

Date _____

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Subject ≠ Microcontroller System

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Question #1.

Answer:-

Part (a):-

Difference b/w microprocessors & microcontroller

Microprocessor:-

- It is the heart of computer system.
- It is only a processor, so memory & I/O components need to be connected externally.
- You can't use it in compact system.
- Cost of entire system is high.

Microcontroller:-

- It is the heart of an embedded system.
- Microcontroller has a processor along with internal memory & I/O components.
- You can use it in compact system.
- Cost of entire system is low.

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Question # 1
part (b).

Answer:-

P1.0	1	40	VCC
P1.1	2	39	P0.0 (AD0)
P1.2	3	38	P0.1 (AD1)
P1.3	4	37	P0.2 (AD2)
P1.4	5	36	P0.3 (AD3)
P1.5	6	35	P0.4 (AD4)
P1.6	7	34	P0.5 (AD5)
P1.7	8	33	P0.6 (AD6)
RST	9	32	P0.7 (AD7)
(RXD) P3.0	10	31	\overline{EA}/VPP
(TXD) P3.1	11	30	$\overline{ALE}/\overline{PROG}$
($\overline{INT0}$) P3.2	12	29	PSEN
($\overline{INT1}$) P3.3	13	28	P2.7 (A15)
(\overline{TO}) P3.4	14	27	P2.6 (A14)
($\overline{T1}$) P3.5	15	26	P2.5 (A13)
(\overline{WR}) P3.6	16	25	P2.4 (A12)
(\overline{RD}) P3.7	17	24	P2.3 (A11)
XTAL2	18	23	P2.2 (A10)
XTAL1	19	22	P2.1 (A9)
GND	20	21	P2.0 (A8)

Question #1

Part (c).

Answer:-

The pin configuration of 8052 is exactly similar to that of 8051 except that the first two pins P1.0 & P1.1 are multiplexed to correspond to Timer 2 operation as given as

Existing	Alternate	Function.
P1.0	T ₂	Timer 2 External Count Input
P1.1	T ₂ EX	Timer 2 Trigger Input.

So 8052 also has Timer 2

Question # 1

part (d)

Answer:- dual role of port 0:

3 Port 0 is also designated as ADO-AD7, as it can be used for both data & addressing handling. While connecting an 8051 to external memory port 0 can provide both address & data. The 8051 microcontroller then multiplexes the input as address or data in order to save pins.

(ii) dual role of Port 2 :-

Besides working as I/O, Port 2 is also used to provide 16-bit address bus for external memory along with Port 0. Port 2 is also designated as (A8-A15), while Port 0 provides the lower 8-bits via AD-A7. We say that an 8051 is connected to an ~~External~~ External Memory (ROM) which can be maximum upto 64KB & this is possible by 16 bit address bus because we know $2^{16} = 64\text{KB}$.

(iii) Dual role of Port 3 :-

It is also 8 bits & can be used as I/O. The port provide some externally important external signals. P3.0 & P3.1 are RXD and TXD respectively and are collectively used for serial communication.

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Question # 1

Part (e)

Answer:- Delay of 56.384
3

```
#include <reg 51.h>
```

```
void Ti Delay ;
```

```
void main (void)
```

```
{
```

```
while 1
```

```
{
```

```
P1 = 0X55 ;
```

```
Ti Delay ( ) ;
```

```
P1 = 0XAA
```

```
void Ti Delay ( ) ;
```

```
{
```

```
}
```

```
void Ti delay ( ) {
```

```
TMOD = 0X01 ;
```

```
TL1 = 0X00 ;
```

```
TH1 = 0X35 ;
```

```
TR1 = 1 ;
```

```
while (TF0 == 0) ;
```

```
TR1 = 0 ;
```

```
TR1 = 0 ;
```

```
}
```

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Question # 1
Part (F).

Answer:-

```
#include <reg 51.h>
sbit Led = P0^0;
void timer delay ()
{
```

```
    TH0 = 0X4B ;
```

```
    TLO = 0XFD ;
```

```
    TR0 = 1 ;
```

```
    while (TF0 == 0) ;
```

```
    TFO = 0 ;
```

```
    TR0 = 0 ;
```

```
}
```

```
void main
```

```
{
```

```
    TMOD = 0X01 ;
```

```
    while (1)
```

```
{
```

```
    LED = 1 ;
```

```
    timer Delay ( ) ;
```

```
    LED = 0 ;
```

```
    timer Delay ( ) ;
```

```
}
```

```
}
```

Question #2.
Answer:-

```
#include <reg 51.h>
sbit button 1 = P1^0;
sbit button 2 = P1^1;
sbit out 1 = P3^0;
sbit out 2 = P3^1;
void main ()
{
    if (button 1 == 0)
    {
        out 1 = 1;
    }
    if (button 2 == 0)
    {
        out 2 = 1;
    }
    else
    {
        out 1 = 0;
        out 2 = 0;
    }
}
```

This code is for user 1.

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User 2 code:-

```
#include <reg51.h>
```

```
#define out P2
```

```
Sbit in 1 = P1^0 ;
```

```
Sbit in 2 = P1^1 ;
```

```
unsigned int num = 0x00 ;
```

```
int convert (void) ;
```

```
void delay (void) ;
```

```
void main ()
```

```
{
```

```
out = 0x00 ;
```

```
while (1)
```

```
{
```

```
if (in 1 == 1)
```

```
{
```

```
delay () ;
```

```
num ++
```

```
out = convert () ;
```

```
}
```

```
if (in 2 == 1) if (in 2 == 1)
```

```
{
```

```
delay () ;
```

```
num -- ;
```

```
out = convert () ;
```

```
}}
```

```
}
```

```
int convert ()
```

```
{
```

```
unsigned int num1 = num % 10;  
unsigned int num2 = num / 10;  
return ((num2 << 4) | num1);  
}
```

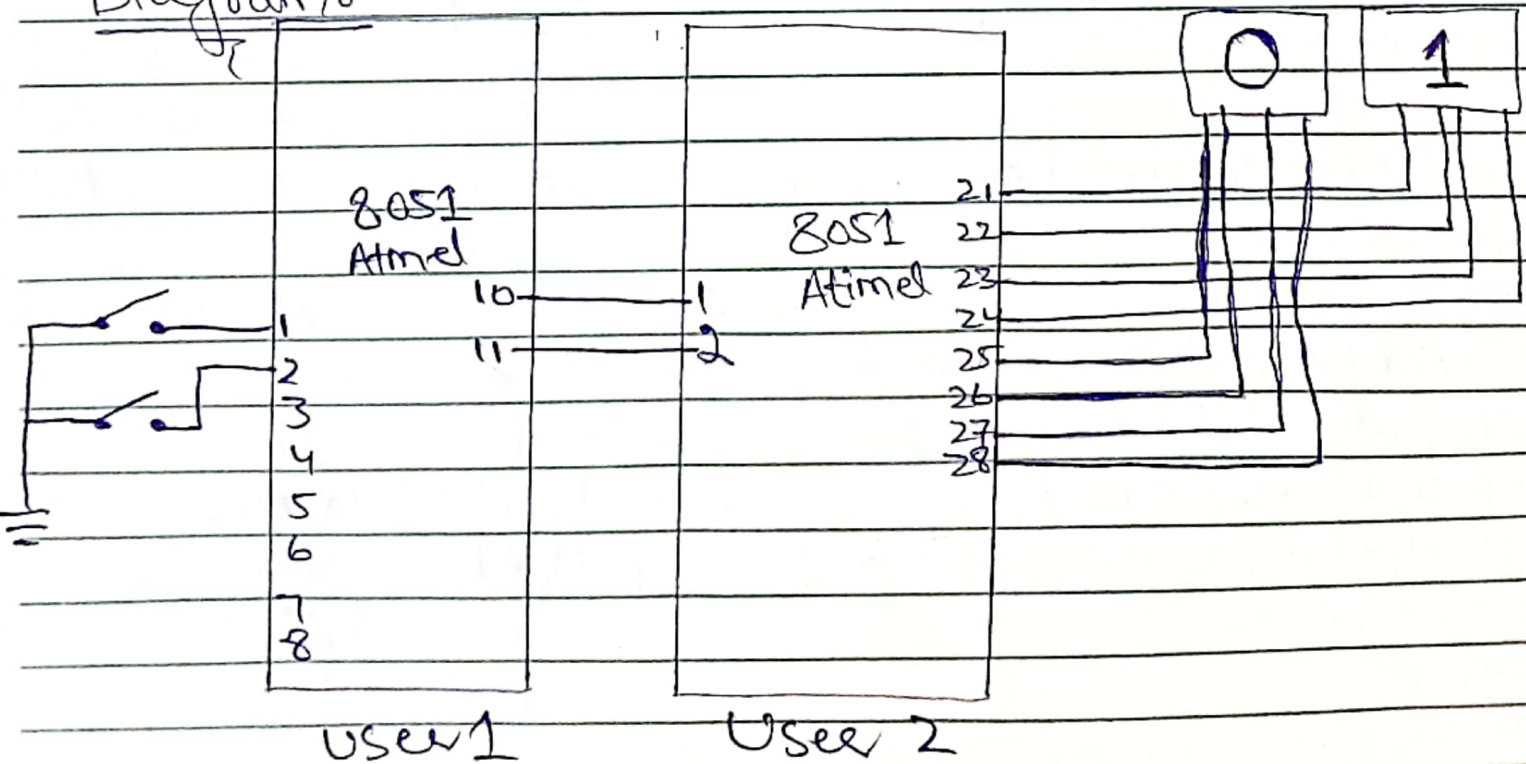
```
void delay ()
```

```
{  
    unsigned int i, j;
```

```
    for (i = 0; i < 100; i++)  
        for (j = 0; j < 500; j++)
```

```
}
```

Diagram



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Question #3

Answer:- #include <reg 51.h>

Sbit m1p = P2^0;

Sbit m1n = P2^1;

Sbit m2p = P2^2;

Sbit m2n = P2^3;

Sbit F = P1^0;

Sbit Ba = P1^1;

void forward ()

{

m1p = 1;

m2p = 1;

m1n = 0;

m2n = 0;

}

void backward ()

m1p = 0;

m2p = 0;

m1n = 1;

m2n = 1;

}

void stop ()

{

m1p = 0;

m1n = 0;

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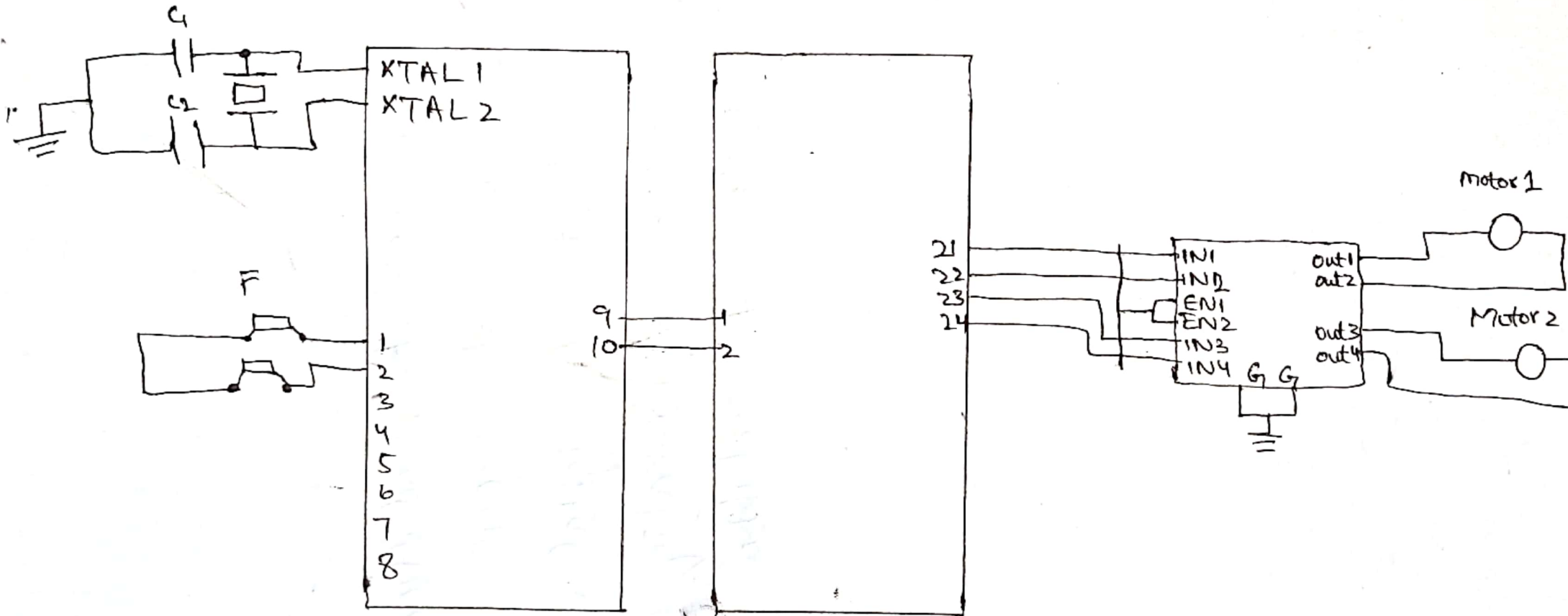
```
m2p=0;  
m2n=0;  
}
```

Code for receiver which will receive command from transmitter.

```
#include <reg 51.h>  
{  
  void main ()  
{  
  F=0;  
  Ba=0;  
  
  while (1)  
  {  
    if (F==1)  
      forward ();  
    else if (Ba==1)  
      backward ();  
    else  
      stop ();  
  }  
}
```

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Diagram



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Question # 4.
Part (A).

Answer

Switch and LED1 are connected as an AND gate
When both are 1, LED 2 will turn off.
after delay of 100ms
it will turn on
and if switch is ON & LED1 is OFF
LED 2 will turn on and after the delay it will
turn on

and both the process will continue till the
loops end.

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Question #4.
Part (b).

Answer:- Find error:

```
#include <reg 50.h>
sbit SW1 = P3^1;
unsigned int i = 0;
void delay_ms(unsigned int x)
{
    unsigned int y, z;
    for(y=0; y<=x; y--)
    for(z=0; z<=1275; z++);
}

void main()
{
    while(0)
    {
        if(SW1==1)
            P3 = i++;
        delay_ms(1000);
    }
}
```