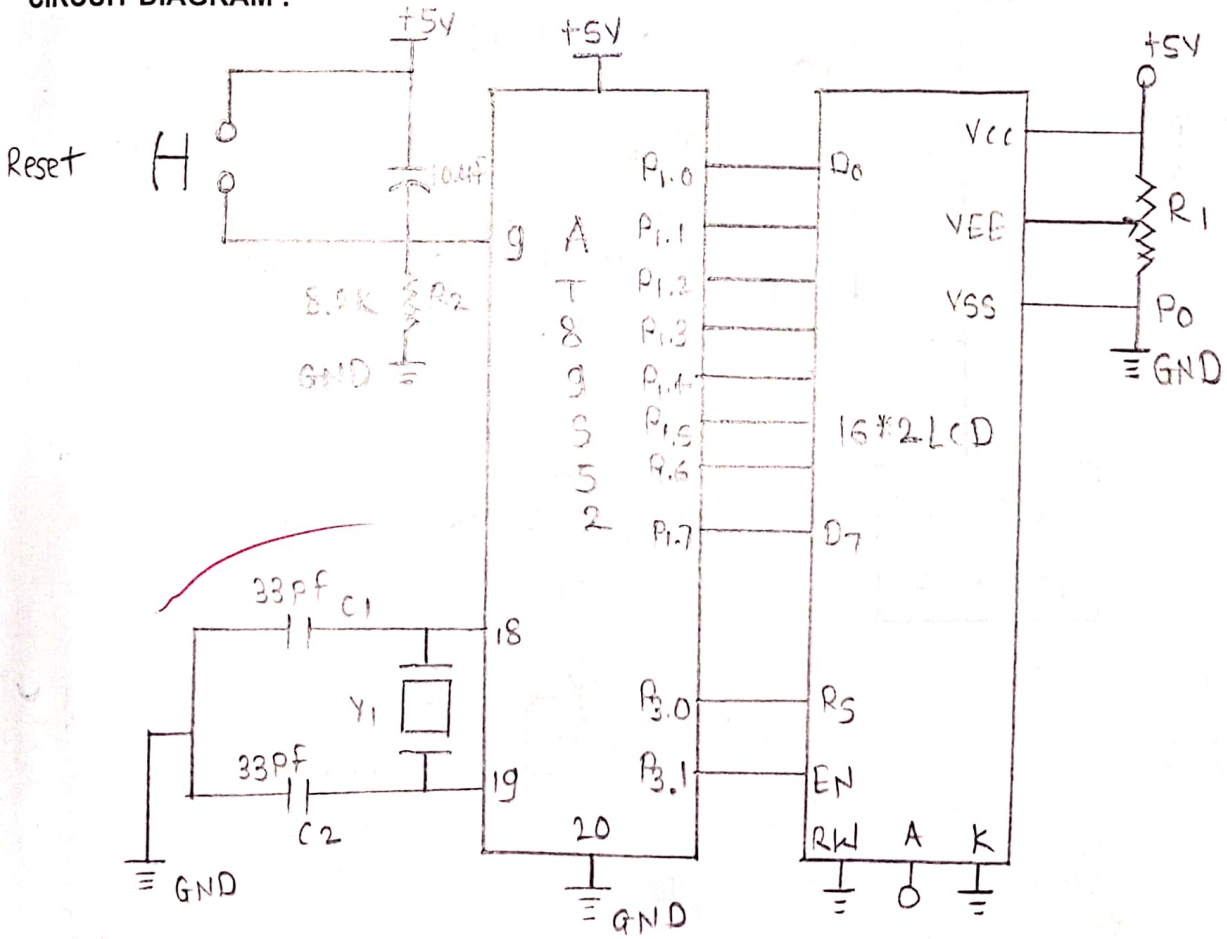
Expt. Tile : Interfacing LCD to 8051 µC.

AIM : To interface 16*2 LCD display to 8051 and display message on both lines of LCD.

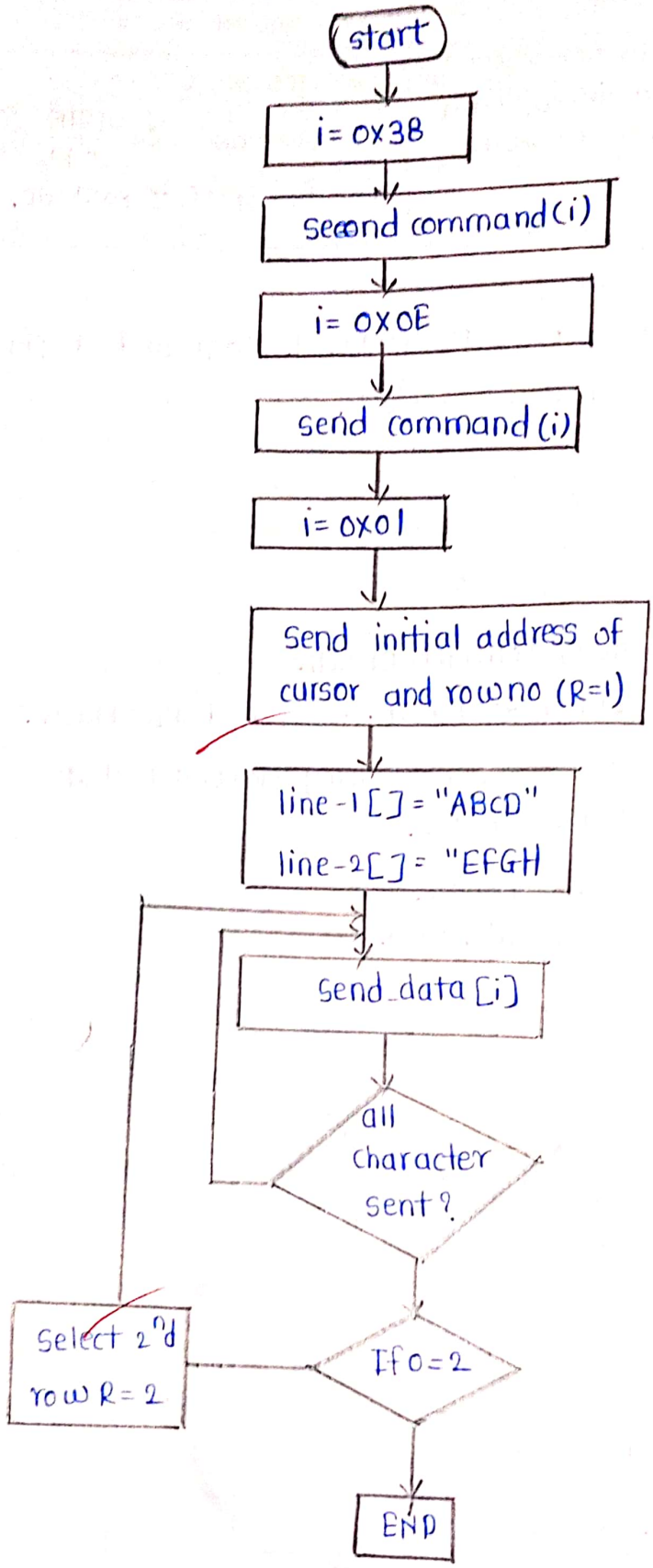
OBJECTIVES :
1. To study concept of LCD.
2. To study 8051 keil vision and ELC flash.
3. To study LCD interfacing flowchart and program using c.

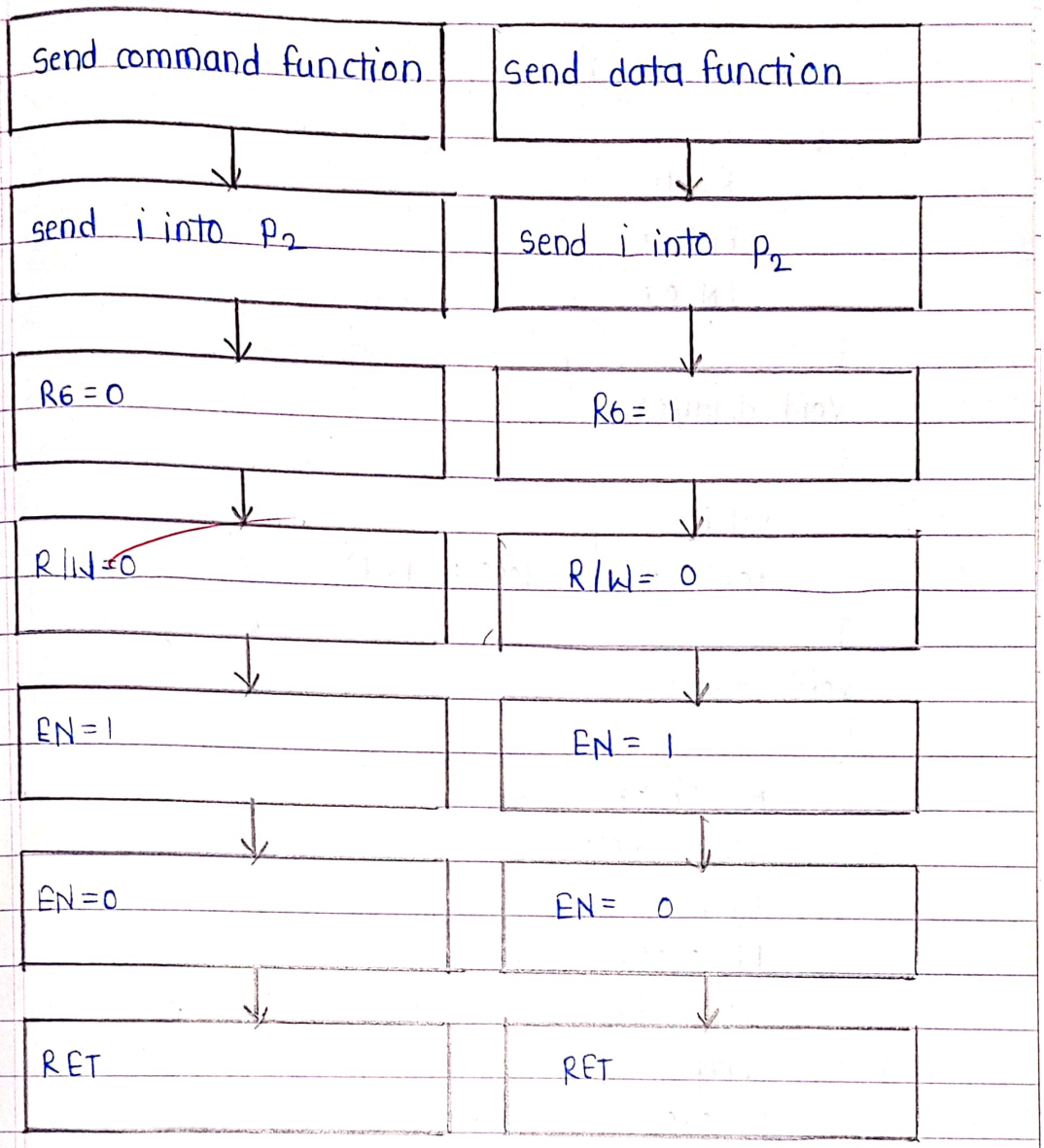
software and Hardware = (i) keil software.
(ii) practical board.

CIRCUIT DIAGRAM :



Flowchart


start
i= 0x38
second command(i)
i= 0x0E
send command(i)
i= 0x01
Send initial address of cursor and row no (R=1)
line-1[] = "ABCD"
line-2[] = "EFGH
Send_data[i]
all character sent?
If 0=2
Select 2nd row R=2
END



Program =

```
#include <reg51.h>
sbit RS = P3^0;
sbit EN = P3^1;
void LCDcmd ()
{
        RS = 0;
        EN = 1;
        EN = 0;
}
```

```
void LCD data()
{
    RS=1;
    EN=1;
    EN=0;
}
void delay()
{
    int i;
    for(i=0; i<=3000; i++)
}
Void main()
{
    P1= 0x38;
    LCD cmd();
    delay();
    P1= 0x01;
    LCD cmd();
    delay();
    P1= 0x0E;
    LCD cmd();
    delay();
    P1=0x06;
    LCD cmd();
    delay()
    P1= 0x80;
    LCD cmd();
    delay();
    P1 = 'A';
    LCD data();
    delay();
```

```
P1 = 'M';
LCD data();
delay();
P1 = 'A';
LCD data();
delay();
P1 = 'N';
LCD data();
delay();
while(1);
}
```

(*) Applications=

① This system is modern way to taking student attendence in classroom.
② It will avoid convential time manual attendence of students.
③ In this system, every student details stored in a card that use a indentification for taking attendence of student.

(*) Result=

Interfacing of 16*2 LCD with 8051 uc is done succesfully and message display on both line on LCD.

Batch B

Expt.

Tile : Event counter using opto coupler.

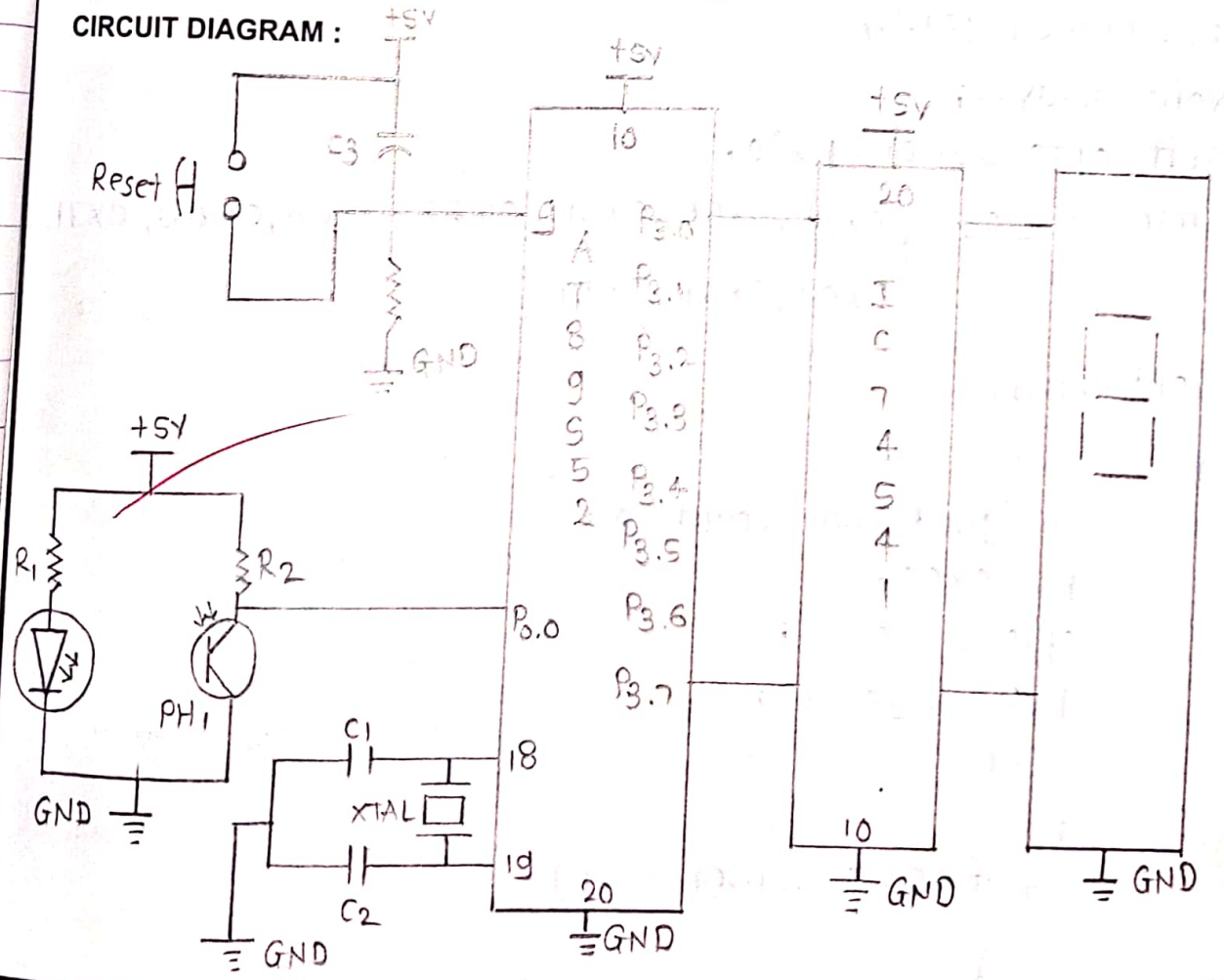
AIM : To study and understand event counter using opto-coupler, seven segment display interface to 8051 microcontroller.

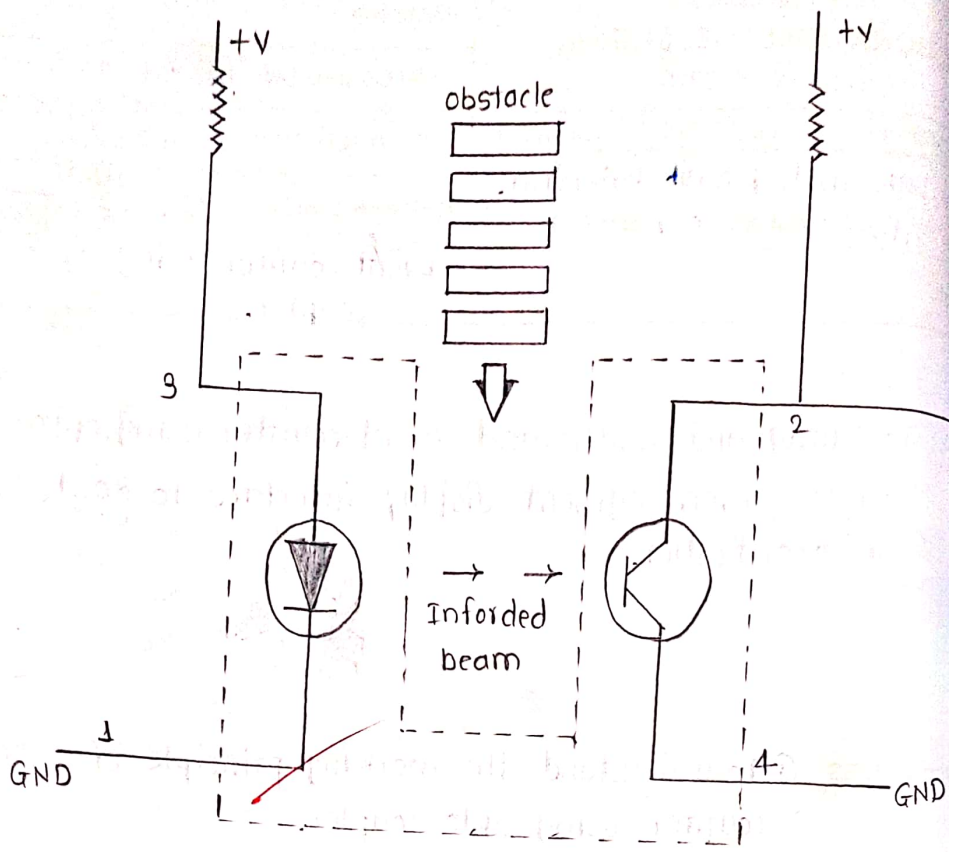
OBJECTIVES : ① To understand the working principle of event counter using opto coupler.

② To study keil µvision IDE software.

Software and Hardware = (i) keil software.
(ii) Practical board.

CIRCUIT DIAGRAM :





Program=

```
#include<reg51.h>
void delay();
sbit opto_sensor = P2^0;
char arr[10] = { 0x3F, 0x06, 0x5B, 0x4F, 0x66, 0x6D, 0x7
                 0x07, 0x7F, 0x6F }
Void main()
{
      unsigned char count=0;
      P3 = 0x00;
      opto_sensor = 1;
      P3 = arr[count];
      while(1)
      {
         if (opto_sensor == 1)
         {
```

```
        count ++;
        if( count >9)
        {
            count = 0;
        }
        P3 = arr[count];
    }
  }
}
```

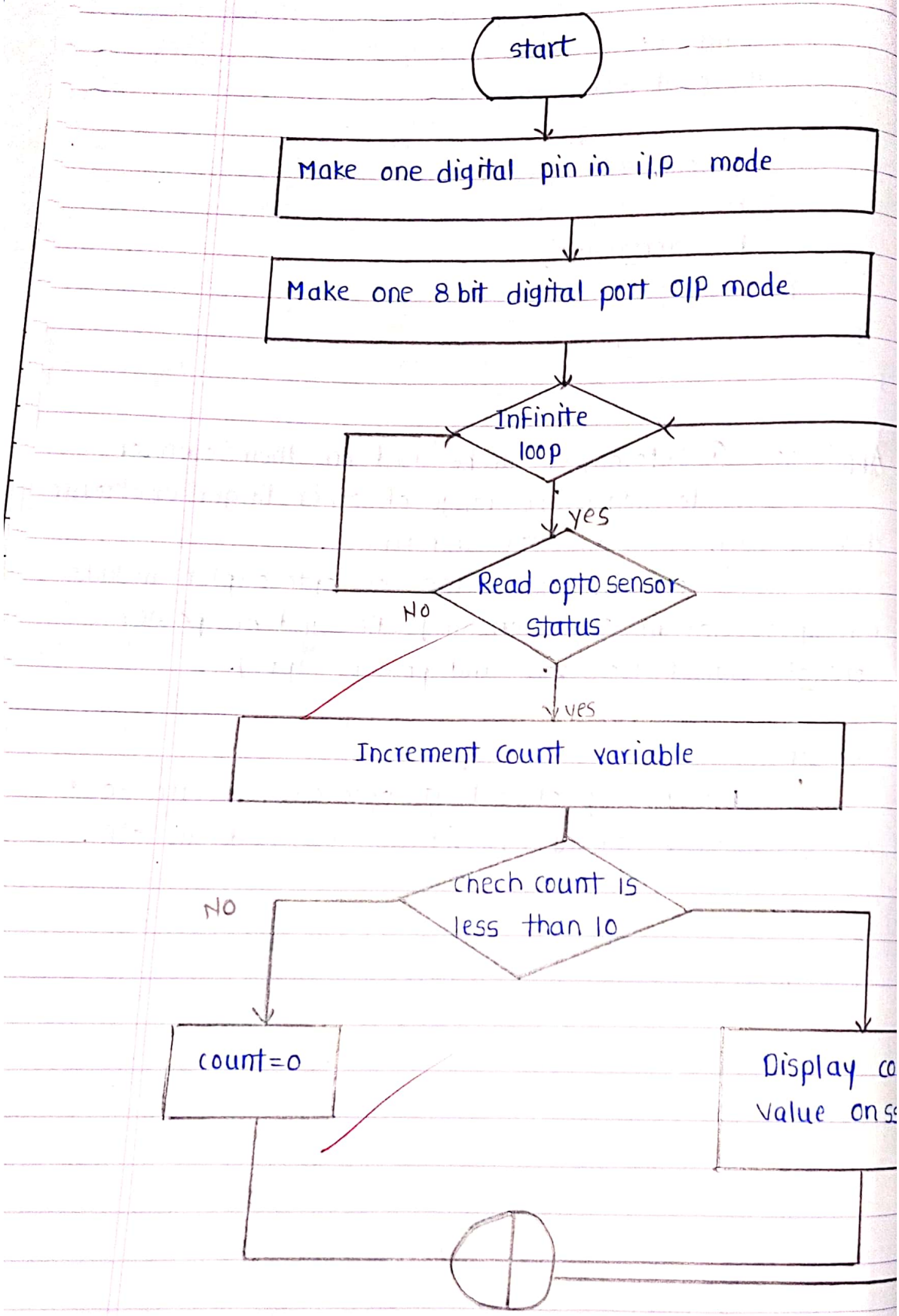
(*) Application = ① Optocoupler can be used on their own, or to switch the range of other larger electronic devices such as transistor and triaces.

② Common application for optocoupler include microprocessor i/p/o/p, switching . Dc and Ac power control, signal isolation and power supply.

(*) Result =

Interfacing of output optocoupler with 8051 is successfully studied, tested and observed the o/p.

(*) Flowchart =


start
Make one digital pin in i/p mode
Make one 8 bit digital port o/p mode
Infinite loop
yes
Read opto sensor status
No
yes
Increment count variable
Check count is less than 10
NO
count=0
Display co
value on s

Expt. Title : Triffic light controller using 8051 uC.

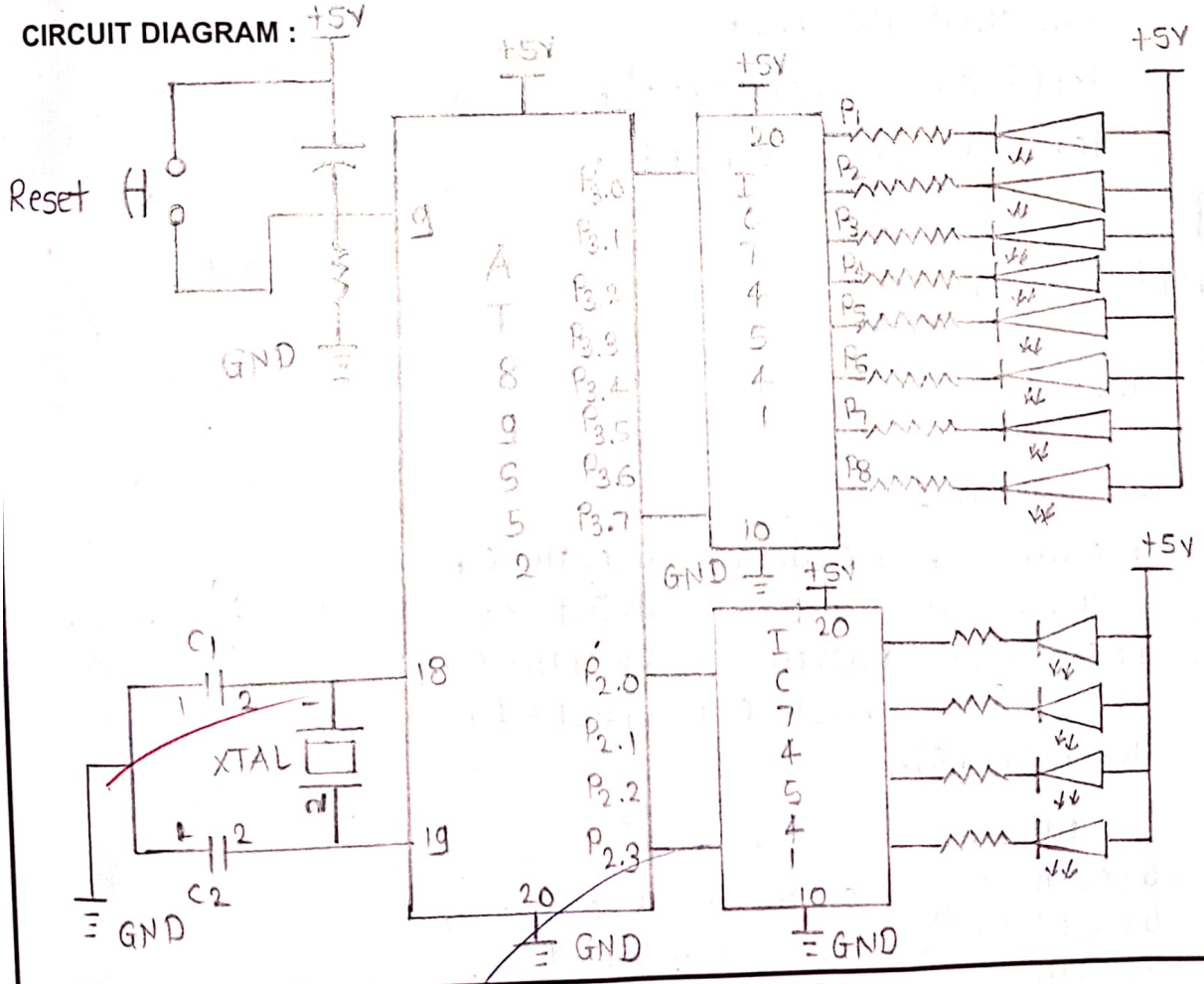
AIM : To study and understand interfacing Traffic light controller to 8051.

OBJECTIVES : ① To understand the concept of Traffic light controller.

② To study interfacing of Traffic light controller to 8051.

③ To study Keil u vision IDE software.

CIRCUIT DIAGRAM :



Program =

```
#include<reg51.h>

sbit GSouth = P1^1;
sbit YNorth = P3^3;
sbit RSouth = P3^2;

sbit GEast = P2^3;
sbit YEast = P3^7;
sbit REast = P3^6;

sbit GNorth = P2^0;
sbit YNorth = P3^1;
sbit RNorth = P3^0;

sbit GWest = P2^2;
sbit YWest = P3^5;
sbit RWest = P3^4;

void delay_sec(unsigned int second)
{
    unsigned int i,j;
    for(i=0; i<second; i++),
    for(j=0; j<53000; j++);
}
void main()
{
  while(1)
  {
    //sequence 1
    GSouth = 1; YSouth=1; RSouth=0;
    GEast = 1; YEast=1; REast=0;
    GNorth=1; YNorth=1; RNorth=0;
    GWest=0; YWest=0; RWest=1;
    delay_sec(5);

    //sequence 2
    GSouth=1; YSouth=1; RSouth=0;
    GEast=1; YEast=1; REast=0;
    GNorth=1; YNorth=1; RNorth=0;
    GWest=0; YWest=0; RWest=1;
    delay_sec(2);
```

```
// sequence 3.
GSouth = 1;   YSouth = 1;   RSouth = 0;
GEast = 1;    YEast = 1;    REast = 0;
GNorth = 0;   YNorth = 1;   RNorth = 1;
GWest = 1;    YWest = 1;    RWest = 0;
delay_sec(5);

// sequence 4
GSouth = 1;   YSouth = 1;   RSouth = 0;
GEast = 1;    YEast = 1;    REast = 0;
GNorth = 0;   YNorth = 0;   RNorth = 1;
GWest = 1;    YWest = 1;    RWest = 0;
delay_sec(2);

// sequence 5.
GSouth = 1;   YSouth = 1;   RSouth = 0;
GEast = 0;    YEast = 1;    REast = 1;
GNorth = 1;   YNorth = 1;   RNorth = 0;
GWest = 1;    YWest = 1;    RWest = 0;
delay_sec(5);

// sequence 6
GSouth = 0;   YSouth = 1;   RSouth = 1;
GEast = 1;    YEast = 1;    REast = 0;
GNorth = 1;   YNorth = 1;   RNorth = 0;
GWest = 1;    YWest = 1;    RWest = 0;
delay_sec(5);

// sequence 8.
```

```
GSouth= 0;    YSouth= 0;    RSouth= 1;
GEast = 1;    YEast = 1;    REast = 0;
GNorth= 1;    YNorth= 1;    RNorth= 0;
GWest = 1;    YWest= 1;     RWest = 0;
delay_sec(2);
}
}
```

Application= ① optimum control fluctuating tra
such as over saturated or unusu
load activities.

② Control the time intervals of the
light.

③ Reduce the number of accidents.

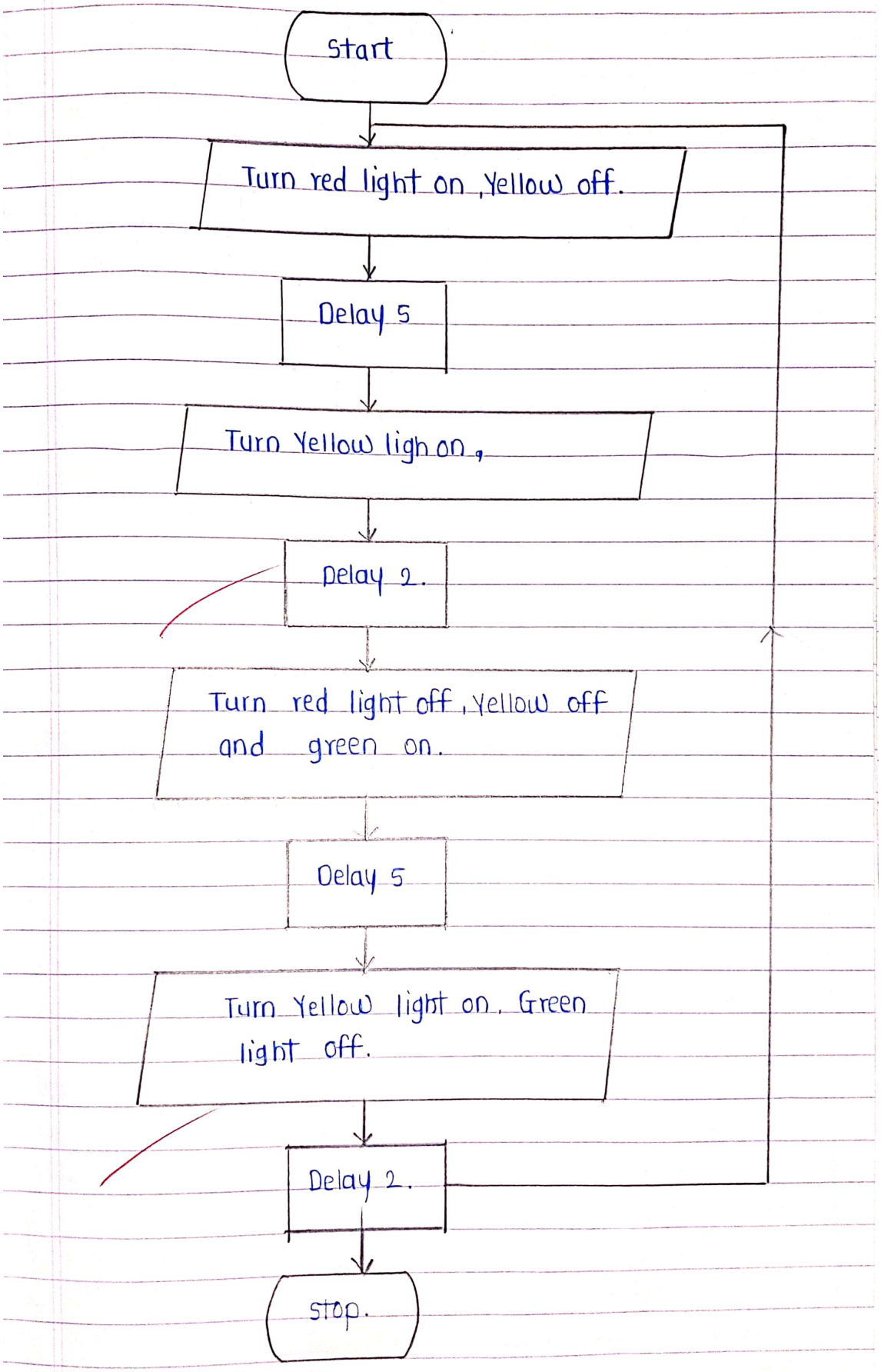
④ Decrease delays of vehicals and
effects.

⑤ Reduce wastage of time by a g
light on empty road.

Result=

Interfacing of Traffic light controller w
8051 is successfully studied, tested and observe

Flowchart=


Start
Turn red light on, Yellow off.
Delay 5
Turn Yellow ligh on,
Delay 2.
Turn red light off, Yellow off and green on.
Delay 5
Turn Yellow light on, Green light off.
Delay 2.
stop.

Expt.

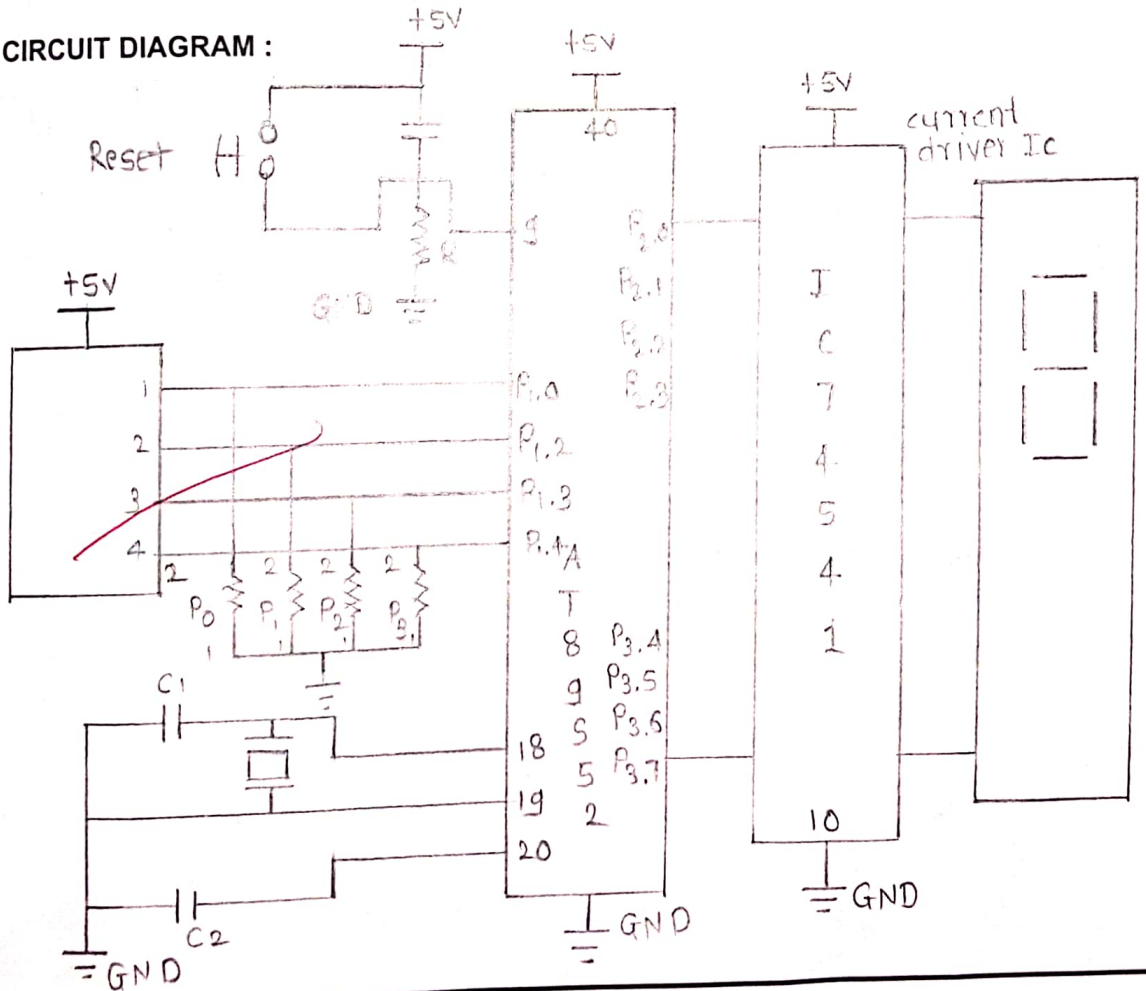
Tile : Interfacing thumbwheel seven segment display.

AIM : To study thumbwheel interfacing with 7 segment display using 8051 uc.

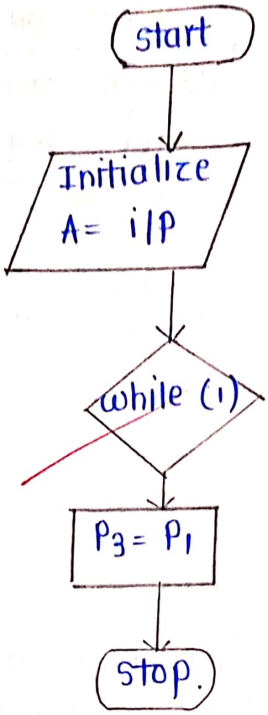
OBJECTIVES :

1. To study principle of operation of thumbwheel and seven segment display devices.
2. To write a program for interfacing to thumbwheel switch and seven segment display using uc.

CIRCUIT DIAGRAM :



Flowchart =



(*) Program=

```
#include<reg51.h>
void delay();
char arr[10] = {0x3F, 0x06, 0x5B, 0x4F, 0x66, 0x6D, 0x7D,
                0x07, 0x7F, 0x6F}
void main()
{
      unsigned char count=0;
      P3=0x00;
      P1= 0x0F;
      while(1)
      {
        count=P1;
        count= count &0xFF;
        P3= arr[count];
        delay();
        delay();
      }
}
void delay()
{
    int i;
    for(i=0;i<=3000;i++);
}
```

(*) Observation table=

I/P number throught thumbwheel switch	Number display on segment display.
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

(*) conclusion=

Thumbwheel interfacing with 7 segme uc 8051. Port 1 is I/P and Port 3 is o/P as we thumbwheel I/P the corresponding LED. Segment display.

Class : SY BSc(CS) Roll No. 3021 Batch B

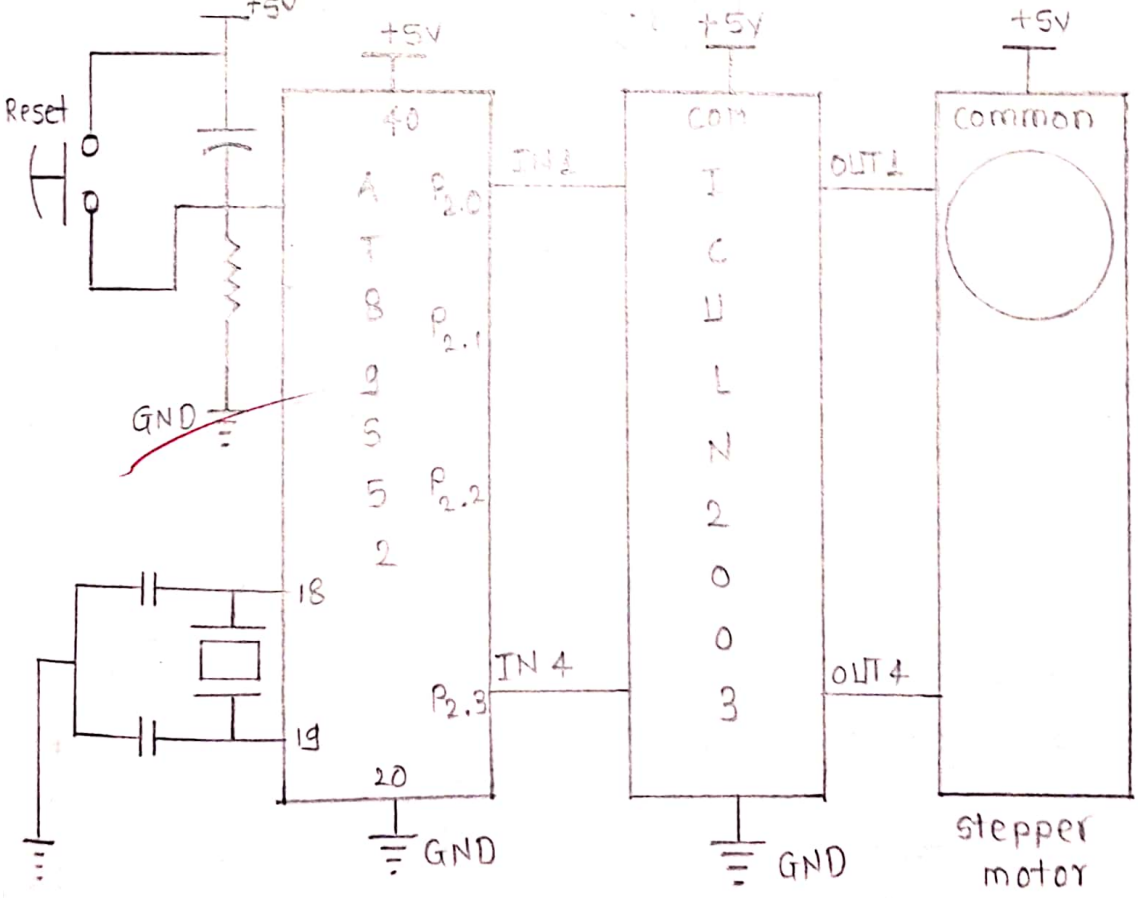
Expt. Title : Speed control of stepper motor using 8051 uC.

AIM : To study and understand speed control of stepper motor using 8051 microcontroller.

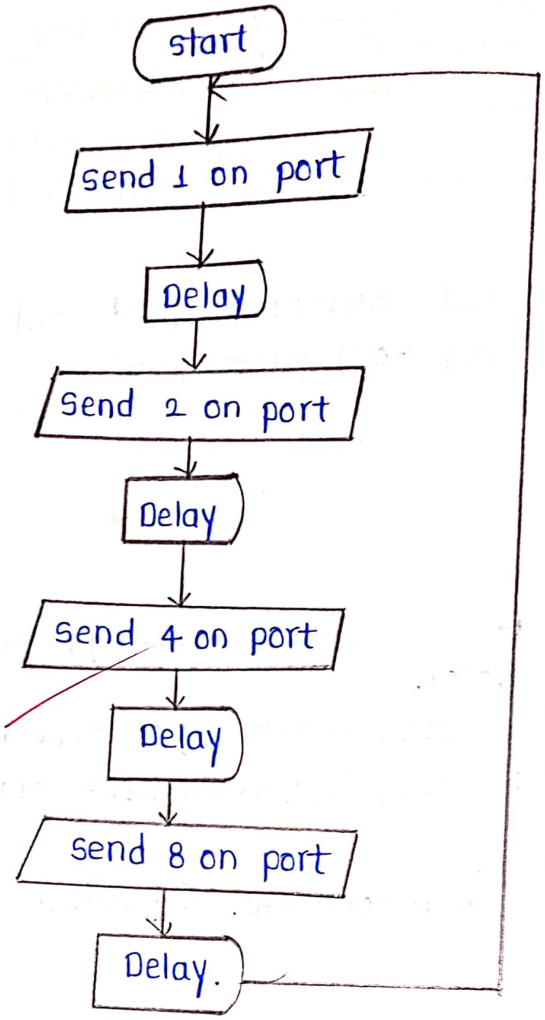
OBJECTIVES :
1. To understand the working principle of stepper motor.
2. To study interfacing of stepper motor of 8051.
3. To study keil uvision IDE software.

Software and Hardware = 1. Keil software. 2. Practical board.

CIRCUIT DIAGRAM :



Flowchart =


start
Send 1 on port
Delay
Send 2 on port
Delay
Send 4 on port
Delay
Send 8 on port
Delay.

(*) Program =

```
#include<reg51.h>
void delay();
void main()
{
   P2=0x00;
   P2= 0x01;
   delay();
   P2= 0x02;
   delay();
   P2= 0x04;
   delay();
   P2=0x08;
   delay();
}
void delay()
{
    int i;
    for(i=0; i<= 3000; i++);
}
```

(*) Applications=

① This circuit can be used in the robotic application.
② This can be also be used in mechatronics application.
③ This stepper motor can be used in disk drive.
④ The main advantages of using the stepper motor is in the position control.

(*) Result=

Interfacing of stepper motor with 80s
succesfully studied, tested and observe the out

Class : SYBSc(CS) Roll No. 5027 Batch B

REMARK & SIGN 18/10/23

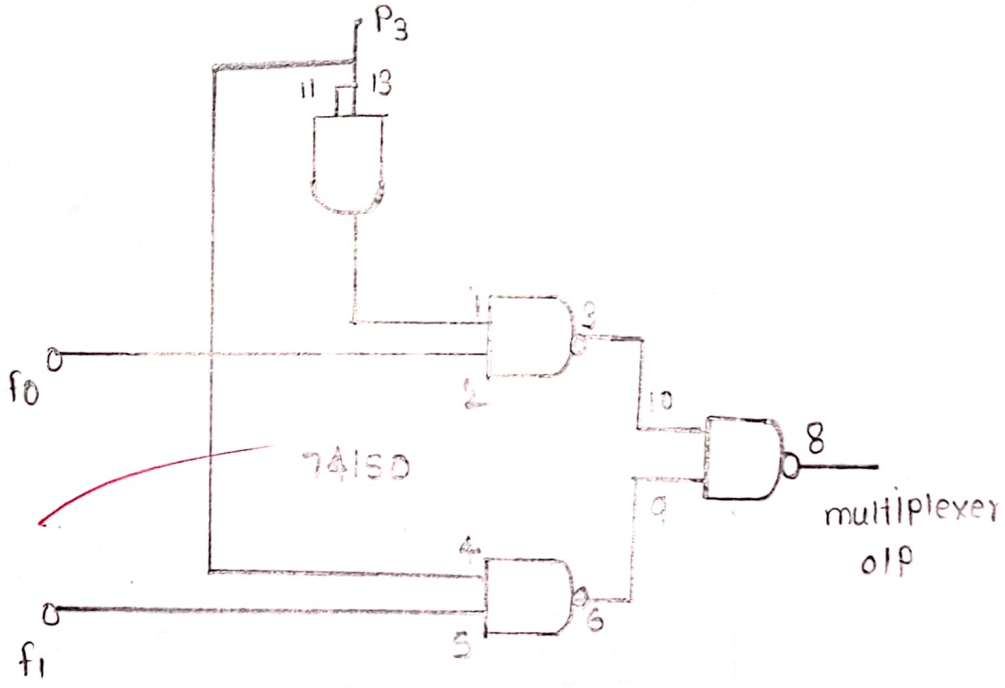
Expt.

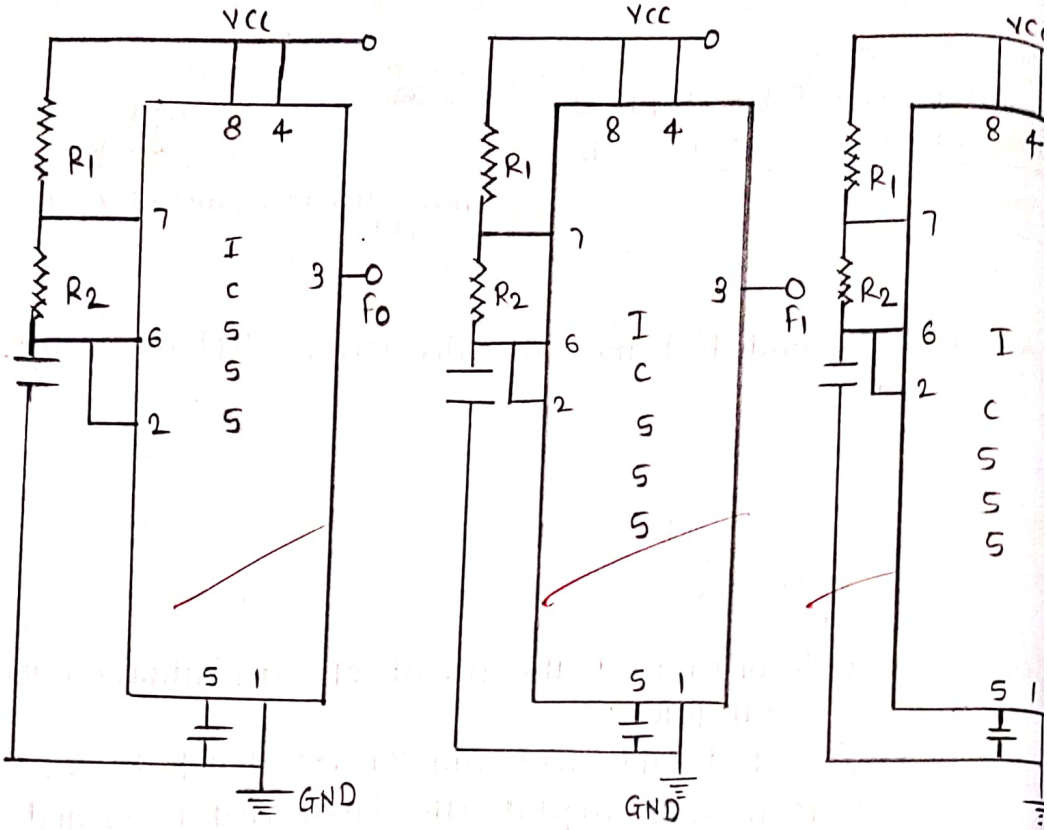
Title : Time division multiplexing ckt.

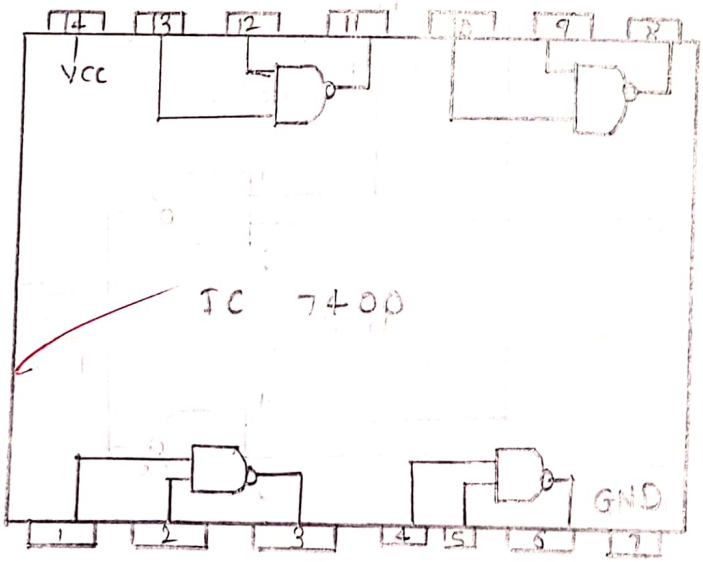
AIM : To build and test the time division multiplexer circuit.

OBJECTIVES :
1. To understand the circuit of 2:1 multiplexer using NAND gate.
2. To test table multivibrator ckt using IC555
3. To measure digital i/p signal freq f_1, f_2 and select line frequency f_0.
4. To understand the timedivision multiplexing action at given ckt.

CIRCUIT DIAGRAM :




VCC
8
4
R1
7
R2
6
2
3
fo
5
1
GND
VCC
8
4
R1
7
R2
6
2
3
f1
5
1
GND
VCC
8
4
R1
7
R2
6
2
5
1


14
13
12
11
10
9
8
VCC
IC 7400
GND
1
2
3
4
5
6
7

Calculation =

$R_1 = 1\ k\Omega$

$R_2 = 6.8\ k\Omega$

$C_1 = 0.1\ \mu f$

$C_2 = 0.047\ \mu f$

Formula =

$$f_0 = \frac{1.44}{(R_1 + 2R_2)C_1}$$

$$= \frac{1.44}{(1k\Omega + 2 \times 6.8\ k\Omega)\ 0.1\mu f}$$

$$= \frac{1.44}{(1 \times 10^3\ \Omega + 13.6 \times 10^3\ \Omega)\ 0.1 \times 10^{-6} f}$$

$$= \frac{1.44}{(14.6 \times 10^3)\ 0.1 \times 10^{-6} f}$$

$$= \frac{1.44}{14.6 \times 0.1 \times 10^{-3}}$$

$$= \frac{1.44}{14.6 \times 0.1}$$

$$= \frac{1.44}{1.46} \times 10^3$$

$\therefore f_0 = 0.9863\ kHz$

$$\therefore f_1 = \frac{1.44}{(R_1 + 2R_2) C_2}$$

$$= \frac{1.44}{(1K\Omega + 2 \times 6.8)\, 0.047\ \mu f}$$

$$= \frac{1.44}{(14.6 \times 10^3)\, 0.047 \times 10^{-6} f}$$

$$= \frac{1.44}{14.6 \times 0.047 \times 10^{-3}}$$

$$= \frac{1.44}{0.6862} \times 10^3$$

$\therefore f_1 = 2.0985$ kHz

$\therefore f_s = f_o + f_1$

$= 0.9863 + 2.0985$

$= 3.0848$

(*) Observation Table =

① Measurment of Frequency =

signal	calculated freq	observed Time	freq (ob
f_o	1.42 kHz	962.5 µs	1.03
f_1	2.5 kHz	20.01 ms	49.
f_s	0.095 kHz	8.826 ms	113

(*) Multiplexer output =

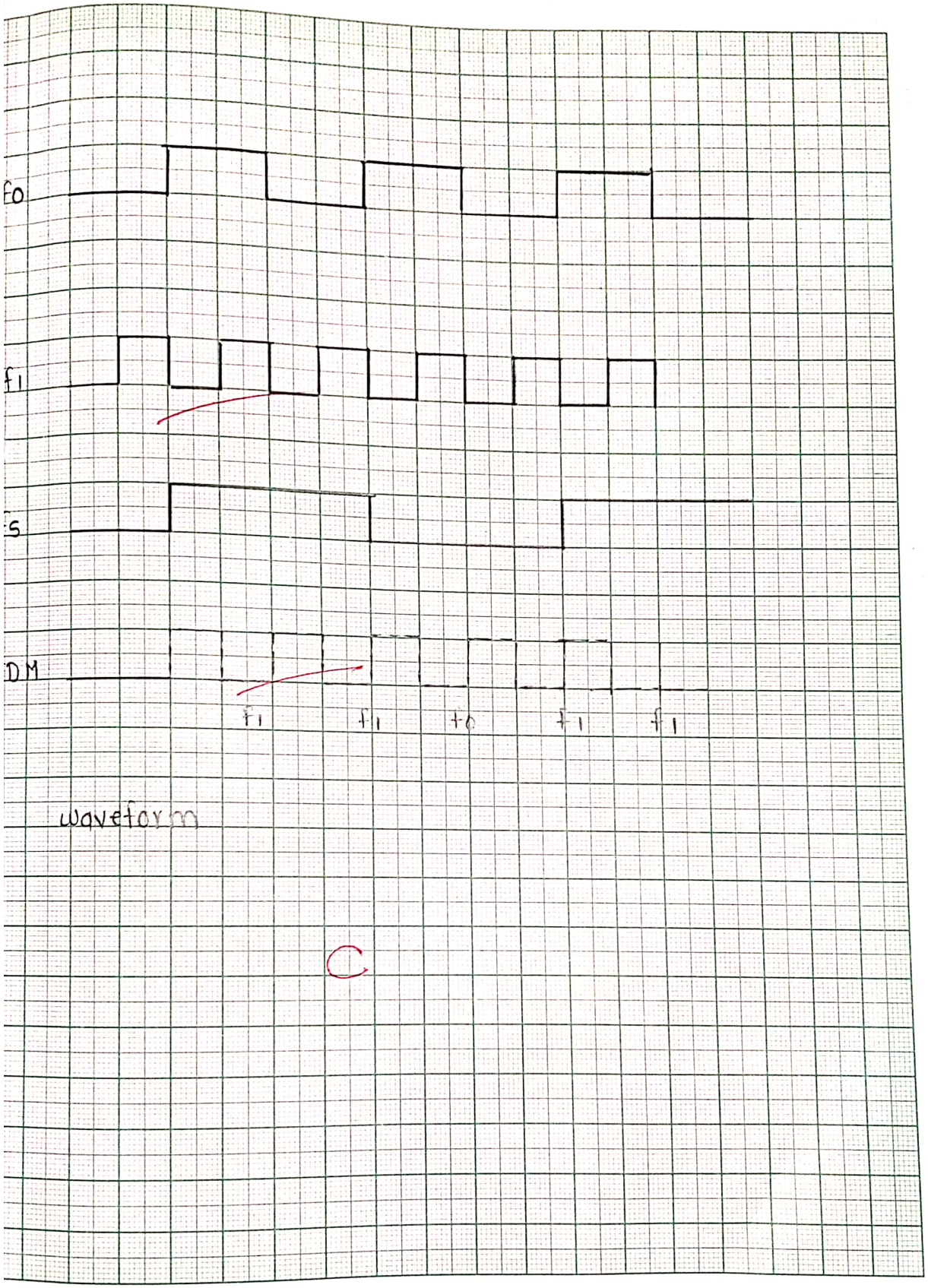
Sr. No	logic level of select signal	observered freq of muttiplexer o/p.
1	logic 1	50.04 Hz
2	logic 0	1.016 kHz

(*) Conclusion =

In TDM fs is worked as selector and fo, f1 are input freq.

(*) Result =

In TDM 'logic 1' observered freq of muttiple o/p is maximum and inlogic 0 observed freq of multiplexer o/p is minimum.



waveform

C

Expt.

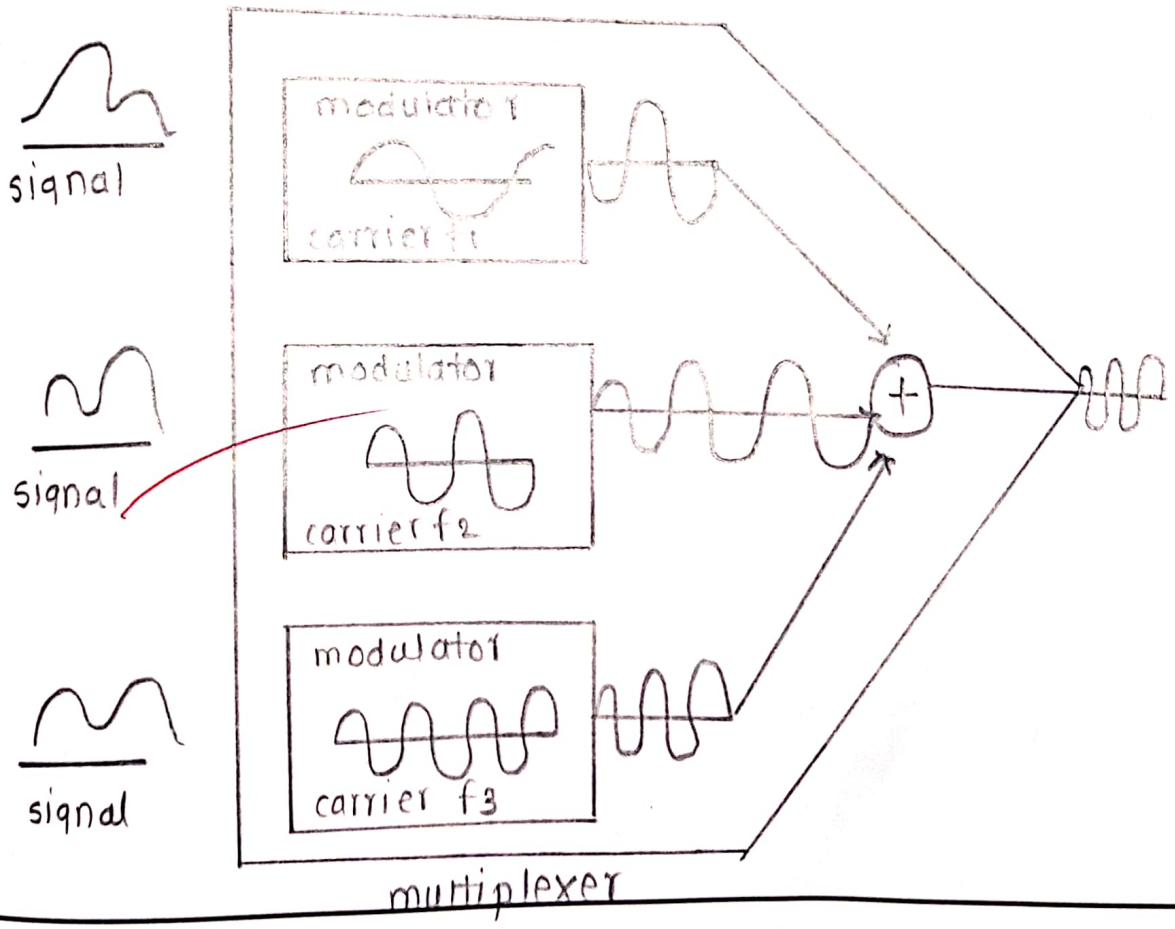
Tile : Frequency division multiplexing and demultiplexing.

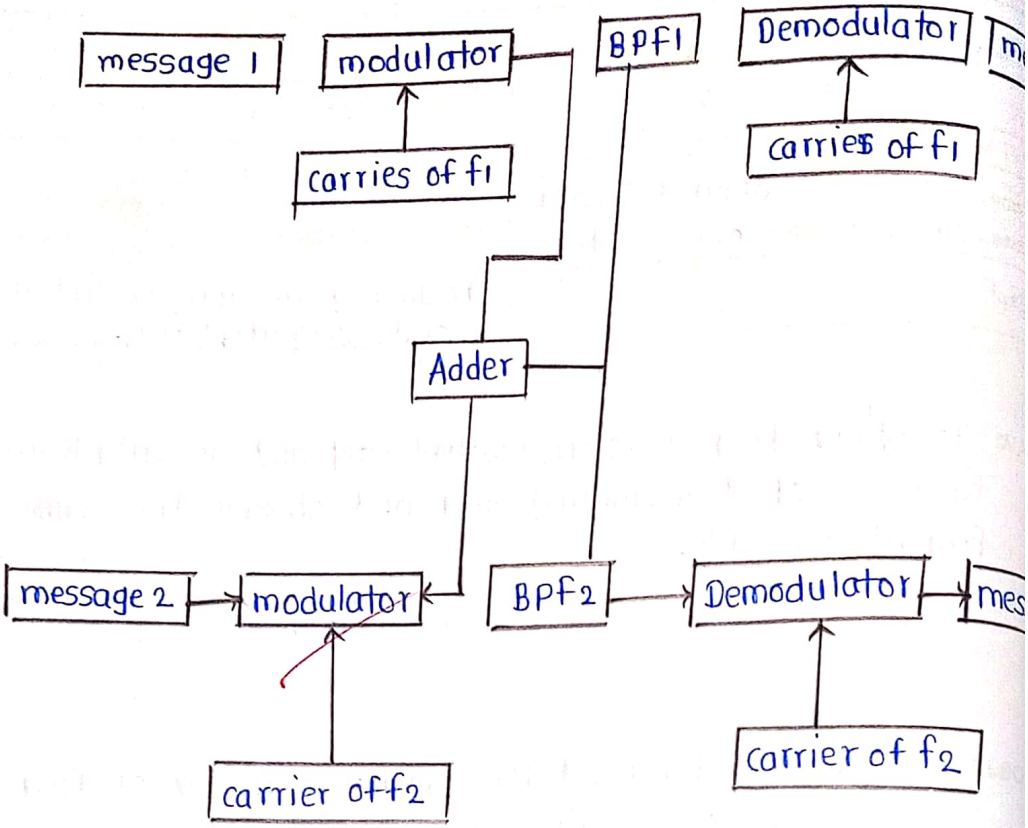
AIM : To study freq division multiplexing and demultiplexing technique of transmitting data and observe the same freq at o/p side.

OBJECTIVES :

1. To understand the operation theory of freq division multiplexer and demultiplexer.
2. To test the freq division multiplexing & demultiplexing by using given circuit.

CIRCUIT DIAGRAM :




message 1
modulator
carries of f1
BPF1
Demodulator
carries of f1
Adder
message 2
modulator
carrier of f2
BPf2
Demodulator
carrier of f2

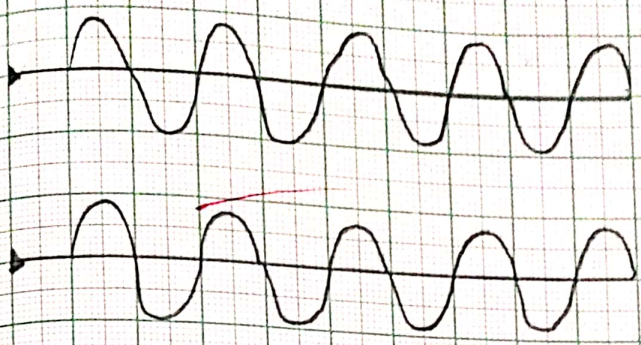
(*) observation table =

Sr.NO	signal	Amplitude	Time	frequency
①	sine wave 1	1.00 mV	2.884 ms	3.487 Hz
	sine wave 2	6.88 mV	3.291 ms	346.8 Hz
②	carrier 1	2.66 mV	3.470 ms	363.9 Hz
	carrier 2	3.60 V	6.960 ms	2.88 kHz
③	Modulator 1	2.48 V	3.468 ms	143.7 kHz
	Modulator 2	3.22 V	6.954 ms	288.4 kHz
④	Bandpass fitter 1	520 mV	69.00 ms	143.8 kHz
	Bandpass fitter 2	408 mV	4.475 ms	14.79 kHz
⑤	Adder	1.98 V	3.492 ms	223.4 kHz
⑥	Demodulator 1	3.04 mV	2.861 ms	286.4 kHz
	Demodulator 2	452 mV	3.286 ms	349.6 kHz
⑦	Lowpass fitter 1	1.44 V	2.872 ms	304.3 Hz
	lowpass fitter 2	1.12 V	3.3287 ms	30.4.3 Hz

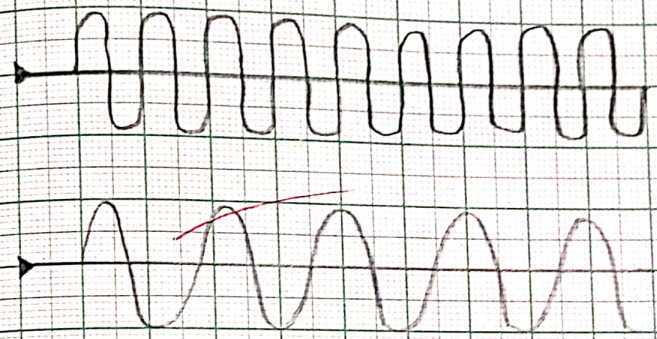
(*) conclusion =

We have studied the concept of freq division multiplexing and perform it practically. observed waveform and freq.

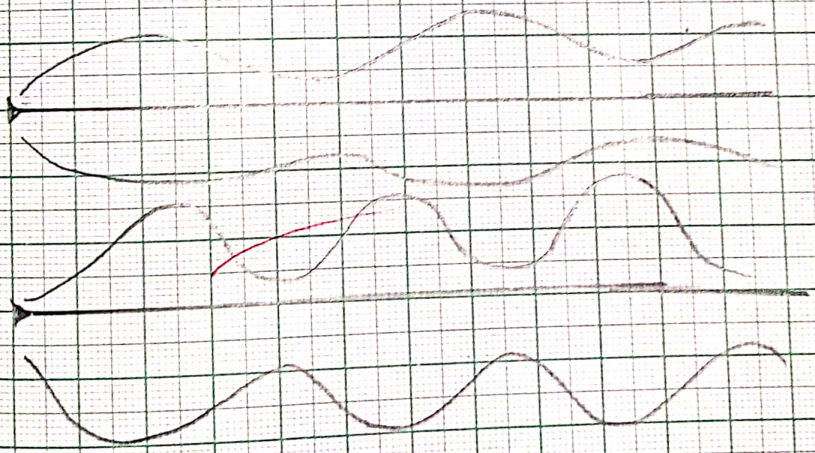
① sinewaves 1/2 :



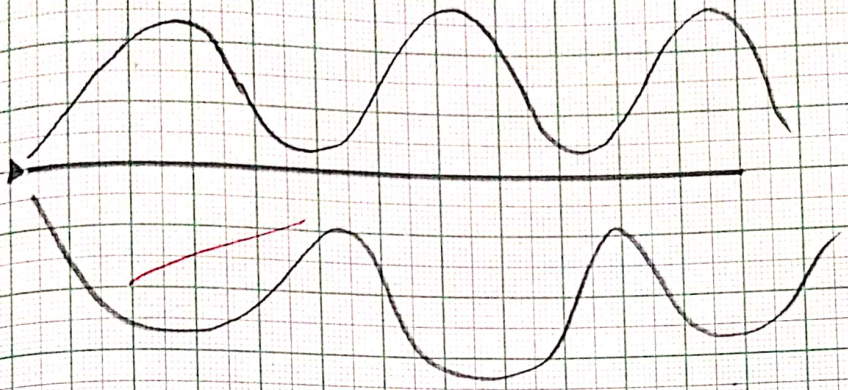
② carrier 1/2 :



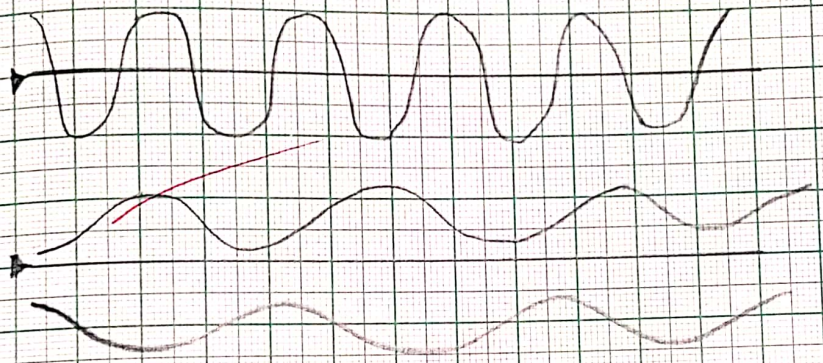
③ Modulator 1/2 o/p :



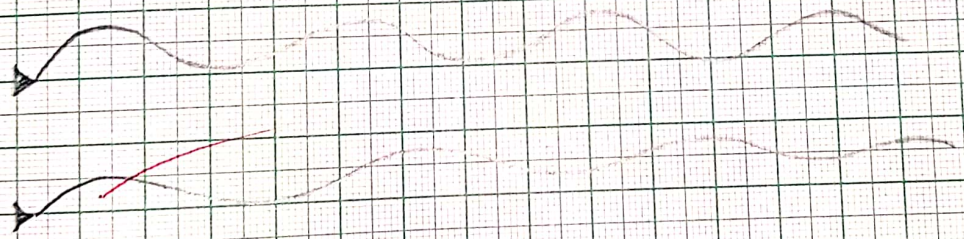
(4) Adder =



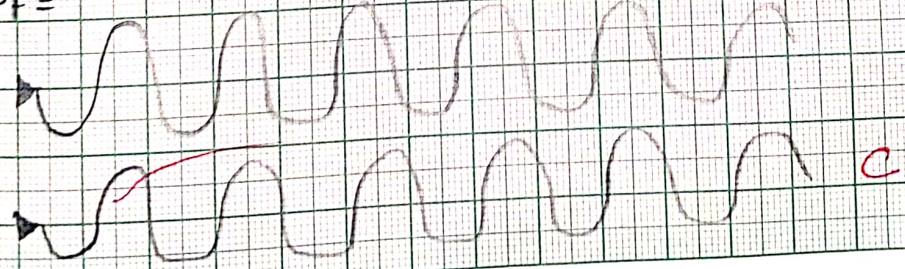
(5) BPS o/p =



(6) Demodulator =



(7) LPF =



Expt.

Tile : Pulse code modulation ckt

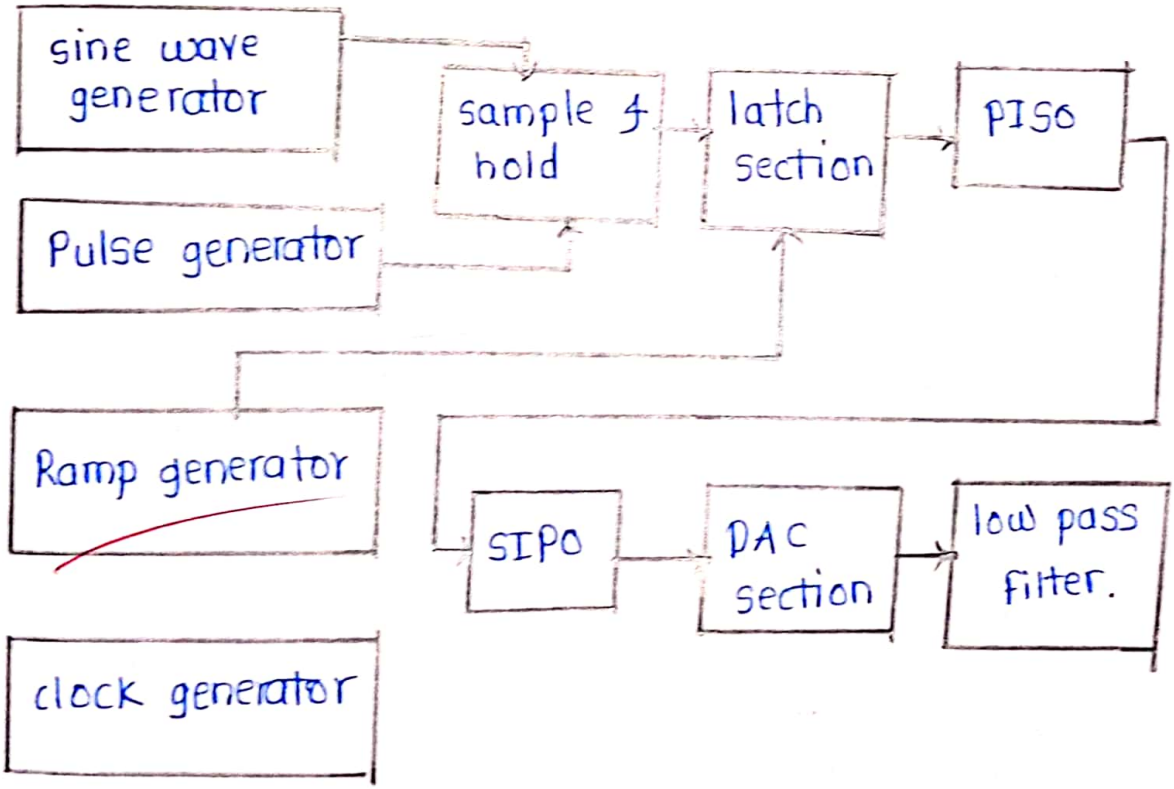
AIM : To study the pulse code modulation and demodulatⁿ

Requirements = PCM kit, 20 MHz, dual trace oscilloscope, connecting patch cords, power supply.

OBJECTIVES : ① To study effort on the variation of the amplitude of the modeling signal

② To study the effect on the variation of the freq of modulating signal.

CIRCUIT DIAGRAM :



(*) observation table =

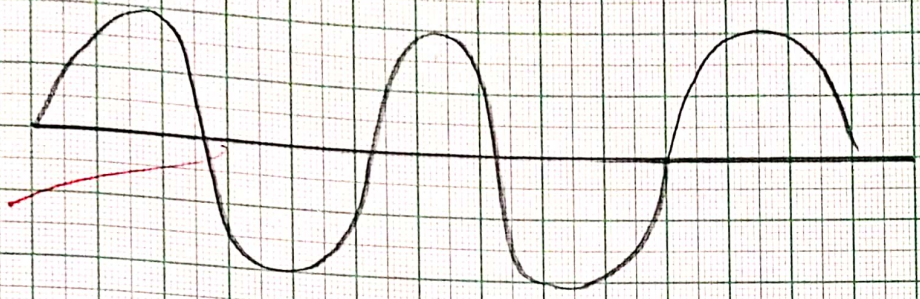
No	Signal	Amplitude	freq
①	Sine wave	5.68 mV	480.5 Hz
②	RAMP	1.52 V	24.15 kHz
③	Digital clock	2 V	94.50 kHz
④	Monostable	5.12 V	23.90 kHz
⑤	PISO	3.64 V	23.84 mHz
⑥	low pass Filter	128 mV	846.4 Hz

(*) conclusion =

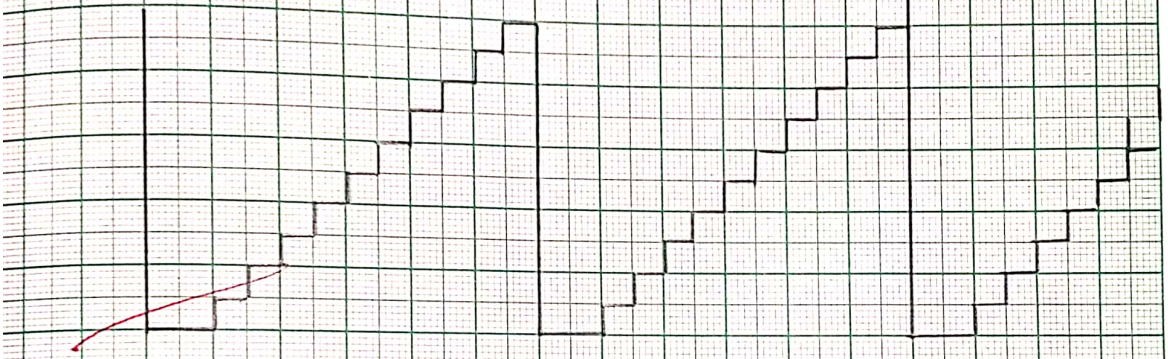
Thus, the PCM and demodulat^n performed and observed o/P waveform.

CS CamScanner

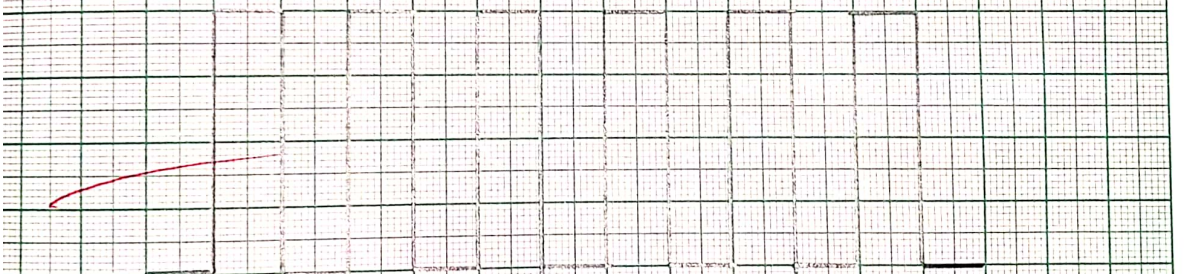
(1) Sine wave =



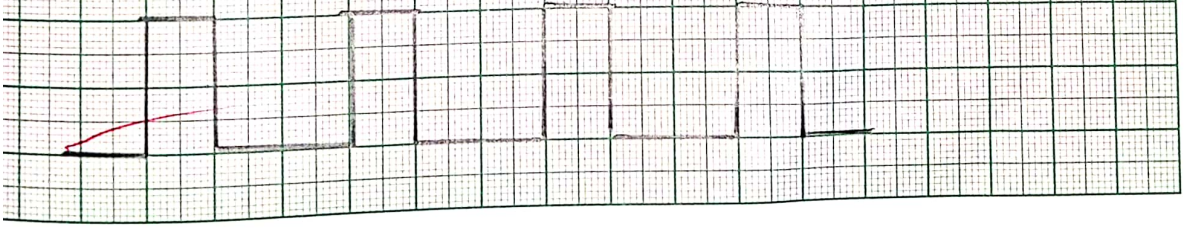
(2) RAMP =



3) Digital clock =

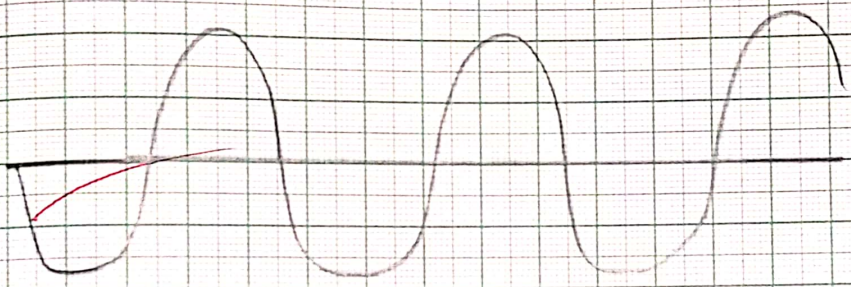


4) Monostable =



(5) PISO =

(6) low pass filter =



C

Class : SYBSC(CS) Roll No. 5027 Batch B | REMARK & SIGN. : C 18/10/23

Expt. | Tile : Hamming code.

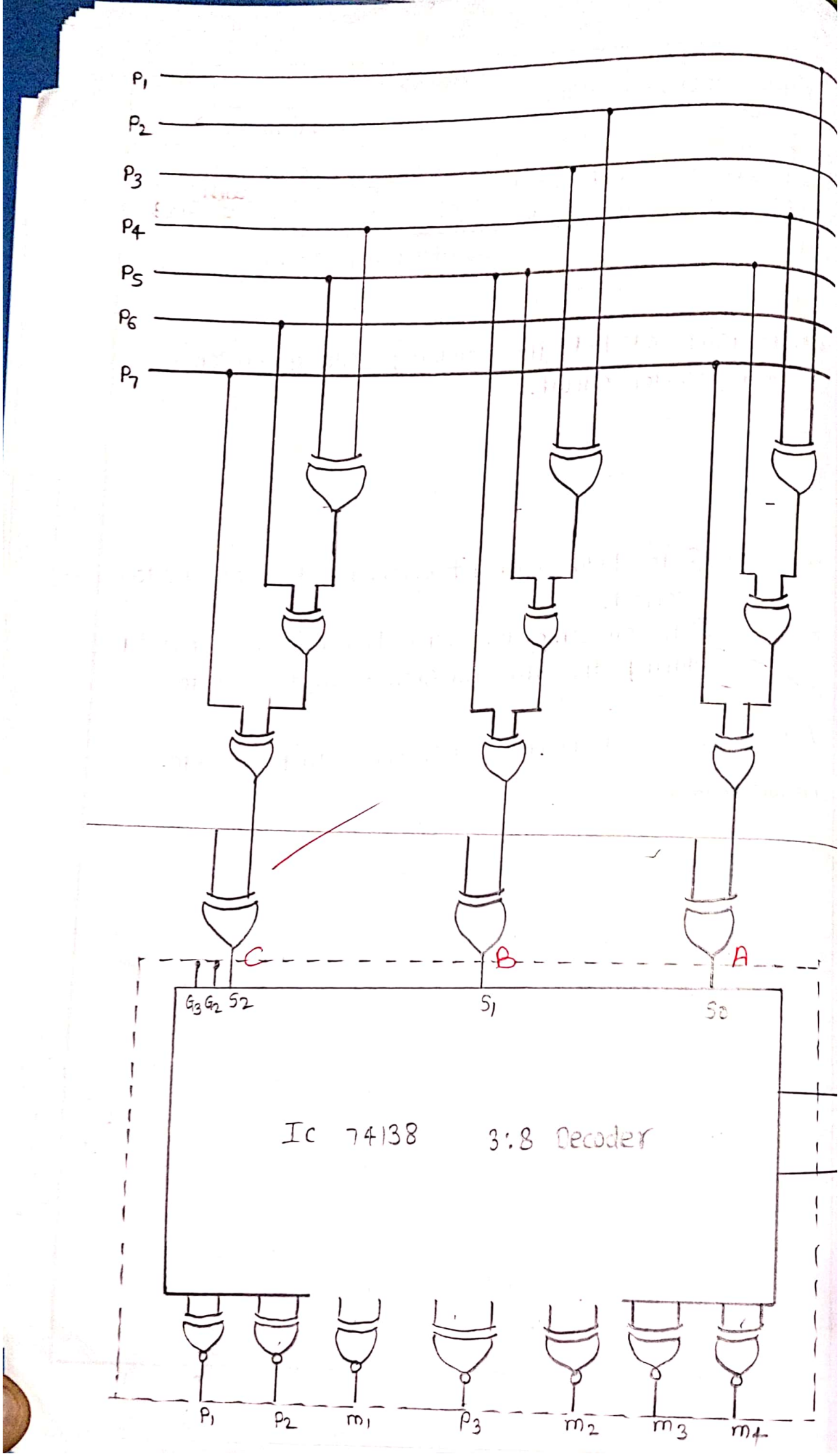
AIM : To build and test the hamming code generator and detector circuit.

OBJECTIVES : ① To study single bit error, brust error and to correct.

② To overcome un reliable transmission of data during the transmission from encoder to decoder.

Apparatus = circuit board, DMM, connecting wire, etc.

CIRCUIT DIAGRAM :


P1
P2
P3
P4
P5
P6
P7
C
B
A
G3 G2 S2
S1
S0
Ic 74138 3:8 Decoder
P1
P2
m1
P3
m2
m3
m4

ST.NO	Parity Hamming Code	construct Hamming code	Error detection			7 bit Hamming code							set bit	code output							correct Hamming code						
			P_1	P_2	P_3	P_1	P_2	m_1	P_3	m_2	m_3	m_4	S	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	P_1	P_2	m_1	P_3	m_2	m_3	m_4
①	Even	~~1110~~	0	0	0	0	0	1	0	1	1	0	0	1	1	1	1	1	1	1	0	0	1	0	1	1	0
②	Even error		0	0	0	0	0	1	0	1	1	0	0	1	1	1	1	1	1	1	0	0	1	0	1	1	0
③	odd	~~1011~~	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1
④	odd error		1	0	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1

calculation:-

① construct the hamming code for 1110 transmission with even parity.

If we want to transmit four bit data information then $m = 4$

Hamming code rule = $m + p + 1 \leq 2^p$

m = length of information

p = parity bit.

let $p = 3$

$m + p + 1 <= 2^p$

$4 + 3 + 1 <= 2^3$

$8 \leq 8$

∴ Hamming rule satisfy.

we use parity bit there P_1, P_2, P_3 and four bits data information bits.

		1		1	1	0
P_1	P_2	m_1	P_3	m_2	m_3	m_4

① Decide parity P_1

P_1 - m_1 m_2 m_4

1 1 0

∴ $P_1 = 0$

② Decide parity P_2

P_2 - m_1 m_3 m_4

1 1 0

$P_2 = 0$

③ Decide parity P_3

P_3 - m_2 m_3 m_4

1 1 0

$P_3 = 0$

④ Write error code word

$P_1 P_2 P_3 \rightarrow (000)$

⑤ Required Hamming code

0	0	1	0	1	1	0
P_1	P_2	m_1	P_3	m_2	m_3	m_4

② Construct the hamming code for 1011 transmissio odd parity.

we used parity bit there P_1, P_2, P_3 and four bits information bits

∴ The length of hamming code word is

$4+3=7$

		1		0	1	1
P_1	P_2	m_1	P_3	m_2	m_3	m_4

① Decide P_1 parity

P_1 - m_1 m_2 m_4

1 0 1

$P_1 = 1$

② Decide the parity of P_2

P_2 - m_1 m_3 m_4

1 1 1

$P_2 = 0$

③ Decide the parity P_3

P_3 = m_2 m_3 m_4

0 1 1

$P_3 = 1$

Required Hamming code =

1	0	1	1	0	1	1
P_1	P_2	m_1	P_3	m_2	m_3	m_4

Result =

In hamming code there are 7 bit data m_1, m_2 m_3, m_4 are transmitted data $P_1 P_2 P_3$ are for error transmitted data in o/p bit code converter in word

P_1	P_2	m_1	P_3	m_2	m_3	m_4
P_1	P_2	m_1	P_3	m_2	m_3	m_4

(*) Conclusion =

In hamming code are detected the er
and correct the bit.

Class : SY BSC(CS) Roll No. 5027 Batch B

REMARK & SIGN

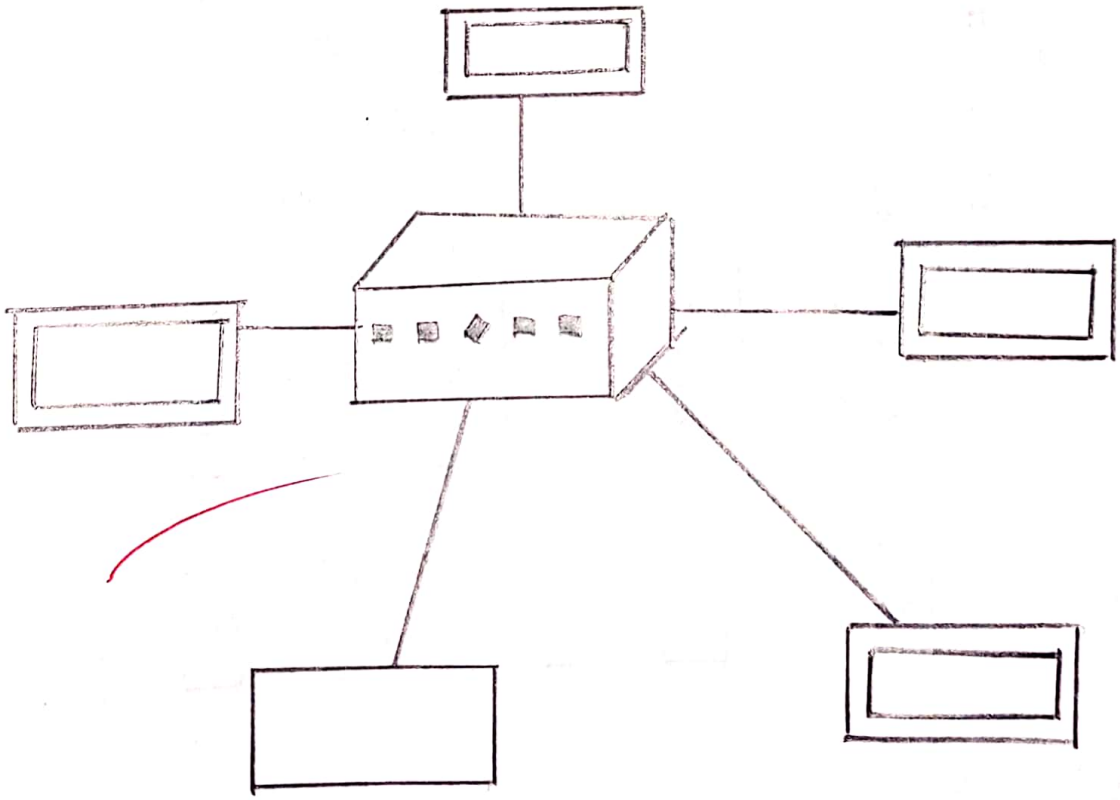
Expt. 5 (A)

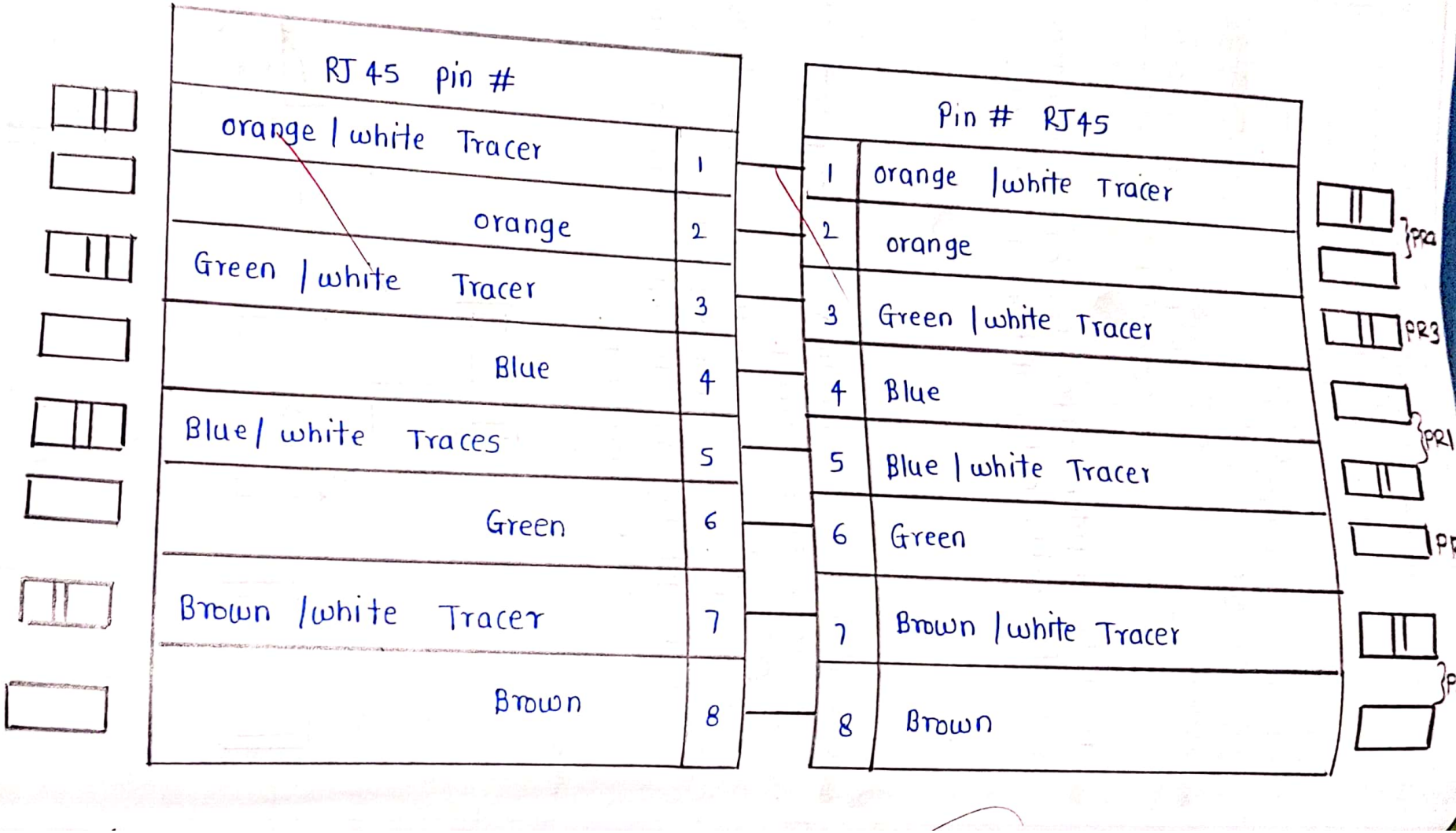
Tile : Study of computer network component.

AIM : To study computer components : cables, connectors, Routers / switches and related interfacing cards.

OBJECTIVES :
1. To get familier with various components of computer networking.
2. To get familier with the cables, connections and network interfacing cards.
3. To get familier with LAN development using network components.

CIRCUIT DIAGRAM :




RJ 45 pin #
orange / white Tracer
1
orange
2
Green / white Tracer
3
Blue
4
Blue / white Traces
5
Green
6
Brown / white Tracer
7
Brown
8
Pin # RJ45
1 orange / white Tracer
2 orange
3 Green / white Tracer
4 Blue
5 Blue / white Tracer
6 Green
7 Brown / white Tracer
8 Brown
PR3
PR1

observation table=

Pc Number	set IP address	Ping Pc	status
PC1	192.168.10.129	PC-1 to PC2	connected
PC2	192.168.10.34	PC2 to PC1	connected.

Result =

Successfully studied for computer network components :- cables, connectors, Routers, related cards.

Batch B

t. 5(B)

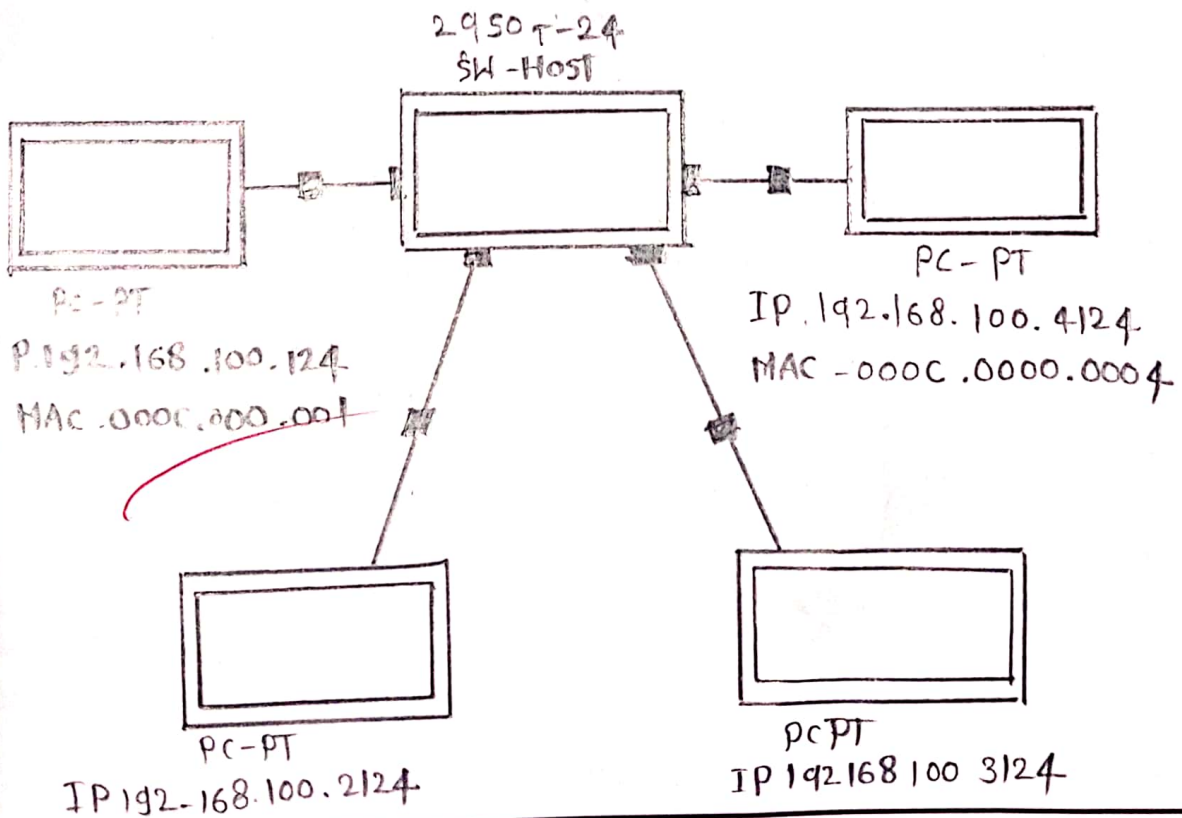
Tile : Study of computer network components.

M: To study configuration of IP and MAC address and to study local area network setup.

BJECTIVES : ① To get familier with local area networking
② To get familier with the concept of IP and MAC address.
③ To get familier with configurat^{n} of IP and mac.

pparatus = Twisted pair, RJ-45 connected, switch, min 2PC.

IRCUIT DIAGRAM :



(*) observation table =

Pc NO	set IP address	mAc add.	mapping IP & macadd
PC1	192.168.10.129	E4-54-E8-CC-D5-91	192.1 168.10.129 E4-54-E8-CC-D5-91
PC2	192.168.10.34	E4-54-E8-CC-D9-4E	192.168.10.34. E4-54-E8-CC-D9

(*) Result =

Succesfully studied for configuratⁿ of IP and mAc address and to study local area network setup.