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10EC077

**M.Tech. Degree Examination, June/July 2011**  
**Synthesis and Optimization of Digital Circuits**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. Draw Gajski and Kuhn's y-chart for synthesis task involved at each level with examples. (10 Marks)
- b. Explain circuit optimization at the architectural level with an example using design evaluation space. (06 Marks)
- c. Explain briefly semicustom design. (04 Marks)
- 2 a. Explain the characteristic numbers of a graph and find whether the graph shown in Fig.Q2(a) is perfect or not. (07 Marks)

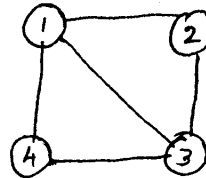


Fig.Q2(a)

- b. Prove that LEFT\_EDGE algorithm is exact. (07 Marks)
- c. Explain Bryant's reduction algorithm. (06 Marks)
- 3 a. Write i) VHDL and ii) UDL/I code for finite state machine that recognizes two or more consecutive 1s in an input data stream. (08 Marks)
- b. Explain briefly dataflow and sequencing graphs with example. (06 Marks)
- c. Explain anatomies of software and hardware compilers. (06 Marks)
- 4 a. Explain Expand, Reduce, Reshape and irredundant operators with example for Leuristic Logic minimization. (10 Marks)
- b. Explain encoding algorithm with example. (10 Marks)
- 5 a. Explain algebraic substitution algorithm with example. (10 Marks)
- b. A logic network is specified by the following expressions:  

$$f_x = ace + bce + de + g$$

$$f_y = ad + bd + cde + ge$$

$$f_z = abc$$
 Generate all kernels and co-kernels of the above expressions. Extract single cube and multiple cube subexpressions. (10 Marks)
- 6 a. Explain state encoding problem for two level circuits with example. (10 Marks)
- b. Discuss FEAS algorithm with an example. (10 Marks)
- 7 a. Discuss the ALAP scheduling algorithms with example. (10 Marks)
- b. Write the pseudo-code of a list scheduler for the minimum-latency problem under resource and relative timing constraints. (10 Marks)
- 8 Write short notes on:
  - a. FPGA
  - b. Simulators for digital design
  - c. DFT techniques
  - c. Automatic test pattern generators. (20 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 or evaluation and/or equations written eg, 42+8 = 50, will be treated as malpractice.

