

DIGITAL LOGIC







Detailed Course Syllabus

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NUMBER SYSTEM

- Introduction to Number System
- Binary to Decimal and Decimal To Binary
- Octal/Hex to Decimal and Decimal to Octal/Hex
- Generalized Base r to Decimal and Decimal to Base r
- Octal/Hex to Binary and Binary to Octal/Hex
- Fractional Number Conversion
- Examples of Base r fractional number conversion
- Arithmetic of unsigned numbers (All Number System)
- Previous year GATE questions of Base r arithmetic
- Representation of Signed Numbers
- Complement of Number (Radix/ Diminished Radix)
- Arithmetic of Signed Numbers
- Miscellaneous codes
- Weighted and Non weighted codes
- Hamming codes
- Practice Set: Previous Year Gate papers
- Practice Set: Previous Year Gate papers 2

BOOLEAN ALGEBRA

- Introduction to Boolean Algebra
- Minimization of Boolean Expressions
- Relationship between SOP and POS
- K-MAP Introduction
- Examples on Kmap
- Covering Functions
- Implicants and Prime Implicants
- Essential Prime Implicants
- Example on Minimal SOP
- Example on Minimal POS
- Introduction to Don't cares
- Examples on Don't cares P1
- Examples on Don't cares P2
- Finding Minimal Functions
- Branching Technique for Minimizing Cyclic Functions
- Self Dual Functions: Definition



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- Converting Function into self Dual
- Self Dual Functions: No of self Dual functions for n variable
- Combining Functions having Don't cares
- Number of Minimal Expressions
- VEM: Variable Entrant Map
- Examples on VEM
- Previous year GATE questions-1
- Previous year GATE questions-2

COMBINATIONAL CIRCUITS

- Introduction to Logic Design
- AOR and OAR
- NAND-NAND realization
- Minimum No. of NAND Gates required
- NOR-NOR realization
- Minimum No. of NOR Gates required
- EXOR-EXNOR implementation with NAND and NOR
- Half Adder
- Half Subtractor
- Full Adder
- Binary Adder (Ripple Carry Adder)
- Binary Adder/ Subtractor (Ripple Carry Adder)
- Look Ahead Carry Adder
- Serial Adder
- BCD Adder
- Time Complexity of RCA
- Time Complexity of LACA
- Comparator
- 3,4 bit comparator
- Introduction to MUX
- MUX: Functionally complete?
- Implementing functions using MUX
- Multiplexer with Enable line
- Cascading Multiplexers
- Expansion of Multiplexer
- Introduction to Demultiplexer
- Introduction to Decoders
- Implementing functions using Decoder



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- Implementation Example#1
- Implementation Example#2
- ROM implementation
- 4X32 Decoder using 2X4 Decoder
- Example of Constructing Decoder using decoder
- Address Expansion of ROM
- Word Expansion of ROM
- Determining the address range
- Enabling a Device
- Introduction to Encoders
- Priority Encoders
- Code Conversion
- Introduction to Hazards
- Test_Vectors

SEQUENTIAL CIRCUITS

- Introduction to Sequential Circuits
- Latch and Flipflop
- Level Triggered and Edge Triggered
- SR Latch
- SR Flipflop
- D Flipflop
- JK Flipflop
- T Flipflop
- Flipflop Interconversion method
- Example#1 of Flipflop conversion
- Example#2 of Flipflop conversion
- Example#3 of Flipflop Conversion
- Introduction to Registers
- Introduction to Counters
- Asynchronous and Synchronous Counters
- Ring Counters
- Ring Counters:Mod 4
- Johnson Counter
- Mod 4 Gray Counter
- Determining the Clock Frequency
- Introduction to Asynchronous Counters
- Questions on FFs
- Questions on sequential circuits
- Questions on Mod N counter

