

Iqra National University, Peshawar

Department of Electrical Engineering

SummerFinal-Semeste2020,Date: 30/09/2020

Course Title: Microcontroller Systems& interfacing

Instructor: Engr. Muhammad Waqas

Program: BS(EE) TotalMarks:50

TimeAllowed:4Hours Note: Attempt all Questions:

Q. NO.	Questions	Marks
1.	<p>Writeshortnotesof4linesMAXorbulletpointsonthefollowingwith examples</p> <p>Explain the difference between microprocessors and microcontroller</p> <p>Draw the pin diagram of the Intel8051 microcontroller.</p> <p>a) How many hardware timer sarepresentin8052?</p> <p>b) Explain the dual role of port0, port2, port3.</p> <p>c) Make an accurate delay of 56.384 MS using timer1 inmode1.</p> <p>d) Make an accurate delay of 50ms using timer1 inmode1.</p> <p>e)</p> <p>f)</p>	<p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>
2.	<p>You are asked to make ast and al one communication link using two 8051 microcontrollers. One 8051 microcontroller will be with User 1 while the other with User2. User1 will enter numbers which will be transmitted to User 2 and will be displayed on User2'sLCD Screen, andvice-versaon User1. Data should be sent and received through Serial Communication ONLY. Write the code In C language and draw the circuit diagram.</p>	<p>7+5</p>

3.	<p>You are asked to make a Remote Controlled Car using two 8051 microcontrollers. One will be your transmitter and the other receiver. Transmitter will send command for Forward and Reverse using two push buttons on the transmitter side using serial communication. Receiver will examine the data received and act accordingly using two brushless DC-Motors operating at 24V. Write the code in C-language and draw the circuit diagram.</p>	7+5
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4.

a)

7

```
What will the following code do?  
#include<reg51.h> sbit sw1=P0^0;  
sbit led1=P0^1; sbit led2=P0^2; unsigned int i=0;  
void delay(unsigned char x)  
{  
    unsigned int j; for(i=0;i<=x;i++)  
        for(j=0;j<=1275;j++);  
}  
void main()  
{  
    while(1)  
    {  
        if(sw1==1&&led1==1)  
        {  
            led2=0;  
            delay(100);  
            led2=1;  
        }  
        if(sw1==1&&led1==0)  
        {  
            led2=1;  
            delay(100);  
            led2=0;  
        }  
    }  
}
```

Find errors in the following code if any.

```
#includ<reg50.h>
sbitSW1=P3^1; voiddelay(unsignedintx)
{
    unsignedinty,z; for(y=0;y<=x;y--)
    for(z=0;z<=1275;z++)
}
voidmain(1)
{
    while(0)
    {
        If(SW1==1) P2=i++;
        Delay_ms(1000);
    }
}
```

b)

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Name = Talha Khan

ID = 13845

Instructor = Engr. Muhammad Waqas

Q 1:

(a) Ans:- Microcontroller:-

It is a mini-computer capable of performing a task on its own. It has necessary peripherals inside the chip like RAM, ROM, etc. The functional units are registers, CU, ALU, RAM, ROM, I/O Ports, DAC, ADC, Counters and Timers.

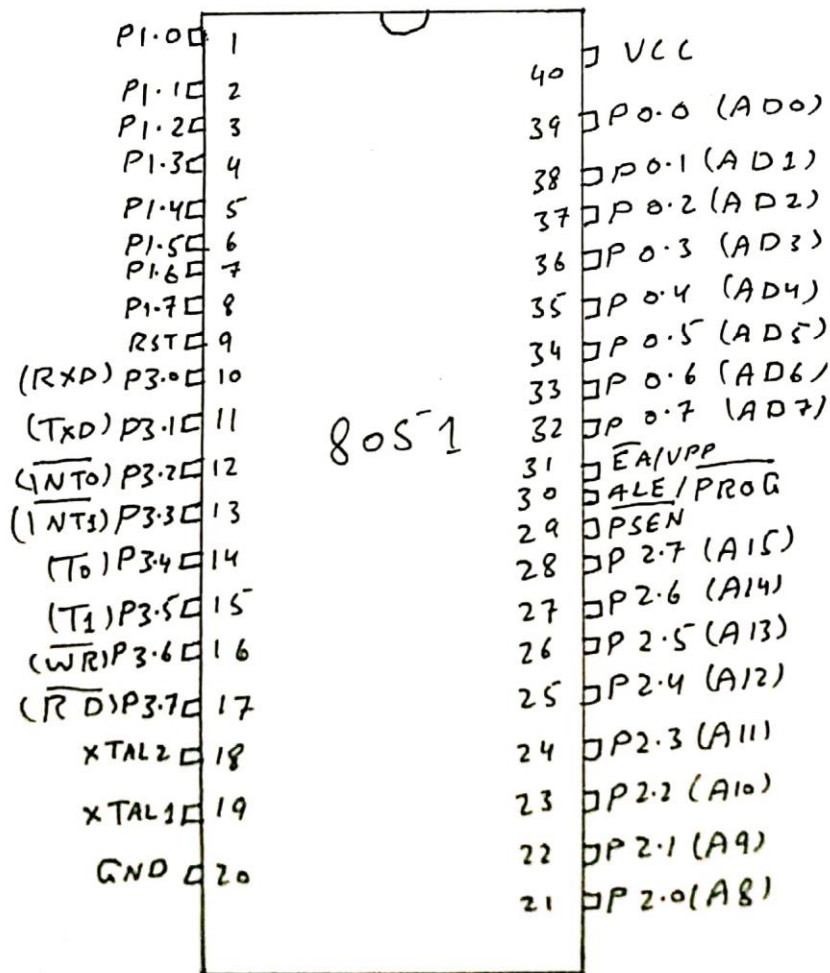
Example:- 8051, 8951 etc.

* Microprocessor:-

It is the central processing unit of computer. It needs external RAM, ROM to perform a task. The functional units are registers, CU and ALU etc.

Example:- 8085, 8086 etc.

(b) 8051 microcontroller Pin diagram:-



40-PIN DIP

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(c) In 8052, we have three timers.

T_0 , T_1 , T_2 . It is a 16-bit Timer/Counter.

(d) Port 0:-

Port 0 can provide both address and data. The 8051 then multiplexes the input as address data in order to save pins.

Port 2:-

Port 2 is also used to provide 16 bits address bus for external memory. Port 2 is used for the upper 8 bits of the 16 bit address and it cannot be used for I/O and in this way any program code for external ROM is addressed.

Port 3:- It is also 8 bits and can be used as I/O. This port provides some ~~extremely~~ extremely important external. P3.0 and P3.1 are RxD and TxD respectively and are collectively used for serial communication.

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(e) Delay of 56.384 ms:

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

```
void T1 Delay;
```

```
void main (void)
```

```
{ while 1
```

```
{ P1 = 0x55;
```

```
T1 Delay();
```

```
P1 = 0xAA
```

```
T1 Delay();
```

```
} }
```

```
void T1 Delay () {
```

```
TMOD = 0x01;
```

```
TL1 = 0x00;
```

```
TH1 = 0x35;
```

```
TR1 = 1;
```

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

```
TR1 = 0;
```

```
TF1 = 0;
```

```
}
```



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(f) Delay of 50 ms:

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

```
sbit led = P0^0;
```

```
void timer Delay()
```

```
{
```

```
    TH0 = 0x4B;
```

```
    TL0 = 0xFD;
```

```
    TR0 = 1;
```

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

```
    TF0 = 0;
```

```
    TR0 = 0;
```

```
}
```

```
void main
```

```
{
```

```
    TMOD = 0x01;
```

```
    while (1)
```

```
{
```

```
    LED = 1;
```

```
    timer Delay();
```

```
    LED = 0;
```

```
    timer Delay();
```

```
}
```

```
}
```

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Q 2:

```
#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
```

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```
{
```

```
    out 1=0;
```

```
    out 2=0;
```

```
}
```

```
void delayC)
```

```
{
```

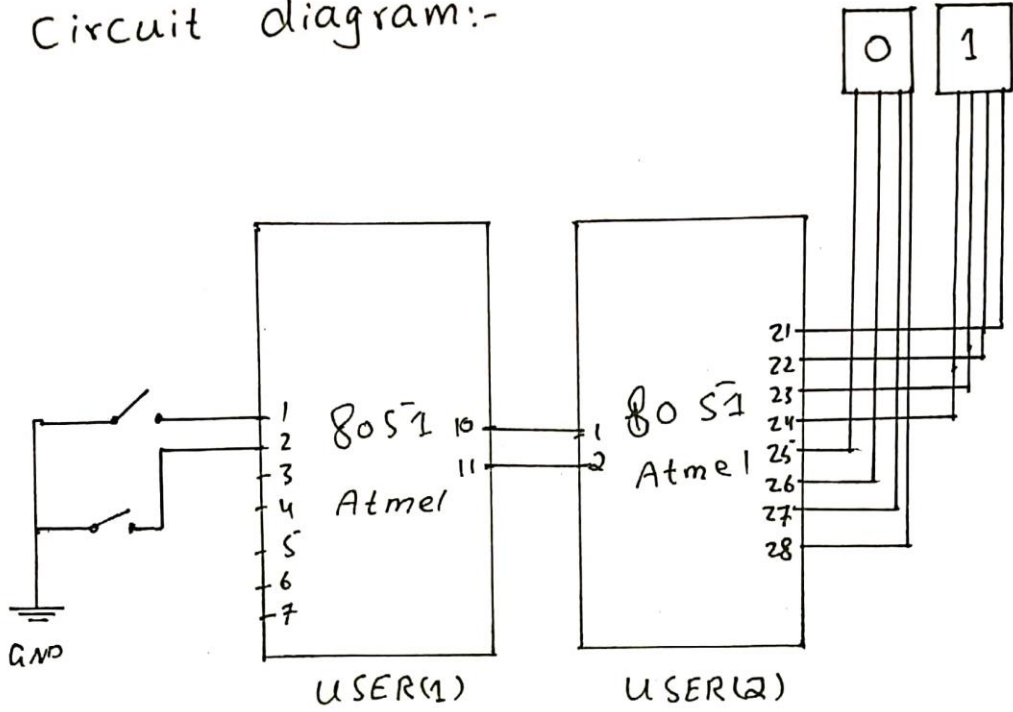
```
    unsigned int i,j;
```

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

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

```
}
```

▣ Circuit diagram:-



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Q 3:

```
#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;
```

```
}
```

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```
void stop ( )
```

```
{  
    m1p = 0;  
    m1n = 0;  
    m2p = 0;  
    m2n = 0;  
}
```

recieve command from transmitter:

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

```
{  
    void main ( )
```

```
{  
    F = 0;  
    Ba = 0;  
    while (1)
```

```
{  
    if (F == 1)  
        forward ( )
```

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else if (Ba == 1)

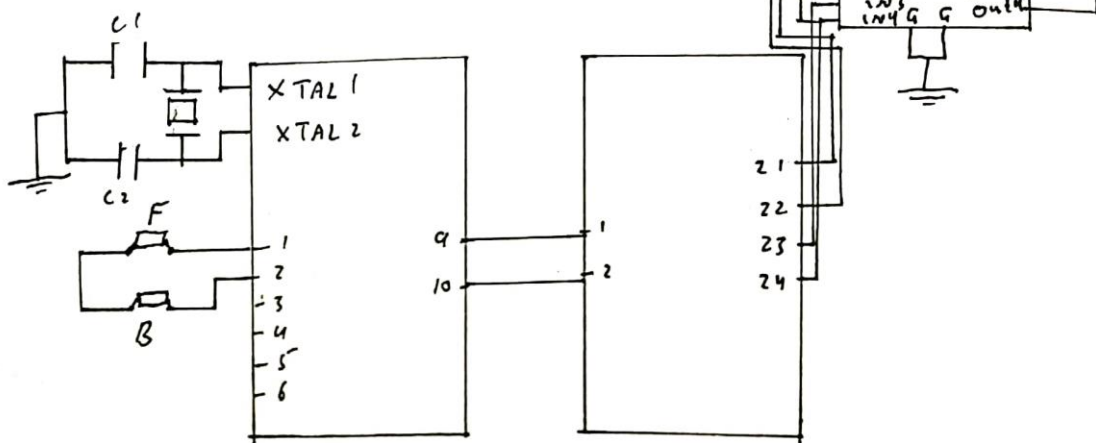
backward ();

else

stop ();

}
}
}

• Circuit diagram:-



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Q 4:

(a) Switch and the LED are connected with each other as an AND Gate. When both are '1'. The LED 2 will turn off. After 100ms delay it will turn ON. And if switch is ON and the LED 1 is OFF. The LED 2 will turn ON and after the 100ms delay it will turn ON. This process will continue until the loop ends.

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Q 4: Find errors in the following code:

```
(b) #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(1)
      {
        while (0)
        {
          if (sw1==1)
            P3=i++;
          delay_ms(1000);
        }
      }
```
