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10EC45

Fourth Semester B.E. Degree Examination, Feb./Mar. 2022
Fundamentals of HDL

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.

PART - A

- 1 a. Discuss the various data types in verilog with examples. (12 Marks)
b. Explain data-flow description in VHDL and verilog using half adder as an example. (08 Marks)
- 2 a. With a neat gate-level diagram of a 2×2 - bit combinational array multiplier, write its VHDL code. (10 Marks)
b. Write VHDL code of a 2×1 multiplexer with a logic diagram. (10 Marks)
- 3 a. Write VHDL code behavioral description for a D-Latch using signal-assignment statements and sketch its simulation waveform. Also write the truth table. (12 Marks)
b. Write the structural VHDL description of a full adder with logic symbol and diagram. (08 Marks)
- 4 a. What is the importance of binding in HDL? Explain binding between:
i) Entity and architecture in VHDL
ii) Entity and component in VHDL. (10 Marks)
b. Write the flow chart for booth algorithm and show the steps of booth algorithm taking $X = 1011$ and $Y = 0111$. (10 Marks)

PART - B

- 5 a. Write VHDL and verilog code for a full adder using procedure and task. Also write the full adder circuit. (10 Marks)
b. Explain Mixed-Language description of a Master-Slave D flip-flop (write the circuit). (10 Marks)
- 6 a. Write VHDL code for addition of two $[5 \times 5]$ matrices. (08 Marks)
b. Explain, invoking a VHDL entity from a verilog module and invoking a verilog module from a VHDL module. (12 Marks)
- 7 a. Explain VHDL file processing with examples. (10 Marks)
b. Write declaration of VHDL single - dimensional arrays and verilog single-dimensional array. (04 Marks)
c. Write verilog code for finding the greatest element of an array. (06 Marks)
- 8 a. Explain verilog synthesis information from module inputs/outputs. (08 Marks)
b. Explain mapping the loop statement with an example. (12 Marks)

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.

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