Explain sharing and structural testability. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and/or equations written eg, $42+8=50$, will be treated as malpractice.