

Digital Electronics

DCA-104

Block I

Unit I: Introduction Weighted-Position Number System, Number System Conversions, Representation of Negative Numbers: One's Complement Representation, Two's Complement Representation

Unit II: Binary Coded Decimal Codes, Unit Distance Codes, Alphanumeric Codes, Error Detection and Correcting Codes

Unit III: Boolean Algebra: Boolean Algebra and Huntington Postulates, Propositions from Huntington's Postulates, Boolean operators.

Unit IV: Logic Functions in Algebraic Form, Truth Table Description of Logic Function, Conversion of English Sentences to Logic Function, Minterms and Maxterms, Circuit Representation of Logic Functions

Block II

Unit V: Karnaugh-Map: Three-Variable Karnaugh Map, Four-variable Karnaugh Map, Fivevariable Karnaugh Map, Boolean functions in POS form, Minimization with Karnaugh Map, Standard POS form from Karnaugh Map, Simplification of Incompletely Specified Functions.

Unit VI: Principle of Quine-McClusky Method, Generation of Prime Implicants, Determination of the Minimal Set of Prime Implicants, Simplification of Incompletely Specified functions

Unit VII: Logic Gates, Truth Table, AND Gate, OR-Gate, NOT Gate, NAND Gate, NOR Gate, X-OR Gate, X-NOR Gate

Unit VIII: Combinational Circuit, Multiplexer and Demultiplexer, Multiplexer, Demultiplexer, Encoder and Decoder, Encoder, Decoder, Half adder and Full adder.

Block III

Unit IX: Sequential Circuit: Flip Flops, RS Flip-Flop, D Flip-Flop, JK Flip-Flop, T Flip-Flop, Master-Slave Flip-Flop

Unit X: Shift registers: Types of shift registers, Serial Input, Serial Output (SISO) Shift Register, Serial Input, Parallel Output (SIPO) Shift Register, Parallel Input, Serial Output (PISO) Shift Register, Parallel Input, Parallel Output (PIPO) Shift Register, Application of Shift register.

Unit XI: Asynchronous (ripple) counter, Synchronous counter, Working of a three-stage synchronous counter, Decade counter (MOD 10 Counter), Ring Counter, Johnson counter.

Unit XII: Introduction to Semiconductor Memories, Read Only Memory (ROM), ROM Size, Random Access Memory(RAM), SRAM vs DRAM, READ Operation in RAM, WRITE Operation in RAM, Flash Memory, Memory Expansion

Reference books:

1. Digital Design, M. Morris Mano
2. Maini, "Digital Electronics: Principles and Integrated Circuits", Wiley India
3. Digital Systems: Principles and Design, Raj Kamal, Pearson
4. Balbanian, Digital logic design, Wiley India
5. Switching Circuit & Logic Design, Hill & Peterson, Wiley