

Digital Techniques

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(CO/CM/CW/DE/EJ/ET/EN/EX/EQ/IE/IS/IC/MU)**

Strictly as per new revised 'I' Scheme w.e.f. academic year 2018-2019

J. S. Katre

M.E. (Electronics and Telecommunication)
Formerly, Assistant Professor
Department of Electronics Engineering
Vishwakarma Institute of Technology (V.I.T.), Pune.
Maharashtra, India

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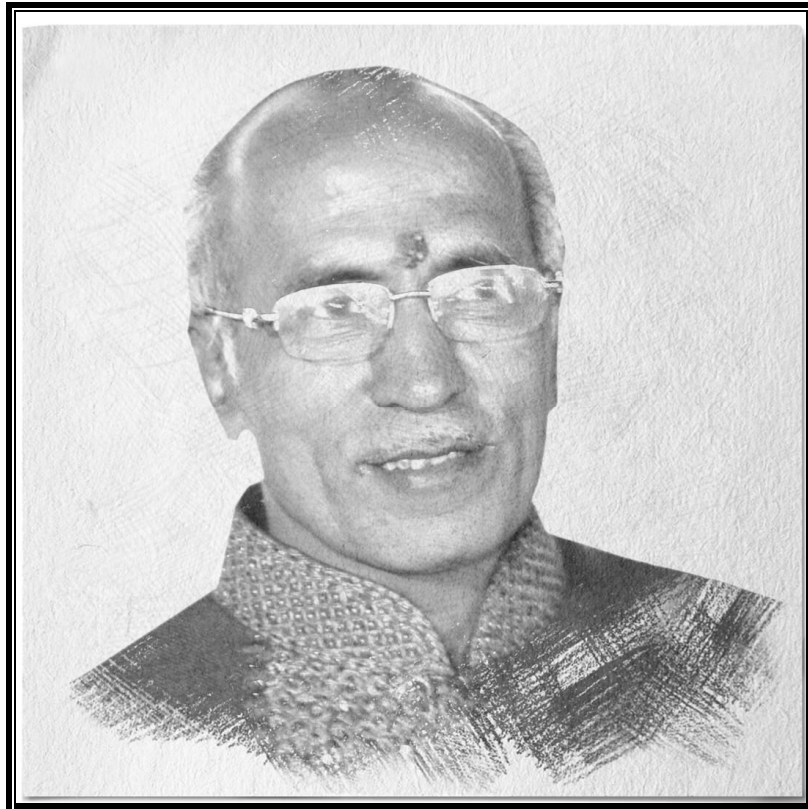
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*We dedicate this Publication soulfully and wholeheartedly,
in loving memory of our beloved founder director,
Late Shri. Pradeepji Lalchandji Lunawat,
who will always be an inspiration, a positive force and strong support
behind us.*



“My work is my prayer to God”

- Lt. Shri. Pradeepji L. Lunawat

*Soulful Tribute and Gratitude for all Your
Sacrifices, Hardwork, and 40 years of Strong Vision...*

Syllabus

Unit	Topics and Sub-topics
<p>Unit - I : Number Systems and Codes</p> <p>Refer chapter 1</p>	<p>1.1 Number system : Base or radix of number system, Binary, Octal, Decimal and hexadecimal number system.</p> <p>1.2 Binary arithmetic : Addition, Subtraction, Multiplication, Division.</p> <p>1.3 Subtraction using 1's complement and 2's complement.</p> <p>1.4 Codes : BCD, Gray code, Excess-3 and ASCII code.</p> <p>1.5 BCD arithmetic : BCD addition.</p>
<p>Unit - II : Logic Gates & Logic families</p> <p>Refer chapters 2 and 3</p>	<p>2.1 Logic gates : Symbol, Diode/Transistor switch circuit and logical expression, Truth table of basic gates (AND, OR, NOT), Universal gates (NAND and NOR) and special purpose gates (EX-OR, EX-NOR), Tristate logic.</p> <p>2.2 Boolean algebra : Laws of Boolean algebra, Duality theorem, De-Morgan's theorems.</p> <p>2.3 Logic families : Characteristics of logic families : Noise margin, Power dissipation, Figure of merit, Fan-in and fan-out, Speed of operation, Comparison of TTL, CMOS, Types of TTL NAND gate.</p>
<p>Unit - III : Combinational Logic Circuits</p> <p>Refer chapters 4 and 5</p>	<p>3.1 Standard Boolean representation : Sum of Product (SOP) and Product of Sum (POS), Minterm and maxterm, Conversion between SOP and POS forms, Realization using NAND/NOR gates.</p> <p>3.2 K-map reduction technique for the Boolean expression : Minimization of Boolean functions upto 4 variables (SOP and POS form).</p> <p>3.3 Design of arithmetic circuits and code converters using K-map : Half and full adder, Half and full subtractor, Gray to binary and binary to gray (up to 4 bits).</p> <p>3.4 Arithmetic circuits : (IC 7483) adder and subtractor, BCD adder.</p> <p>3.5 Encoder/Decoder : Basics of encoder, Decoder, Comparison, (IC 7447) BCD to 7 segment decoder / driver.</p> <p>3.6 Multiplexer and Demultiplexer : Working, Truth table and applications of multiplexers and demultiplexers, MUX tree, IC 74151 as MUX, DEMUX tree, DEMUX as decoder, IC 74155 as DEMUX.</p> <p>3.7 Buffer : Tristate logic, Unidirectional and bidirectional buffer (IC74LS244, 74LS245).</p>

Unit	Topics and Sub-topics
<p>Unit - IV : Sequential Logic Circuit</p> <p>Refer chapters 6, 7 and 8</p>	<p>4.1 Basic memory cell : RS-latch using NAND and NOR.</p> <p>4.2 Triggering methods : Edge trigger and level trigger.</p> <p>4.3 SR flip flops : SR-flipflop, Clocked SR flip flop with preset and clear, Drawbacks of SR flip flop.</p> <p>4.4 JK flip flops : Clocked JK flip flop with preset and clear, Race around condition in JK flip flop, Master slave JK flip flop, D and T type flip flop, Excitation table of flip flops, Block schematic and function table of IC 7474, 7475.</p> <p>4.5 Shift register : Logic diagram of 4-bit shift register-Serial input serial output, Serial input parallel output, Parallel input serial output, Parallel input parallel output, 4 bit universal shift register.</p> <p>4.6 Counters : Asynchronous counter : 4 bit ripple counter, 4 bit up/down counter, Modulus of counter, Synchronous counter : Design of 4 bit synchronous up/down counter.</p> <p>Decade counter : Block schematic of IC 7490 decade counter, IC 7490 as MOD N counter, Ring counter, Twisted ring counter.</p>
<p>Unit - V : Data Converters and PLDs</p> <p>Refer chapters 9, 10 and 11</p>	<p>5.1 Data converter : DAC : Types, Weighted resistor circuit and R-2R ladder circuit, DAC IC 0808 specifications.</p> <p>ADC : Block diagram, Types and working of dual slope ADC, SAR ADC, ADC IC 0808/0809, Specifications.</p> <p>5.2 Memory : RAM and ROM basic building blocks, Read and write operation, Types of semiconductor memories.</p> <p>5.3 PLD : Basic building blocks and types of PLDs, PLA, PAL, GAL.</p> <p>5.4 CPLD : Basic building blocks, Functionality.</p>

Unit-I

Chapter 1 : Number Systems and Codes 1-1 to 1-45

Syllabus : Number system : Base or radix of number system, Binary, Octal, Decimal and hexadecimal number system, **Binary arithmetic :** Addition, Subtraction, Multiplication, Division, Subtraction using 1's complement and 2's complement. **Codes :** BCD, Gray code, Excess-3 and ASCII code. **BCD arithmetic :** BCD addition.

<p>1.1 Introduction..... 1-1</p> <p>1.2 Signals 1-1</p> <p> 1.2.1 Analog Signals 1-1</p> <p> 1.2.2 Digital Signals 1-1</p> <p> 1.2.3 Sources of Digital Signal 1-1</p> <p> 1.2.4 Advantages of Digital Signals 1-1</p> <p> 1.2.5 Applications of Digital Signals 1-2</p> <p> 1.2.6 Comparison of Digital and Analog Signals 1-2</p> <p>1.3 System or Circuit 1-2</p> <p> 1.3.1 Analog Circuits or Systems 1-2</p> <p> 1.3.2 Digital Circuits (Systems) 1-2</p> <p> 1.3.3 Advantages of Digital Circuits 1-2</p> <p> 1.3.4 Disadvantages of Digital Systems 1-2</p> <p>1.4 Comparison of Analog and Digital Circuits 1-2</p> <p>1.5 Binary Logic and Logic Levels 1-3</p> <p> 1.5.1 Positive Logic 1-3</p> <p> 1.5.2 Negative Logic 1-3</p> <p>1.6 Number Systems 1-3</p> <p> 1.6.1 Important Definitions 1-3</p> <p> 1.6.2 Various Numbering Systems 1-4</p> <p>1.7 The Decimal Number System 1-4</p> <p> 1.7.1 Characteristics of a Decimal System 1-4</p> <p>1.8 The Binary Number System 1-4</p> <p> 1.8.1 Binary Numbers from $(0)_{10}$ to $(15)_{10}$ 1-4</p> <p> 1.8.2 Binary Number Formats 1-5</p> <p> 1.8.3 Disadvantages of the Binary System 1-5</p> <p>1.9 Octal Number System 1-5</p> <p> 1.9.1 Applications of Octal System 1-5</p>	<p>1.10 Hexadecimal Number System 1-5</p> <p> 1.10.1 Relation between Binary, Decimal, Octal and Hexadecimal Numbers 1-6</p> <p>1.11 Conversion of Number Systems 1-7</p> <p>1.12 Conversions Related to Decimal System 1-7</p> <p> 1.12.1 Conversion from Radix r to Decimal 1-7</p> <p> 1.12.2 Conversion from Decimal to Other Systems 1-8</p> <p>1.13 Conversion from Binary to Other Systems 1-12</p> <p> 1.13.1 Conversion from Binary to Decimal 1-12</p> <p> 1.13.2 Binary to Octal Conversion 1-12</p> <p> 1.13.3 Binary to Hex Conversion 1-13</p> <p>1.14 Conversion from Other Systems to Binary System 1-13</p> <p> 1.14.1 Conversion from Decimal to Binary 1-13</p> <p> 1.14.2 Octal to Binary Conversion 1-13</p> <p> 1.14.3 Hex to Binary Conversion 1-13</p> <p>1.15 Conversion from Octal to Other Systems 1-14</p> <p> 1.15.1 Octal to Hex Conversion 1-14</p> <p> 1.15.2 Conversion from Other Systems to Octal 1-14</p> <p>1.16 Conversions Related to Hexadecimal System ... 1-15</p> <p> 1.16.1 Other Systems to Hex 1-15</p> <p> 1.16.2 Hex to Other Systems 1-15</p> <p>1.17 Binary Addition 1-16</p> <p> 1.17.1 Sum and Carry 1-16</p> <p> 1.17.2 Addition of Large Binary Numbers 1-16</p> <p>1.18 Binary Subtraction 1-18</p> <p> 1.18.1 Subtraction and Borrow 1-18</p> <p> 1.18.2 Subtraction of Larger Binary Numbers 1-18</p> <p>1.19 1's Complement of a Binary Number 1-19</p> <p>1.20 2's Complement 1-20</p> <p>1.21 Binary Subtraction using 1's and 2's Complements 1-20</p> <p> 1.21.1 Subtraction using 1's Complement 1-20</p> <p> 1.21.2 Binary Subtraction using 2's Complement Method 1-22</p>
---	--

<p>1.22 Binary Multiplication 1-26</p> <p>1.23 Binary Division 1-27</p> <p>1.24 Concept of Coding 1-29</p> <p> 1.24.1 Applications of Binary Codes 1-29</p> <p>1.25 Classification of Codes 1-29</p> <p>1.26 Binary Coded Decimal (BCD) Code 1-29</p> <p> 1.26.1 Comparison with Binary 1-30</p> <p> 1.26.2 Advantages of BCD Codes 1-30</p> <p> 1.26.3 Disadvantages 1-30</p> <p>1.27 BCD Arithmetic 1-30</p> <p> 1.27.1 BCD Addition 1-30</p> <p>1.28 Non – weighted Codes 1-33</p> <p>1.29 Excess – 3 Code 1-34</p> <p>1.30 Gray Code 1-35</p> <p> 1.30.1 Gray-to-Binary Conversion 1-36</p> <p> 1.30.2 Binary to Gray Conversion 1-36</p> <p>1.31 Code Conversions 1-39</p> <p> 1.31.1 Binary to BCD Conversion 1-39</p> <p> 1.31.2 BCD to Binary Conversion 1-39</p> <p> 1.31.3 BCD to Excess – 3 1-39</p> <p> 1.31.4 Excess – 3 to BCD Conversion 1-40</p> <p>1.32 Alphanumeric Codes 1-41</p> <p> 1.32.1 ASCII - (American Standard Code for Information Interchange) 1-41</p> <p>1.33 I-Scheme Solved Examples..... 1-43</p> <p>1.34 I-Scheme Questions and Answers 1-45</p> <p> • Review Questions 1-42</p>	<p>2.1 Introduction 2-1</p> <p> 2.1.1 NOT Operator (Inversion) 2-1</p> <p> 2.1.2 AND Operator 2-1</p> <p> 2.1.3 OR Operator 2-1</p> <p> 2.1.4 Logic Gates 2-1</p> <p> 2.1.5 Gates, Symbols and Boolean Expression 2-2</p> <p>2.2 Boolean (Binary) Algebra 2-2</p> <p>2.3 Boolean Laws 2-2</p> <p> 2.3.1 Commutative Law 2-3</p> <p> 2.3.2 Associative Law 2-3</p> <p> 2.3.3 Distributive Law 2-3</p> <p> 2.3.4 AND Laws 2-3</p> <p> 2.3.5 OR Laws 2-3</p> <p> 2.3.6 INVERSION Law 2-3</p> <p> 2.3.7 Other Important Rules 2-4</p> <p> 2.3.8 Principle of Duality 2-4</p> <p> 2.3.9 Duality Theorem 2-4</p> <p>2.4 De-Morgan's Theorems 2-5</p> <p> 2.4.1 Examples on Simplification of Logic Expression 2-6</p> <p>2.5 Logic Gates 2-8</p> <p> 2.5.1 Classification of Logic Gates 2-8</p> <p>2.6 NOT Gate or Inverter 2-8</p> <p> 2.6.1 NOT Gate Using Switches 2-8</p> <p> 2.6.2 NOT Gate using Transistor 2-9</p> <p>2.7 AND Gate 2-9</p> <p> 2.7.1 AND Gate Using Switches 2-9</p> <p> 2.7.2 AND Gate Using Diodes 2-10</p> <p>2.8 The OR Gate 2-10</p> <p> 2.8.1 OR Gate Using Switches 2-10</p> <p> 2.8.2 OR Gate using Diodes 2-11</p> <p>2.9 The NAND Gate 2-11</p> <p>2.10 The NOR Gate 2-11</p> <p>2.11 EX-OR and EX-NOR Gates 2-12</p> <p> 2.11.1 The EX-OR Gate 2-12</p>
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Unit-II

Chapter 2 : Logic Gates & Boolean Algebra 2-1 to 2-25

Syllabus : Logic gates : Symbol, **Diode/Transistor switch circuit and logical expression**, Truth table of basic gates (AND, OR, NOT), Universal gates (NAND and NOR) and special purpose gates (EX-OR, EX-NOR), **Boolean algebra** : Laws of Boolean algebra, Duality theorem, De-Morgan's theorems.



<p>2.11.2 The EX-NOR Gate2-12</p> <p>2.12 Writing Boolean Expression from a Logic Diagram2-13</p> <p>2.13 Construction of a Logic Circuit from the Given Boolean Expression2-13</p> <p>2.14 Gates using More than 2 Inputs2-16</p> <p> 2.14.1 Multiple Input AND Gates2-16</p> <p> 2.14.2 Multiple Input OR Gate2-16</p> <p> 2.14.3 Multiple Input NAND Gate2-17</p> <p> 2.14.4 Multiple Input NOR Gate2-17</p> <p> 2.14.5 Multiple Input EX-OR Gate2-17</p> <p> 2.14.6 Multiple Input EX-NOR Gate2-17</p> <p>2.15 Universal Gates2-18</p> <p> 2.15.1 NAND Gate as a Universal Gate2-18</p> <p> 2.15.2 NOR Gate as a Universal Gate2-19</p> <p>2.16 TTL and CMOS Logic Gate ICs2-23</p> <p>2.17 I-Scheme Solved Examples.....2-24</p> <p>2.18 I-Scheme Questions and Answers2-24</p> <p> • Review Questions2-23</p>	<p>3.3.4 Propagation Delay (Speed of Operation) 3-3</p> <p>3.3.5 Power Dissipation 3-4</p> <p>3.3.6 Operating Temperature 3-4</p> <p>3.3.7 Figure of Merit (Speed Power Product SPP) 3-4</p> <p>3.3.8 Invalid Voltage Levels 3-4</p> <p>3.3.9 Current Sourcing and Current Sinking ... 3-5</p> <p>3.4 TTL Family 3-5</p> <p> 3.4.1 Standard TTL Characteristics 3-5</p> <p> 3.4.2 Advantages of TTL 3-6</p> <p> 3.4.3 Disadvantages of TTL 3-6</p> <p>3.5 CMOS Logic 3-6</p> <p> 3.5.1 CMOS Characteristics 3-6</p> <p>3.6 Advantages and Disadvantages of CMOS 3-6</p> <p> 3.6.1 Advantages of CMOS 3-6</p> <p> 3.6.2 Disadvantages of CMOS 3-7</p> <p>3.7 Comparison of TTL and CMOS 3-7</p> <p>3.8 Types of TTL NAND Gates 3-8</p> <p> 3.8.1 The Multiple Emitter Transistor 3-8</p> <p> 3.8.2 Two Input TTL-NAND Gate (Totempole Output) 3-8</p> <p> 3.8.3 Totem-pole (Active Pull up) Output Stage 3-9</p> <p>3.9 TTL NAND Gate with Open Collector Outputs ... 3-10</p> <p> 3.9.1 Disadvantages of Open Collector Output 3-11</p> <p> 3.9.2 Advantage 3-11</p> <p> 3.9.3 Wired ANDing 3-11</p> <p> 3.9.4 Comparison of Totem-pole and Open Collector Output NAND Gates 3-12</p> <p>3.10 Tristate (Three state) Logic 3-12</p> <p> 3.10.1 Advantages of Tristate 3-13</p> <p> 3.10.2 Tristate Buffers 3-13</p>
---	--

Unit-II

Chapter 3 : Logic Families

3-1 to 3-15

Syllabus : Logic families : Characteristics of logic families : Noise margin, Power dissipation, Figure of merit, Fan-in and Fan-out, Speed of operation, Comparison of TTL, CMOS, Types of TTL NAND gate. Tristate logic.

3.1 Logic Families.....3-1
3.2 Classification of Logic Families 3-1
3.2.1 Classification Based on Devices Used ...3-1
3.2.2 Classification Based on Circuit Complexity 3-1
3.3 Characteristics of Digital ICs 3-2
3.3.1 Voltage and Current Parameters 3-2
3.3.2 Fan-in and Fan-out 3-3
3.3.3 Noise Margin 3-3

3.10.3 Applications of Tristate Buffers (Bus Organization)3-13

3.10.4 A TRI-STATE Inverter3-14

3.11 I-Scheme Questions and Answers3-15

- **Review Questions**3-14

Unit-III

Chapter 4 : Combinational Logic Circuits – Part I
4-1 to 4-40

Syllabus : Standard Boolean representation : Sum of Product (SOP) and Product of Sum (POS), Minterm and maxterm, Conversion between SOP and POS forms, Realization using NAND/NOR gates, **K-map reduction technique for the Boolean expression :** Minimization of Boolean functions upto 4 variables (SOP and POS form). **Design of arithmetic circuits and code converters using K-map :** Half and full adder, Half and full subtractor, Gray to binary and binary to gray (up to 4 bits). **Arithmetic circuits :** (IC 7483) adder and subtractor, BCD adder.

4.1 Introduction.....4-1

- 4.1.1 Classification of Digital Circuits4-1
- 4.1.2 Combinational Circuit Design4-1
- 4.1.3 Methods to Simplify the Boolean Equations4-2

4.2 SOP and POS Representations for Logic Expressions4-2

- 4.2.1 Sum-of-Products (SOP) Form4-2
- 4.2.2 Product of the Sums Form (POS)4-2
- 4.2.3 Standard or Canonical SOP and POS Forms 4-2
- 4.2.4 Conversion of a Logic Expression to Standard SOP or POS Form4-3

4.3 Concepts of Minterm and Maxterm4-5

- 4.3.1 Representation of Logical Expressions using Minterms and Maxterms4-6
- 4.3.2 Writing SOP and POS Forms for a Given Truth Table4-6

- 4.3.3 To Write Canonical SOP Expression for a Given Truth Table4-6
- 4.3.4 To Write a Canonical POS Expression for a Given Truth Table4-7
- 4.3.5 Conversion from SOP to POS and Vice Versa4-7

4.4 Methods to Simplify the Boolean Functions4-9

- 4.4.1 Algebraic Simplification4-9
- 4.4.2 Disadvantages of Algebraic Method of Simplification4-10

4.5 Karnaugh-Map Simplification4-10

- 4.5.1 K-map Structure4-10
- 4.5.2 K-map Boxes and Associated Product Terms4-10
- 4.5.3 Alternative Way to Label the K-map4-11
- 4.5.4 Truth Table to K-map4-11
- 4.5.5 Representation of Standard SOP Form on K-map4-12

4.6 K-map Reduction Technique for Boolean Expression4-12

- 4.6.1 How does Simplification Take Place ?..4-13
- 4.6.2 Way of Grouping (Pairs, Quads and Octets)4-13
- 4.6.3 Grouping Two Adjacent One's (Pairs)4-13
- 4.6.4 Grouping Four Adjacent Ones (Quad)4-14
- 4.6.5 Grouping Eight Adjacent Ones (Octet)4-16
- 4.6.6 Summary of Rules Followed for K-Map Simplification4-16

4.7 Minimization of SOP Expressions (K-map Simplification)4-18

- 4.7.1 Elimination of a Redundant Group4-21
- 4.7.2 Don't Care Conditions4-21
- 4.7.3 Disadvantages of K-map Technique4-23

4.8 Product of Sum (POS) Simplification4-23

- 4.8.1 K-map Representation of POS Form ...4-23



4.8.2	Representation of Canonical POS Form on K-map	4-23	4.16	BCD Adder Using IC 7483	4-37
			4.16.1	Block Diagram of BCD Adder	4-37
4.9	Simplification of Canonical POS Form using K-map	4-24	4.16.2	Design of Combinational Circuit	4-37
4.10	Design Examples	4-26	4.17	I-Scheme Solved Examples	4-39
4.11	Adders	4-26	4.18	I-Scheme Questions and Answers	4-40
4.11.1	Half Adder	4-26		• Review Questions	4-38
4.11.2	Half Adder using Only NAND Gates	4-27	Unit-III		
4.11.3	Full Adder	4-27	Chapter 5 : Combinational Logic Circuits – Part II		
4.11.4	Full Adder using Half Adders	4-28	5-1 to 5-43		
4.11.5	Applications of Full Adder	4-29	Syllabus : Encoder/Decoder : Basics of encoder, Decoder, Comparison, (IC 7447) BCD to 7 segment decoder / driver.		
4.11.6	Comparison of Half Adder and Full Adder	4-29	Multiplexer and Demultiplexer : Working, Truth table and applications of multiplexers and demultiplexers, MUX tree, IC 74151 as MUX, DEMUX tree, DEMUX as decoder, IC 74155 as DEMUX.		
4.12	Binary Subtractors	4-29	Buffer : Tristate logic, Unidirectional and bidirectional buffer (IC 74LS 244, 74LS245).		
4.12.1	Types of Binary Subtractors	4-29	5.1	Introduction	5-1
4.12.2	Half Subtractor	4-29	5.1.1	Analysis of a Combinational Circuit	5-1
4.12.3	Half Subtractor using Basic Gates	4-30	5.1.2	Design of Combinational Logic	5-2
4.12.4	Half Subtractor using NAND Gates	4-30	5.2	Multiplexer (Data Selector)	5-3
4.12.5	Full Subtractor	4-30	5.2.1	Need of Multiplexers	5-4
4.12.6	Full Subtractor using Half Subtractors	4-31	5.2.2	Advantages of Multiplexers	5-4
4.13	Code Converters	4-32	5.3	Types of Multiplexers	5-4
4.13.1	Binary to Gray Code Converter	4-32	5.3.1	2 : 1 Multiplexer	5-4
4.13.2	Gray to Binary Code Conversion	4-33	5.3.2	A 4 : 1 Multiplexer	5-5
4.14	The n-Bit Parallel Adder	4-34	5.3.3	8 : 1 Multiplexer	5-6
4.14.1	A Four Bit Parallel Adder Using Full Adders	4-35	5.3.4	16 : 1 MUX	5-6
4.14.2	Fast Adder IC 74 LS 83 / 74 LS 283	4-35	5.4	Applications of a Multiplexer	5-7
4.14.3	Four Bit Binary Adder Using IC 7483	4-35	5.5	Study of Different Multiplexer ICs	5-7
4.14.4	Cascading of Adders	4-36	5.5.1	8 : 1 Multiplexer (74151)	5-8
4.15	n-bit Parallel Subtractor (Use of Adder as Subtractor)	4-36	5.6	Multiplexer Tree	5-8
4.15.1	4 Bit Parallel Subtractor Using 2's Complement	4-36	5.7	Use of Multiplexers in Combinational Logic Design	5-12
4.15.2	4-Bit Binary Parallel Adder/ Subtractor	4-36	5.7.1	Implementing a Standard POS Expression using Multiplexer	5-16

<p>5.7.2 Implementation of Boolean SOP Expression with Don't Care Conditions5-16</p> <p>5.8 Demultiplexers5-16</p> <p>5.8.1 Demultiplexer Principle5-16</p> <p>5.9 Types of Demultiplexers5-17</p> <p>5.9.1 1 : 2 Demultiplexer5-17</p> <p>5.9.2 1 : 4 Demultiplexer5-18</p> <p>5.9.3 1 : 8 Demultiplexer5-19</p> <p>5.9.4 1 : 16 Demultiplexer5-19</p> <p>5.10 IC 74155 Dual 1 : 4 Demux or Dual 2 : 4 Decoder5-19</p> <p>5.10.1 General Description5-19</p> <p>5.10.2 Features5-19</p> <p>5.10.3 Connection of IC 74155 as 1 : 4 Demultiplexer5-21</p> <p>5.11 Demultiplexer Tree5-21</p> <p>5.11.1 Comparison of Multiplexer and Demultiplexer5-25</p> <p>5.11.2 Use of DEMUX in Combinational Logic Design5-25</p> <p>5.11.3 Applications of Demultiplexer5-25</p> <p>5.12 Encoders5-25</p> <p>5.12.1 Types of Encoders5-26</p> <p>5.13 Priority Encoder5-26</p> <p>5.13.1 Priority Encoders in the IC Form5-27</p> <p>5.13.2 Decimal to BCD Encoder5-27</p> <p>5.13.3 Decimal to BCD Encoder IC 741475-27</p> <p>5.13.4 Octal to Binary Encoder5-28</p> <p>5.13.5 Encoder IC 74148 (Octal to Binary Encoder)5-28</p> <p>5.14 Decoder5-29</p> <p>5.14.1 2 to 4 Line Decoder5-29</p> <p>5.14.2 Difference between Decoder and Demultiplexer5-30</p> <p>5.14.3 Demultiplexer as Decoder5-30</p> <p>5.14.4 IC74155 as 2 : 4 Decoder5-30</p> <p>5.14.5 3 to 8 Line Decoder5-31</p> <p>5.14.6 1 : 8 DEMUX Operated as 3:8 Decoder5-31</p>	<p>5.14.7 Comparison of Encoder and Decoder .. 5-31</p> <p>5.14.8 Implementation of Boolean Function using Decoder 5-32</p> <p>5.14.9 4 Line to 16 Line Decoder using 3 : 8 Decoder 5-32</p> <p>5.15 Seven Segment LED Display5-32</p> <p>5.15.1 Types of Seven Segment Displays5-33</p> <p>5.15.2 Common Anode Display5-33</p> <p>5.15.3 Common Cathode Display5-33</p> <p>5.15.4 Use of a Decoder for Driving the Seven Segment Display5-33</p> <p>5.15.5 Driving a Common Cathode Seven Segment Display5-34</p> <p>5.15.6 BCD to Seven Segment Display Code Converter (Common Anode Display) ... 5-34</p> <p>5.15.7 BCD to Seven Segment Decoder IC 7446A, IC 7447A and 74LS47 5-36</p> <p>5.15.8 Use of 7447 to Drive a Common Anode Display5-37</p> <p>5.16 Tristate (Three state) Logic5-38</p> <p>5.16.1 Tristate Buffers5-39</p> <p>5.16.2 Applications of Tristate Buffers5-39</p> <p>5.16.3 DM 74LS244 : Octal Tristate Buffer/Line Driver/Line Receiver 5-39</p> <p>5.16.4 Tristate Octal-Bidirectional Buffer IC DM 74LS2455-40</p> <p>5.17 MSBTE Questions and Answers5-41</p> <p>5.18 I-Scheme Questions and Answers5-42</p> <p>5.19 I-Scheme Questions and Answers5-42</p> <p>• Review Questions 5-40</p>
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Unit-IV

Chapter 6 : Flip Flops **6-1 to 6-22**

Syllabus : **Basic memory cell :** RS-latch using NAND and NOR, **Triggering methods :** Edge trigger and level trigger, **SR flip flops :** SR-flipflop, Clocked SR flip flop with preset and clear, Drawbacks of SR flip flop. **JK flip flops :** Clocked JK flip flop with preset and clear, Race around condition in JK flip flop, Master slave JK flip flop, D and T type flip flop, Excitation table of flip flops, Block schematic and function table of IC 7474, 7475.



6.1	Introduction to Sequential Logic Circuits	6-1	6.10.2	Negative Edge Triggered T Flip Flop ...	6-15
6.1.1	Combinational Circuits	6-1	6.10.3	Application of T FF	6-15
6.1.2	Sequential Circuits	6-1	6.11	Master Slave (MS) JK Flip Flop	6-16
6.1.3	Comparison of Combinational and Sequential Circuits	6-1	6.12	Clocked FFs with Preset and Clear Inputs	6-17
6.2	Clock Signal	6-2	6.12.1	S-R Flip-Flop with Preset and Clear Inputs	6-17
6.3	Latches	6-2	6.12.2	JK Flip Flop with Preset and Clear Inputs	6-18
6.3.1	1-Bit Memory Cell (Cross Coupled Inverter)	6-2	6.13	Excitation Table of Flip-Flop	6-18
6.4	RS Latch	6-3	6.13.1	Excitation Table of SR Flip Flops	6-18
6.4.1	S-R Latch using NOR Gates	6-3	6.13.2	Excitation Table of D Flip Flop	6-19
6.4.2	S-R Latch using NAND Gates	6-5	6.13.3	Excitation Table of JK Flip Flop	6-19
6.5	Triggering Methods	6-6	6.13.4	Excitation Table of T Flip Flop	6-19
6.5.1	Difference between Latch and Flip-flop.....	6-6	6.14	Conversion of Flip Flops	6-20
6.5.2	Level Triggering	6-6	6.15	Applications of Flip Flops	6-20
6.5.3	Types of Level Triggered Flip-flops	6-6	6.16	Flip-Flop ICs	6-20
6.5.4	Edge Triggering	6-7	6.16.1	SN74LS74A : Dual D-Type Positive Edge-triggered Flip-Flop Low Power Schottky	6-20
6.5.5	Types of Edge Triggered Flip Flops	6-7	6.16.2	SN 74LS75 : 4-Bit Bistable Latches	6-21
6.6	Clocked SR Flip Flops	6-7	6.17	Comparisons	6-21
6.6.1	Positive Edge Triggered SR Flip Flop	6-7	6.17.1	Comparison of D Flip-flop and T Flip-flop	6-21
6.6.2	Negative Edge Triggered S - R Flip Flop.....	6-8	6.17.2	Comparison of SR Flip-flop and JK Flip-flop	6-21
6.6.3	Drawback of S-R Flip Flop	6-8	6.18	I-Scheme Questions and Answers.....	6-22
6.7	Clocked D Flip-flop	6-9		• Review Questions	6-22
6.7.1	Positive Edge Triggered D Flip-flop	6-9	Unit-IV		
6.7.2	Negative Edge Triggered D Flip Flop	6-9	<hr/>		
6.7.3	Applications of D Flip-flop	6-10	Chapter 7 : Shift Registers 7-1 to 7-16		
6.8	Edge Triggered (Clocked) J-K Flip Flop	6-10	Syllabus : Logic diagram of 4-bit shift register-Serial input serial output, Serial input parallel output, Parallel input serial output, Parallel input parallel output, 4 bit universal shift register, Ring counter, Twisted ring counter.		
6.8.1	Positive Edge Triggered JK Flip Flop ...	6-10	7.1	Introduction	7-1
6.8.2	Negative Edge Triggered JK Flip-Flop	6-12	7.2	Data Formats	7-1
6.9	Level Triggered JK Flip Flop or JK Latch	6-12	7.3	Classification of Registers	7-1
6.9.1	Race Around Condition in Level Triggered JK FF	6-12	7.4	Buffer Registers	7-2
6.9.2	How does an Edge Triggered JK FF Avoid Race Around Condition ?.....	6-13			
6.10	Toggle Flip Flop (T Flip Flop)	6-14			
6.10.1	Positive Edge Triggered T-FF	6-14			

7.5	Shift Registers 7-2	8.2.3	State Diagram of a Counter 8-4
7.5.1	Serial Input Serial Output (Shift Left Mode) 7-3	8.2.4	Modulus of the Counter 8-4
7.5.2	Serial In Serial Out (Shift Right Mode) 7-4	8.2.5	Frequency Division in Asynchronous Counters 8-4
7.5.3	Applications of Serial Operation 7-5	8.3	Decade Asynchronous Up Counter (MOD-10 Counter) 8-7
7.6	Serial In Parallel Out (SIPO) 7-7	8.4	Asynchronous Down Counter 8-8
7.7	Parallel In Serial Out Mode (PISO) 7-7	8.4.1	3-Bit Asynchronous Down Counter 8-8
7.8	Parallel In Parallel Out (PIPO) 7-8	8.5	Up / Down Counters 8-10
7.9	Bidirectional Shift Register 7-8	8.5.1	Up/Down Ripple Counters 8-10
7.9.1	A 3-bit Bidirectional Register using the JK Flip Flops 7-9	8.5.1.1	3-bit and Up Down Ripple Counters 8-11
7.10	Applications of Shift Registers 7-10	8.5.1.2	4-bit Asynchronous Up/Down Counter 8-11
7.11	Universal Shift Register 7-10	8.6	Disadvantages of Ripple Counters 8-12
7.11.1	Universal Shift Register IC 7495 7-11	8.7	Synchronous Up Counters 8-12
7.11.2	Parallel Loading (PIPO) 7-12	8.7.1	2-Bit Synchronous Up Counter 8-12
7.11.3	Serial Shift Right Operation 7-12	8.7.2	3-Bit Synchronous Binary Up Counter 8-13
7.11.4	Serial Shift Left Operation 7-12	8.7.3	Synchronous Counter using T Flip Flops 8-15
7.12	Ring Counter 7-12	8.7.4	Four Bit Synchronous Up Counter 8-15
7.13	Johnson's Counter (Twisted Ring Counter) 7-14	8.8	Design of the 3 Bit Synchronous Counter 8-15
7.14	I-Scheme Questions and Answers 7-16	8.8.1	Design using T Flip Flops 8-16
	• Review Questions 7-15	8.8.2	Design using JK Flip Flops 8-17

Unit-IV

Chapter 8 : Counters **8-1 to 8-29**

Syllabus : Asynchronous counter : 4 bit ripple counter, 4 bit up/down counter, Modulus of counter, Synchronous counter : Design of 4 bit synchronous up/down counter.
Decade counter : Block schematic of IC 7490 decade counter, IC 7490 as MOD N counter, Ring counter, Twisted ring counter.

8.1	Introduction..... 8-1	8.9	Modulo – N Synchronous Counters 8-18
8.1.1	Types of Counters 8-1	8.9.1	Synchronous Decade Counter 8-18
8.1.2	Classification of Counters 8-1	8.10	UP / DOWN Synchronous Counter 8-20
8.2	Asynchronous Up Counters 8-1	8.10.1	3-bit Up/Down Synchronous Counter 8-20
8.2.1	3 Bit Asynchronous Up Counter 8-1	8.10.2	Advantages of Synchronous Counter 8-21
8.2.2	4 Bit Asynchronous Up Counter 8-3	8.10.3	Comparison of Synchronous and Asynchronous Counters 8-21
		8.11	Ripple Counter IC 7490 (Decade Counter) 8-22
		8.11.1	The Internal Diagram of IC 7490 8-23
		8.11.2	IC 7490 as MOD-N Counter 8-24
		8.12	Applications of Counters 8-26
		8.12.1	Comparison of Counter and Shift Register 8-27



8.13 MSBTE Questions and Answers8-27

8.14 I-Scheme Solved Examples.....8-27

8.15 I-Scheme Questions and Answers8-28

- **Review Questions8-27**

Unit-V

Chapter 9 : A-D and D-A Converters 9-1 to 9-23

Syllabus : Data converter : DAC : Types, Weighted resistor circuit and R-2R ladder circuit, DAC IC 0808 specifications.

ADC : Block diagram, Types and working of dual slope ADC, SAR ADC, ADC IC 0808/0809, Specifications.

9.1 Need of Data Converters9-1

- 9.1.1 Types of Data Converters9-1

9.2 DAC Fundamentals9-1

- 9.2.1 Circuit Symbol and Transfer Characteristics9-1
- 9.2.2 Input-Output Equation9-2
- 9.2.3 Types of D to A Converters9-2

9.3 Binary Weighted Resistor DAC9-3

- 9.3.1 Expression for Analog Output Voltage ...9-3
- 9.3.2 Output Voltage Waveform of a 3-Bit DAC9-4
- 9.3.3 Disadvantages of Weighted Resistor DAC9-4
- 9.3.4 Advantages of Weighted Resistor DAC9-5

9.4 R-2R Ladder Network9-6

9.5 R-2R Ladder DAC9-6

- 9.5.1 Operation of R-2R ladder DAC9-7
- 9.5.2 Advantages of R/2R Ladder DACs9-8
- 9.5.3 Applications of D/A Converters9-8
- 9.5.4 Comparison of DACs9-8

9.6 Specifications for DAC9-9

9.7 Monolithic IC DAC 08089-10

- 9.7.1 Pin Configuration and Functional Block Diagram9-10
- 9.7.2 Typical Connection Diagram9-11

9.7.3 Connection Diagram with a Negative Reference Voltage9-11

9.7.4 Specification of DAC 08089-11

9.8 Analog to Digital Converters (ADC)9-11

9.9 Types of A to D Converters9-12

9.10 ADC Circuits9-12

- 9.10.1 Counter Type ADC (Staircase Ramp)9-12
- 9.10.2 Successive Approximation ADC (SA - ADC)9-13
- 9.10.3 Single Slope Integrating ADC9-15
- 9.10.4 Dual Slope Integrator ADC9-17
- 9.10.5 Comparison of A/D Converters9-18
- 9.10.6 Comparison of Dual Slope and Ramp Type ADCs9-18
- 9.10.7 Comparison of Ramp and Successive Approximation Type ADC9-19
- 9.10.8 Comparison of Single and Dual Slope ADC9-19

9.11 ADC Characteristics (Specifications)9-19

- 9.11.1 Resolution9-19
- 9.11.2 Conversion Time9-19
- 9.11.3 Quantization Error9-19

9.12 ADC Applications9-20

9.13 ADC DAC ICs9-20

- 9.13.1 Monolithic IC ADC 08099-20
- 9.13.2 Features of ADC 08099-20
- 9.13.3 Pin Configuration of ADC 08099-20
- 9.13.4 Typical Connection Diagram of ADC 08099-22
- 9.13.5 Specifications of ADC 08099-22

9.14 MSBTE Questions and Answers9-22

9.15 I-Scheme Solved Examples9-23

9.16 I-Scheme Questions and Answers9-23

- **Review Questions9-22**

Unit-V

Chapter 10 : Memories 10-1 to 10-16

Syllabus : Memory : RAM and ROM basic building blocks, Read and write operation, Types of semiconductor memories.

10.1 Introduction..... 10-1

 10.1.1 Advantages of Semiconductor Memory 10-1

10.2 Memory Organization and Operation 10-1

 10.2.1 Memory Size 10-1

 10.2.2 Block Diagram of a Memory Device 10-2

10.3 Classification and Characteristics of Memories 10-3

10.4 Classification Based on Principle of Operation 10-3

 10.4.1 Sequential Memories 10-3

 10.4.2 Random Access Memory (RWM or RAM) 10-3

 10.4.3 Read Only Memories (ROM) 10-4

 10.4.4 Content Accessible Memories (CAM) ... 10-4

10.5 Classification Based on Physical Characteristics 10-4

 10.5.1 Erasable or Non-erasable Memories 10-4

 10.5.2 Ultraviolet Erasable Programmable ROM (UV EPROM) 10-5

 10.5.3 Volatile or Non-volatile Memories 10-5

10.6 Classification Based on Mode of Access 10-5

 10.6.1 Sequential Access 10-6

 10.6.2 Random Access 10-6

10.7 Classification Based on Fabrication Technology 10-6

10.8 Read Only Memory (ROM) 10-6

 10.8.1 Application of ROM 10-6

 10.8.2 ROM Manufacturing 10-6

 10.8.3 ROM Organization 10-6

10.9 Internal Organization of RAM 10-7

 10.9.1 Write Operation 10-7

 10.9.2 Read Operation 10-7

10.10 Expanding the Memory Size 10-8

 10.10.1 Expanding the Word Size 10-8

 10.10.2 Expanding Word Capacity 10-9

10.11 Random Access Memory (RAM) 10-11

 10.11.1 Static RAM (SRAM) 10-11

 10.11.2 TTL Static RAM Cell 10-11

 10.11.3 MOS Static RAM Cell 10-12

10.12 Dynamic RAM (DRAM) 10-13

 10.12.1 Advantages of Dynamic RAM 10-13

 10.12.2 Disadvantage of Dynamic RAM 10-13

 10.12.3 Dynamic MOS RAM Cell 10-13

 10.12.4 Comparison of SRAM and DRAM 10-14

10.13 Comparison of RAM and ROM 10-15

10.14 Comparison of EPROM and EEPROM 10-15

 10.14.1 Comparison of PROM and EPROM ... 10-15

10.15 I-Scheme Questions and Answers 10-16

 • **Review Questions 10-15**

Unit-V

Chapter 11 : Programmable Logic Devices 11-1 to 11-15

Syllabus : PLD : Basic building blocks and types of PLDs, PLA, PAL, GAL. CPLD : Basic building blocks, Functionality.

11.1 Introduction to PLDs..... 11-1

 11.1.1 Advantages of PLDs 11-1

11.2 Types of PLDs 11-1

11.3 Programmable Logic Array (PLA) 11-1

 11.3.1 Input Buffers 11-2

 11.3.2 And Matrix 11-2

 11.3.3 The OR Matrix 11-3

 11.3.4 Invert/Non-invert Matrix 11-4

 11.3.5 Output Buffer 11-5

 11.3.6 Output through Buffers and Flip Flops 11-5

 11.3.7 The Programming Procedure for PLA 11-5



11.3.8	Expansion of PLA Capacity	11-5	11.4.8	Configurable PAL	11-11
11.3.9	Application Areas of PLA	11-6	11.5	Generic Array Logic Devices (GAL)	11-11
11.3.10	Designing of Combinational Circuit using PLA	11-6	11.5.1	Comparison of PLA and PAL	11-11
11.4	Programmable Array Logic (PAL)	11-8	11.6	Complex Programmable Logic Devices (CPLDs)	11-11
11.4.1	Input Buffers	11-8	11.6.1	Basic Architecture of CPLD	11-11
11.4.2	AND Matrix	11-8	11.6.2	PAL like Block	11-12
11.4.3	OR Matrix	11-8	11.7	Programming of PLDs	11-12
11.4.4	Input and Output Circuits	11-9	11.7.1	CPLD Packaging	11-12
11.4.5	Solved Examples on PAL	11-9	11.8	I-Scheme Questions and Answers	11-13
11.4.6	Types of PAL Devices	11-11		• Review Questions	11-13
11.4.7	Registered PALs	11-11			

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