GROUP A
Assignment No. 1

Title: Full Adder & Full Subtractor

Problem Statement: Realize Full Adder and Subtractor using

a) Basic Gates and b) Universal Gates

Hardware & software requirements:

Digital Trainer Kit, IC 7404, IC 7432, IC 7408, IC 7400 IC 7402, Patch Cord, + 5V Power Supply

Theory:

Full Adder: (with block diagram)

Full Subtractor: (with block Diagram)

Universal Gates

Design:

1. **Full Adder**

Truth Table
Kmap + Equation
Simplification

Circuit Diagram

1. Using Basic Gates
2. Using NAND gate
3. Using NOR gate

2. **Full Subtractor**

Truth Table Kmap
+ Equation
Simplification

Circuit Diagram

1. Using Basic Gates
2. Using NAND gate
3. Using NOR gate

Conclusion:

Assignment No. 2

Title: Code Converter

Problem Statement: To Design and implement the circuit for the following 4-bit Code conversion.

1. Binary to Gray Code
2. Gray to Binary Code
3. BCD to Excess – 3 Code
4. Excess-3 to BCD Code

Hardware & software requirements:

Digital Trainer Kit, IC 7404, IC 7432, IC 7408, IC 7486, Patch Cord, + 5V Power Supply

Theory:

1. Binary Code:

2. Gray Code:

- Binary to Gray code conversion
- Gray to binary Code Conversion

3. BCD Code

4. Excess 3 Code

- BCD to EX-3 Code Conversion
- EX- 3 to BCD Code Conversion

Design:

1. Binary to Gray Code

Truth table

K-map

Circuit Diagram

2. **Gray to Binary**

Code Truth table

K-map

Circuit Diagram

3. **BCD to Excess – 3**

Code Truth table

K-map

Circuit Diagram

4. **Excess-3 to BCD**

Code Truth table

K-map

Circuit Diagram

Conclusion:

Assignment No. 3

Title: Multiplexer

Problem Statement: Realization of Boolean Expression for suitable combination logic using MUX 74151

Hardware & software requirements:

Theory:

What is multiplexer? + Block Diagram

Necessity of multiplexer

Advantages of Multiplexer

Applications of MUX

Design:

1. Design Boolean Expression using MUX

Function = Sum of Product (SOP) Y = ∑m (1, 2, 3, 4, 5, 6, 7)

Truth Table

Diagram

2. Implementation of 16:1 MUX using 8:1 MUX

F(A,B,C,D) = ∑m (2, 4, 5, 7, 10, 14)

Use hardware reduction method and implement the given Boolean expression with the help of neat logic diagram. ***(N-circle Method)***

Simplification:

Truth Table

	D0	D1	D2	D3	D4	D5	D6	D7
$\overline{A}$	0	1	(2)	3	(4)	(5)	6	(7)
A	8	9	(10)	11	12	13	(14)	15
Input to Mux	0	0	1	0	$\overline{A}$	$\overline{A}$	A	$\overline{A}$

Diagram

Conclusion:

Assignment No. 4

Title: Comparator

Problem Statement: Verify the truth table of one bit and two bit comparators using logic gates and comparator IC

Hardware & software requirements:

Theory:

What is comparator?

(Block Diagram)

IC 7485 Description

Design:

1. **1-bit comparator** Truth Table Kmap

Circuit Diagram

1. **2-bit comparator** Truth Table Kmap

Circuit Diagram

Conclusion:

Assignment No. 5

Title: Parity Generator

Problem Statement: Design & Implement Parity Generator using EX-OR.

Hardware & software requirements:

Theory:

What is Parity?
Parity Generator: (diagram)
Even Parity Example

Odd Parity Example

Design

1. a. Even Parity generator

Tuth Table

Kmap

circuit diagram

b. Even Parity Detector

Tuth Table

Kmap

circuit diagram

2. a. Odd Parity generator

Tuth Table

Kmap

circuit diagram

b. Odd Parity Detector

Tuth Table

Kmap

circuit diagram

Conclusion:

Group A
Assignment No. 3

Title: BCD Adder

Problem Statement: Design and Realization of BCD Adder using 4-bit Binary Adder (IC 7483)

Hardware & software requirements:

Theory:

What is BCD Adder?
BCD addition rules
Kmap
Circuit Diagram
Applications

Conclusion:

Group B

Assignment No. 7

Title: Flip Flop Conversion

Problem Statement: Flip Flop Conversion: Design and Realization

Hardware & software requirements:

Theory:

Steps for FF Conversion:

Design:

1. D to T FF Conversion
- Table
- kmap
- Diagram

2. D to SR
- Table
- kmap
- Diagram

3. JK to SR
- Table
- kmap
- Diagram

4. JK to D
- Table
- kmap
- Diagram

Conclusion:

Assignment No. 8

Title: Ripple Counter

Problem Statement: Design of 2 bit and 3 bit Ripple Counter using MS JK flip-flop.

Hardware & software requirements:

Theory:

- What is Counter?
- Types of Counter.

Design:

- 3 bit Asynchronous Up Counter Truth Table
- circuit Diagram
- 3 bit Asunchronous Down Counter Truth Table
- circuit Diagram
- Applications of Counter

Conclusion:

Assignment No. 9

Title: a. Syncronous Counter

Problem Statement: Design of Synchronous 3 bit Up and Down Counter using MSJK Flip Flop / D Flip Flop

Hardware & software requirements:

Theory:
-Synchronous Counter

Design:
Designing of 3 bit synchronous UP-DOWN Counter
- Truth table
- Kmap
- Diagram

Applications
Conclusion:

Assignment No. 10

Title: Realization of Mod -N counter using (Decade Counter IC 7490) .

Problem Statement: Realization of Mod -N counter using (7490)

Hardware & software requirements:

Theory:

Modulo N counter
IC 7490 Internal Structure

Design:

MOD 7
-Truth table
-kamp
-diagram

MOD 98
-diagram

MOD 124
-diagram

Conclusion:

Assignment No. 11

Title:Ring Counter and Johnson Ring counter

Problem Statement: Design and Realization of Ring Counter and Johnson Ring counter

Hardware & software requirements:

Theory:

Ring Counter:

Design:
-Circuit Diagram
-Truth Table
-Application

Johnson Counter:

Design:
-Circuit Diagram
-Truth Table
-Application

Conclusion:

Assignment No. 5

Title: Sequence Generator

Problem Statement: Design and implement Sequence generator

JK flip-flop

Hardware & software requirements:

Theory:

Introduction to Sequence Generator

Using Shift Register & using counter

Design:

Design and implement Sequence generator using JK flip-flop for following sequence 1001001 using Counter.

1. Decide the no. Of FF

2. Write state table

Fkip Flop Outputs			State
Q_2	Q_1	Q_0	
1	0	0	4
0	0	1	1
0	1	0	2
1	1	1	7
0	0	0	0
0	1	1	3
1	1	0	6

3. State Diagram
4. Write the excitation Table
5. Kmap
6. Circuit Diagram

Conclusion:

GROUP C

Assignment No. 13

Problem Statement: Study of Shift Registers (SISO,SIPO, PISO,PIPO)

Theory:

Conclusion