PART-B

ESSAY QUESTIONS

1. Assuming XTAL =22 MHZ, write a program to generate a pulse train of 2 seconds period on pin P2.4 . Use Timer 1 in mode 1.
2. Assuming XTAL = 22 Mhz, write program to generate a square wave of frequency 1 Khz on pin P1.2.
3. Write program to toggle only bit P1.5 continuously every 50 ms. Use Timer 0, mode 1 .
4. Write program to create a frequency of 2500 Hz on pin P2.7. Use timer 1, mode 2 to create the delay.
5. Assume that a 1-Hz external clock os being fed into pin TI(P3.5). Write program for counter 1 in mode 2 to count up and display the state of the TL1 count on P1. Start the count at 0H.
6. Assume that 60 Hz external clock is being fed into pin T0(P3.4). Write a C program for counter 0 in mode 2 to display the seconds and minutes on P1 and P2, respectively.
7. with XTAL=11.0592 Mhz, find the TH1 value needed to have the following baud rates.
   a) 9600 b) 2400 c) 1200
8. Write C program to transfer the letter "A" serially at 4800 baud continuously. Use 8-bit data and 1 stop bit.
9. Program the 8051 In C to receive bytes of data serially and put them in P1. Set the baud rate at 4800, 8-bit data and 1 stop bit.
10. Write C program to send two different strings to the serial port. Assuming that SW is connected to pin P2.0, monitor its status and make a decision as follows :
    SW =0 send your first name
    SW =1 send your last name
    Assume XTAL = 11.0592 MHz,baud rate of 9600, 8-bit data, 1 stop bit.

G	$C/\overline{T}$	m_1	m_0	G	$C/\overline{T}$	m_1	m_0
↓	↓	↓	↓				
0	0	0	1	0	0	0	0

00 → mode 0 → 13 bit

01 → mode 1 → 16 bit timer.

10 → mode 2 → 8 bit timer, auto Reload

11 → mod 3 → split timer.

22MHz - clk freq

0.0455 μsec → Time. = $1/f = 1/22MHz$

12 clk cycles → 22MHz

1 μ → $\frac{22}{12}$ MHz = 1.8333 MHz.

T → $\frac{1}{1.8333}$ = 0.5455 μsec.

For 1sec → $\frac{1ms}{0.5455\ \mu sec}$ = $1.8333 \times 10^{+6} \times 10$

= 1833300

= 1833

*(1). 22MHz

$\frac{1}{22MHz} = 1.8333\,MHz$

$T = \frac{1}{1.8333\,MHz} = 0.5460\,\mu secs.$

for 1ms → $\frac{1ms}{0.5460\,\mu s} = 1831.5$

$2^{16} - 1831.5 = 47204.5$

↓ Hexa

$= B875 = B875\,H.$

```
#include<reg51.h>
Sbit PIN = P2^4;
Void MSdelay( );
Void main( )
{
   PIN = 1;
   while(1)
   {
      PIN = ~PIN;
      MSdelay( );
   }
}
```

```
void Msdelay()
{
    unsinged char i;
    for(i=0; i<10; i++)
    {
     TMOD = 0X10;
     TL1 = 0X75;
     TH1 = 0XB8;
     TR1 = 1;
     while(TF1==0);
     TR1=0;
     TF1=0;
    }
}
```

(4) 11.0592 MHz.

$= \frac{11.0592\ MHz}{12}$

$= 0.9216\ MHz.$

$T = \frac{1}{0.9216M} = 1.085\ \mu s.$

Given T = 400 ms. So, we need to create 200 ms.

40 ms → $T = \frac{40ms}{1.085\mu s} = 36.8 = 37.$

$2^8 - 37 = 219.$

= 0XDB in Hexa.

```
#include<reg51.h>
Void msdelay();
Sbit P = P2^7;
Void main()
{
  P = 1;
```

```
while(1)
{
  P = ~P;
  msdelay();
  }
}

Void msdelay()
{
  unsigned char i;
  for(i=0; i<5; i++)
  {
    TMOD = 0X20;
    TH1 = 0XDB;
    TR1 = 1;
    while(TF1==0);
    TR1=0;
    TF1=0;
  }
}
```

*(5).

```
#include<reg51.h>
sbit T1 = P3^5;
void main()
{
T1=1;
TMOD = 0X60;
TH1= 0;

while(1)
{

TR1=1;
P1=TL1;
while(TF1==0);

TF1=0;
TR1=0;
}
}
```

*(8).

```
#include <reg51.h>

Void main( )

{

TMOD = 0X20;

TH1 = 0XFA;

SCON = 0X50;

TR1 = 1;

while(1)

{

SBUF = 'A';

while(TI==0);

TI = 0;

}

}
```

4800 → FA

9600 → FD

(9).

```
#include<reg51.h>
void main()
{
    unsinged char mybyte;
    TMOD = 0X20;
    TH1 = 0XFA; // 4800 Baud rate
    SCON = 0X50;
    TR1 = 1;
    while(1)
    {
        while(RI==0);
        Mybyte = SBUF;
        P1 = MYByte;
        RI = 0;
    }
}
```

*. Sw → P2^0.

if sw = 0 → first name.

if sw = 1 → last name.

TMOD = 0x20;

TH1 = 0XFD. → Baud rate 9600.

Program :→

```
#include <reg51.h>
sbit SW = P2^0;
void main( );
{
unsigned char fname[ ] = "shiva";
unsigned char lname [ ] = "kumar";
unsigned char x;
TMOD= 0x20;
TH1 = 0XFD;
SCON = 0x50;
TR1 = 1;
```

```
if (SW==0)
  {
    for(x=0; x<5; x++)
      {
        SBUF = frame[x];
        while (TI==0);
        TI=0;
      }
  }
Else
  {
    for (x=0; x<5; x++)
      {
        SBUF = frame[x];
        while (TI==0);
        TI=0;
      }
  }
```

③. 11.0592 MHz.

$\Rightarrow \frac{50\,ms}{1.085\,\mu s} = 46083.$

$2^{16} - 46083 = 19453.$

$= 4BFD.$

```
#include <reg51.h>
sbit P = P1^5;
void msdelay();
void main()
{
  P = 1;
  while(1)
  {
    P = ~P;
    msdelay();
  }
}
```

```
void msdelay()
{
  TMOD = 0x01;
  TH0 = 0xFB;
  TL0 = 0xFD;
  TR0 = 1;
  while(TF0 == 0);
  TF0 = 0;
  TR0 = 0;
}
```

UNIT - IV

LCD * Cmd

```
#include <reg51.h>

Sfr ldata = 0x90;

Sbit rs = P2^0;

Sbit rw = P2^1;

Sbit en = P2^2.

Void msdelay (unsigned char time));

Void main ( )

{

lcd cmb (0x38);

MSdelay (250);

lcd cmb (0x0E);

msdelay (250);

lcd cmd (0x01);

ms delay (250 0x01);

lcd cmd (0x06);

ms delay (250 0x01);

lcd cmd (0x86);

msdelay (250);
```

```
lcddata('M');
Msdelay(200);
lcddata('D');
msdelay(250);
lcddata('E');
msdelay(250);
}
Void lcdCmd(unsigned char value)
{
    ldata = value;
    rs = 0;
    rw = 0;
    en = 1;
    msdelay(10);
    en = 0;
}
```

```
Void lcddata (unsigned char value)
{
    ldata = value;
    rs = 1;
    rw = 0;
    en = 1;
    mydelay(10);
    en = 0;
}

Void msdelay (unsigned char time)
{
    unsigned char i, j;
    for (i = 0; i < time; i++)
        for (j = 0; j < 275; j++);
}
```