Reg. No.

Manipal University

ipal FORTH SEMESTER B.E. (E & C) DEGREE END SEMESTER EXAMINATION

MAY /JUNE 2016

SUBJECT: DIGITAL SYSTEM DESEIGN AND HDL (ECE - 206)

TIME: 3 HOURS

Instructions to candidates

- Answer ANY FIVE full questions.
- Missing data may be suitably assumed.
- 1A. Consider Full adder is designed using 2 half adder and OR gate. Implement it using ACT1 architecture. Mention the number of Logic modules used in it.
- 1B. Find the test vector for the circuit shown in FIG.1B using Boolean difference method.
- 1C. Explain the antifuse programming technology.

(5+3+2)

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- 2A.Write the hierarchical structural VHDL code for mod-64 ripple up counter using negative edge triggered T flip-flop.
- 2B. Write a behavioural VHDL code for negative edge triggered SR flip-flop with active-high preset and active-low clear.
- 2C.Write a behavioral VHDL code for 8-to-3 encoder with active low enable input.
- 3A. Write a behavioural VHDL code for 4 bit ripple carry adder using procedure.
- 3B. Implement a 3 bit synchronous up counter using PLA and D flip-flops.
- 3C. Find test vector for critical 0 at the primary output in the circuit shown in FIG. 3C and show the critical path. (5+3+2)
- 4A.Find the test vector for the circuit shown in FIG. 4A using i) PODEM .ii) Path sensitization.
- 4B. Implement 3 bit synchronous up counter using a suitable PROM.
- 4C. Explain ACTEL ACT 1 interconnect with the Layout diagram.

(5+3+2)

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MAX. MARKS: 50

- 5A. Write a behavioural VHDL program to model a bidirectional shift register satisfying following conditions.
- 5B. Explain the difference between signal and variable wit example.
- 5C. Write a VHDL test bench for a two input AND gate. (5+3+2)
- 6A. Find the test vector for the circuit shown in **FIG.6A** using ITG method.
- 6B. Find the faulty and fault free signature for the circuit shown in **FIG. 6B** with initial content of LFSR 0000.
- 6C. Write a VHDL program that generates a square wave of period 20ns without any explicit loop? (5+3+2)



FIGURE 3C



FIGURE 4A



FIGURE 6B