

Note: Attempt all Questions:

Q. NO.	Questions	Marks
1.	<p>Write short notes of 4 lines MAX or bullet points on the following with examples</p> <p>a) Explain the difference between microprocessors and micro controller</p> <p>b) Draw the pin diagram of the Intel 8051 micro controller.</p> <p>c) How many hardware timers are present in 8052?</p> <p>d) Explain the dual role of port 0, port 2, port 3.</p> <p>e) Make an accurate delay of 56.384 ms using timer 1 in mode 1.</p> <p>f) Make an accurate delay of 50 ms using timer 1 in mode 1.</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 a standalone communication link using two 8051 microcontrollers. One 8051 microcontroller will be with User1 while the other with User2. User1 will enter numbers which will be transmitted to User2 and will be displayed on User2's LCD Screen, and vice-versa on User1. Data should be sent and received through Serial Communication ONLY. Write the code in C-language and draw the circuit diagram.</p>	7+5

3.	<p>You are asked to make a small 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 pushbuttons 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
4. a)	<p>What will the following code do?</p> <pre>#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 i,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; } } } </pre> <p>Find errors in the following code if any.</p>	7

	<pre>#include <reg50.h> sbit SW1 = P3^1; void delay(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) P2 = i++; Delay_ms(1000); } } </pre>	7
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Q1 Write short notes.

(a) Explain the difference between microprocessor and micro controller.

Microprocessor :-

1. Microprocessor consists of only central processing unit.
2. Microprocessor is used in personal computers.
3. Microprocessor uses an external bus to interface to RAM, Rom.
4. Microprocessor is complicated and expensive, with a large number of instructions to process.

Micro Controller :-

1. Micro controller contains a C.PU memory I/O all integrated into one chip.
2. Microcontroller uses an internal controlling bus.
3. Microcontroller used in an embedded system.

4. Micro controller is inexpensive and straight forward with fewer instructions to process.

b) Draw Pin diagram of the intel 8051 micro controller.

8051	
P1.0 [1	46 [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 [EA/UPP
(TXD) P3.1 [11	30 [ALE PROG
(INT0) P3.2 [12	29 [PSEN
(INT1) P3.3 [13	28 [P2.7 (A15)
(T0) P3.4 [14	27 [P2.6 (A14)
P3.5 [15	26 [P2.5 (A13)
P3.6 [16	25 [P2.4 (A12)
(RD) P3.7 [17	24 [P2.3 (A11)
XTA2 18	23 [P2.2 (A10)
XTA1 19	22 [P2.1 (A9)
X(AND) 20	21 [P2.0 (A8)

Q.1) Explain the dual role of port 0, Port 2, Port 3

Port 0.

It can be used for both data and address handling while connecting as 8051 to external memory. Port D can provide both address & data.


The 8051 then multiplexes the input as address or data in order to save pins.

Port 2.

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

Port 3.

It is also 8 bit & can be used as input/output. This port provide some externally imported external signals. P3.0 & P3.1 are RxD TxD respectively are collectively used for serial communication.

3. 

(C) How many hardware timers are present in 8052?

Ans:

In 8052 we have total three timers which are

~~T0, T1, T2~~

T1, T2 & T3.

Qe. Make an accurate delay of 56.384ms using timer 1 in mode 1.

Sol. $56.384 \text{ms} / \mu\text{s} = 56.384 \mu\text{s}$

$$56.384 \times 1000 = 56384$$

$$65536 - 56384 = 9152$$

$$\text{in hexadecimal} = 23C0$$

Delay

```
MOV TMOD, # 0000001B
```

```
MOV TH0, H23H
```

```
MOV TL0, # C0H
```

```
SETB TR0
```

Here:

```
JNB TF0, Here
```

```
CLR TR0
```

```
CLR TF0
```

```
RET
```

(F) Make an accurate delay of 50ms
using timer 1 in mode 1.
12 MHz Crystal

Sol: $50\text{ms}/1\mu\text{s} = 50\text{K}$.

$$50 \times 1000 = 50,000$$

$$65536 - 50,000 = 15,536$$

in hexadecimal = 3C30.

Delay : MOV IMOD, # 00000001B

MOV TH0, # 3CH.

MOV TL0, # 00H.

SETB TR0

Here. INB TF0, Here

CLR TR0

CLR TF0

RET.

5 B



Q2:- you are asked to make
 write the code in C-language &
 draw the circuit diagram.

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

```
sbit rs = P3^5;
sbit en = P3^6;
sbit rw = P3^7;
```

} P2ⁿ 1 user 1
 P2ⁿ 2 P2ⁿ 3

```
void receive ();
void transmit ();
void delay (unsigned int time)
```

```
{
  unsigned i, j;
  for (i = 0; i < time; i++)
  for (j = 0; j < 5; j++)
```

```
{
  void ledcmd (unsigned char value)
```

```
{
  user @ 1
  P1 = value } same
```

```
rs = 0
```

```
rw = 0
```

```
en = 1
```

```
delay (50);
```

```
en = 0;
```

```
delay (50);
```

```
}
```

```
void display (unsigned char value)
```

```
P1 = value.
```

```
rs = 1
```

```
rw = 0.
```

```
en = 1;
delay (500);
en = 0;
delay (50);
}
```

```
void lcd_initialize (void)
{
```

```
    P1 = 0x00;
```

```
    P3 = 0x03;
```

```
    delay (1500);
```

```
    display (0x30);
```

```
    delay (1500);
```

```
    display (500);
```

```
    lcdcmd (0x30);
```

```
        delay (50);
```

```
    lcdcmd (0x0f);
```

```
        delay (50);
```

```
    lcdcmd (0x01);
```

```
        delay (50);
```

```
    lcdcmd (0x06);
```

```
        delay (50);
```

```
    lcdcmd (0x80);
```

```
        delay (50);
```

```
    }
```

```
void main ()
```

```
{
```

```
    char data;
```

```
    ICR1 = 0x20;
```

```
    ICR2 = 0xf0;
```

// 9600 baud rate.

```
    SCRN = 0x50;
```

```
    ICR1 = 1;
```

```
    Receive ();
```

```
    Transmit ();
```

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```
void Recive ( )
```

```
{
```

```
while (R1 == 0.)
```

```
data = SBof "
```

```
R1 = 0;
```

```
display (data);
```

```
delay (50);
```

```
}
```

Q3: you asked to make a small remot

draw circuit diagram

Ans. void receive ()

{

unsigned char value;

while (R1 == 0)

value = SBuf;

P2 = value;

R1 = 0;

~~#~~ if (P2 == 0;

{

PI.1 = 1;

PI.2 = 0;

~~120~~ }

~~Receiver~~ Receiver

#include <reg51.h>

void initialise ();

void receiver ();

void main ()

{

while (1)

PI.1 is connected
to reverse

PI.2 is connected
forward

9

```
initialize ();  
receive ();
```

```
↑  
↑  
void initIc1x ();
```

```
↑  
TMOD = 0x20;  
TH1 = 0xf0;  
SCON = 0x50;  
TR1 = 1;
```

```
↑  
Tr1 = 1;  
void transmit ();
```

```
↑  
if (sw == 1)  
{  
SBuf = 0;  
while (TI == 0);  
TI = 0;
```

```
↑  
if (sw2 == 1)  
{
```

```
SBuf = 1;  
while (TI == 0);  
TI = 0;  
↑  
↑
```

Transmitter 1.

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

```
sbit sw1 = P2^1;
```

```
sbit sw2 = P2^2;
```

```
void transmit initialize ();
```

```
void initIc1x ();
```

```
void main ( )
```

```
{
```

```
while (1) {
```

```
{
```

```
Transmit ( );
```

```
}
```

```
}
```

```
void initialize ( )
```

```
{
```

```
IMOD = 0x20;
```

```
TIH = 0xfd;
```

```
SCON = 0x50;
```

```
void Transmit ( );
```

```
{
```

```
SBUF = '0';
```

```
while (TI == 0);
```

```
if = 0;
```

```
SBUF = 'K';
```

```
while (T == 0);
```

```
T = 0;
```

```
}
```

Q4.

(a) What will be the following code do.

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Ans. `sbit sw1 = P0^0;`

It means that pin 0.0 is assigned to switch 1.

`sbit led1 = P0^1;`

`sbit led2 = P0^2;`

`sbit led`

→ Two Led are connected to two pin of port 0. One Led is connected to P0.1 & other is connected to P0.2.

```
void delay (unsigned char x)
```

```
{
```

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

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

```
        for (j=0; j<=1275; j++)
```

```
}
```

→ Delay function has been introduced in code. To perform delay operation if crystal frequency is 11.0592 MHz. Then any number of "x" will produce delay in millisecond.

```
void main ()
```

```
{
```

```
    while (1)
```

```
    {
```

```
        if (sw1 == 1 && led1 == 1)
```

```
        {
```

```
led 2 = 0;  
delay (100);  
led = 1;
```

↑

"if" condition is used here;

If both the switch 1 and led 1 outputs are assigned 1.

Then a low to high pulse will generated for led

which mean. That led 2 must be off with giving low pulse (led 2 = 0).

Then after delay of (100ms) led 2 must be on. by giving high pulse (led 2 = 1).

```
if (sw1 == 1) { led 1 == 0;
```

;

```
led 2 = 1
```

```
delay (100);
```

```
led 2 = 0;
```

'if' condition is used here

if switch 1 is ON.

and led 1 is assigned to off or low pulse.

Then high to low pulse must be executed to led 2 or pin 02.

first led 2 will get on by assigning high pulse (led=1). Then after 100ms delay it will be off.

(B) Find errors in the following code if any.

```
#include <reg50.h>
```

↓

error No 1

correct form

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

error No 2.

```
for (y=0; y <= x; y')
```

↓

correct form

```
for (y=0; y <= x; y++)
```

↓

increment by 1.

error 3. void main (1)



correct

void main ()

error 4.

while (0)

correct

while (1).

