

CBT-1 (Portions)

Subject : Digital Design Using HDL

Code : VE18EC204.

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Module 1

1. Introduction to Boolean Functions

- * (Basic Theorems and properties of Boolean Algebra)

- * Operator precedence

- * Boolean Functions

- * Canonical and Standard Forms

 - Minterms

 - Maxterms

 - Conversion between Canonical forms

- * Logic Gates.

2. K-Maps

- * 2-Variable K-Maps

- * 3-Variable K-Map

- * 4-Variable K-Map

- * 5-Variable K-Map

3. Prime Implicants

* PI \rightarrow Prime Implicants

* EPI \rightarrow Essential Prime Implicants

* RPI \rightarrow Redundant Prime Implicants

4. SOP & POS Simplification

5. Don't care Conditions.

6. Quine - McCluskey Minimization Method.

7. NAND - NOR Implementation

* Two - level Implementation.

* Multi - level Implementation.

8. Other Two - Level Implementation

* AND - OR - INVERT (AOI)

* OR - AND - INVERT (OAI)

* Wired logic

* Nondegenerate forms

9. HDL Flow

- * Design entity
- * Logic Simulation
- * Logic Synthesis
- * Timing Verification
- * Fault Simulation.

10. Module Declaration

- * How to declare a module in Verilog
- * Verilog - Ports
- * Port - declaration
- * Verilog Primitives
- * Verilog code using primitives
- * Delays → Gate Delays
- * User defined primitives
- * Verilog Test bench
- * Verilog code using data flow style
 - ↳ Logical operators
 - ↳ Bit-wise operators

Module - 2

1. Design procedure

2. Binary Adder - Subtractor

- * Half adder
- * Full adder
- * Parallel adder
- * Limitations of Parallel adder
- * Carry Lookahead adder
- * Signed & unsigned numbers
- * Binary subtractor
 - ↳ with overflow detection.

* Decimal / BCD Adder

* Binary Multiplier

↳ 2 bit by 2 bit Multiplier

↳ Four bit by 3 bit Multiplier

* Magnitude Comparator

⑤

- Lab
1. SOP and POS Simplification using K-Map
 2. Half adder
 3. Half Subtractor
 4. Full adder
 5. Full Subtractor
 6. Parallel Adder (7483) / Subtractor.
 7. BCD to Excess 3 and Vice versa using (7483)
 8. Gray to Binary and Vice versa
 9. 2:1 mux
 10. 4:1 mux
 11. 1:4 Demux
 12. Dual 4:1 mux IC 74153
 13. Dual 2 to 4 line decoder IC 74139
 14. Full adder/ Half adder using 74153
 15. Full adder/ Half adder using 74139

** All the Best **