Iqra National University, Peshawar
Department of Electrical Engineering

IQRA NATIONAL UNIVERSITY

Mid – Term Examination Summer 2020
Date: 26/08/2020

Course Code:	EEE413	**Course Title:**	Microcontroller & Embedded Systems		
Prerequisite:	Programming Fundamentals, Digital Logic Design	**Instructor:**	Engr. Muhammad Waqas		
Module:	6	**Program:**	BEE	**Total Marks:**	30	**Time Allowed:**	4 Hours

Note: Attempt all questions.

Q1.	(a)	**Write** short notes on the following with examples a) What is pull-up resistor? How do we use pull-up resistor with 8051 microcontroller? Draw the circuit diagram. b) What is pull-down resistor? How do we use pull-down resistor with 8051 microcontroller? Draw the circuit diagram. c) How many hardware timers are present in 8052? d) How many Input / Output ports are in an 89c51 microcontroller? e) What is the difference between a microcontroller and a microprocessor?	Marks 5 CLO 1
	(b)	**Convert** the following to their respective bases a) $89501_{10} = ?_8$ b) $64101_{10} = ?_2$ c) $9AB3_{16} = ?_2$ d) $1110100100111_2 = ?_8$ e) $1011000011011_2 = ?_{16}$	Marks 5 CLO 1
Q2	(a)	**Code** the following scenario You are asked to make an anti-burglar system using 8051 microcontroller. There must be a hidden switch on the ground which will be connected to the controller. When the switch is in OPEN state the microcontroller should have the GREEN led in the ON state and the RED led in the OFF state. When the switch is in the CLOSED state the microcontroller should have the RED led in the ON state and the GREEN led in the OFF state. Write the code in C-language and draw the circuit diagram.	Marks 7 CLO 1
	(b)	**Code** the following scenario A parking lot must be automated by counting each car entering the lot and leaving the lot. The lot has a total space for 99 cars at a time. A display should be seen to the parking lot worker on how many cars are parked currently. On each entering of car into the lot must increment the display and on each leaving of car must decrement the display. Write the code in C-language and draw the circuit diagram.	Marks 7 CLO 1

Q3	(a)	**Identify** errors in the following code if any
		#incl <reg50.h>
		sbit led = P2^10;
		void delay(unsigned int x) {
		unsigned int y,z
		for(y=0;y=<x;y++)
		for(z=0;z<=1275;z++)
		}
		void main();
		{
		while(1) {
		Led = 0;
		Delay(-350);
		Led = 1;
		Delay(-350);
		}
		}
			Marks 6
			CLO 1

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Subject: Microcontroller.

Q1.

Pull-up resistor:

Pull-up resister are fixed value resister used between the connection of a voltage supply and a particular pin in digital logic circuit which are paired with switches. The voltage b/w ground & Vcc is actively controlled when the switch is open.

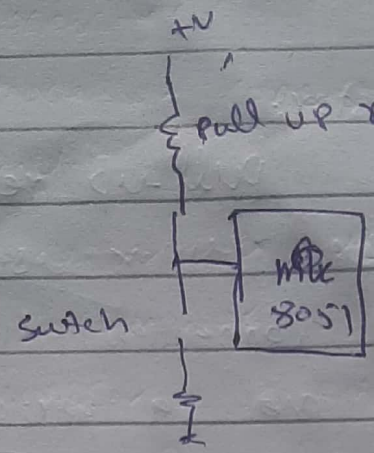
using pull-up in 8051

we use pull up resister in microcontroller when the switch is open state. & input is in floting state. mean low or high.

we use pull-resister of (10k) when switch is open the input is connected to Vcc through resister and the input

reads high.

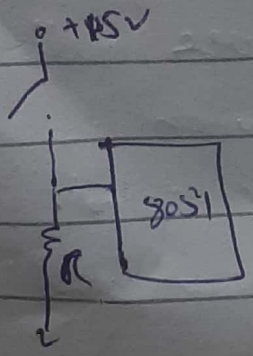
Diagram



(b) Pull down resistor.

Pull down resistor ensures the voltage between Vcc & a microcontroller pin acutlaly controlled. when the switch is open. instead of pulling a pin to high value. these resistor pull the pin to a low value

Diagram



using pull down in 8051

first we will connect logic gate input to the ground to low. The pull down resistor configuration is use ful for digital circuit like latches & ~~flip~~ flip floop. Also connecting input together will result in a large current through the resistor.

C. In 8052, we have total 3 timers which To, T1, & T2.

D. In 89C51 we have 32 ~~inputs~~ ~~pins~~ I/O pins. It means we have total 4 I/O Ports. which is port 0, Port 1 port 2, port 3.

(e) Difference b/w microcontroller & microprocessor.

Micro processor

- Micro processor consists of only a C.P.U.
- Micro processor is used for personal computer.
- Microprocessor use external bus to interface Ram, Rom.
- Micro processor is complicated & expensive with large instruction to process.

Micro-controller.

- Microcontroller contains cpu. memory. I/O all integrated into on chip
- Micro controller is used in an embedded system.
- Micro controller uses an internal controlling bus.
- Microcontroller is inexpensive & fewer instruction to process.

— X — X — X —

Q2: Convert the following to their respective base:

$(89501)_{10} = (\ )_8$

Sol:

8	89501
8	11187 - 5
8	1389 - 3
8	174 - 6
8	21 - 6
	2 - 5

$(89501)_{10} = (256635)_8$

(b) $(64101)_{10} = (\quad)_2$

2	64101
2	32050 – 1
2	16025 – 0
2	8012 – 1
2	4006 – 0
2	2003 – 0
2	1001 – 1
2	500 – 1
2	250 – 0
2	125 – 0
2	62 – 1
2	31 – 0
2	15 – 1
2	7 – 1
2	3 – 1
2	1 – 1

$(64101)_{10}$ $(1111010011001 01)_2$.

(c) $(9AB3)_{10}$ = ?

Write equlent binary value for each hexa decimal.

9 = 1001

A = 1010

B = 1011

3 = 0011

So, $(9AB3)_{10} = (1001\ 1010\ 1011\ 0011)_2$

(d) $(111010010011)_2$ ( )$_8$

Sol Split the binary no do from left to right of grop 4bit

0001 0110 0011 0011

1 6 1 B

$(111010010011)_2$ $(16AB)_{16}$

Ans

7

(c) $(1101001001111)_2 = ()_8$

Sol: Split the binary no from left to Right group of 3 bit.

Sol: $\frac{110}{6}$ $\frac{100}{4}$ $\frac{100}{4}$ $\frac{111}{7}$

$(1101001001111)_2 = (6447)_8$.

— x —x —x—x —x—x—x—.

Q3: Identify errors in following code if any.

correct program

```
#include <reg50.h>
sbit led = P2^0
void delay (unsigned int x){
void delay (unsigned int x);
void delay (unsigned int x){
```

```
unsigned int y, z;

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

for (z=0; z<=1275, z++).
  @ }

Void main ( )
{   while (1) }
        Led =0
        Delay (-350)
        Led =1
        Delay (-350)
    }.
```

— x — x — x — x — x —

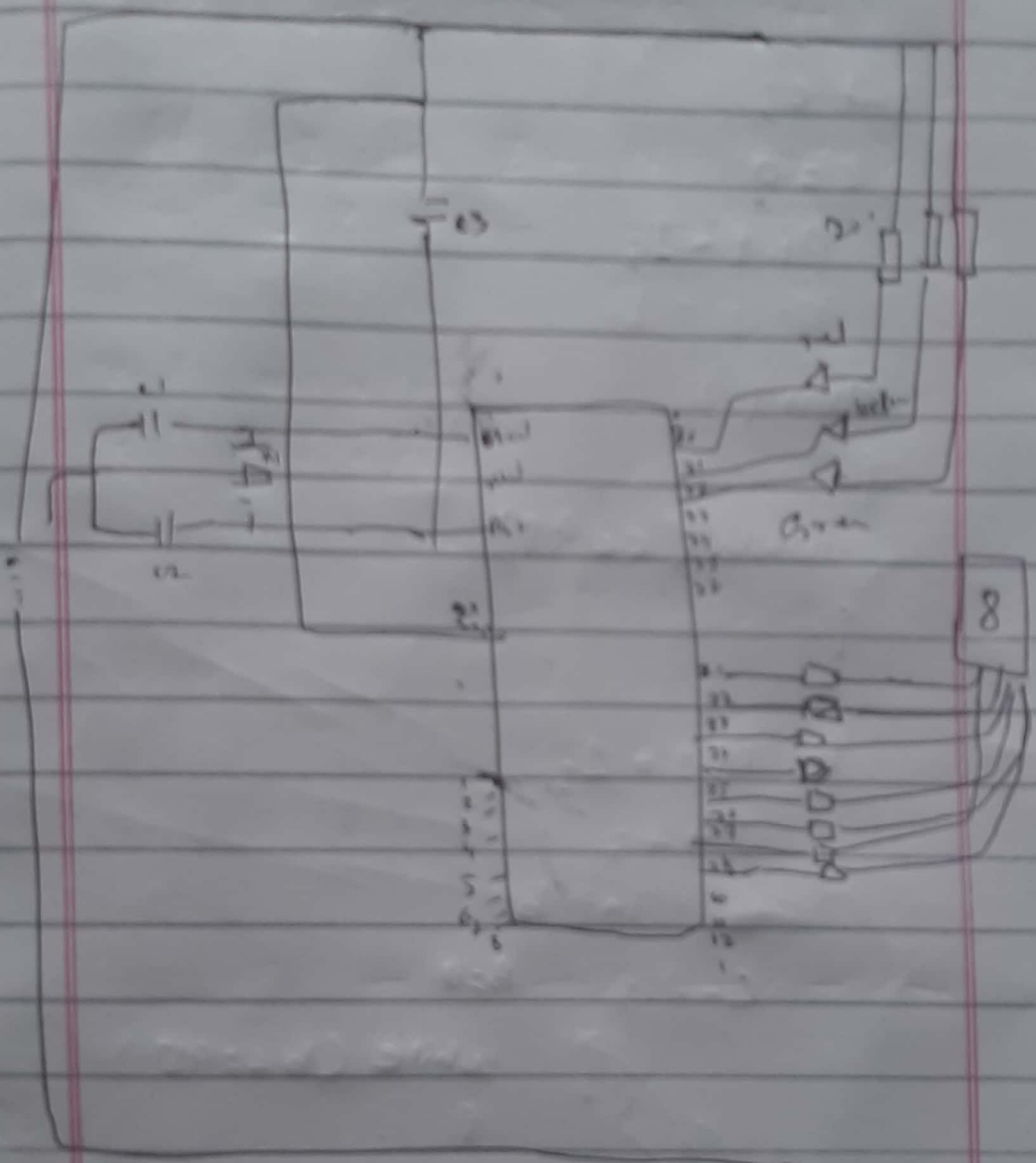
Q2

part(1)

```
#include <reg51.h>

Sbit green Led = P1'1

Sbit red led = P2'2
void delay int (x);
```

```
sbit switch = 0;
    int x, y;
    void main()
    {
if (switch == 0) on state
    green led = 1
    red led = 0;
    }
If  else (switch == 1) off state.
{
    green led = 0;
    red led = 1;
    }
    else
    {
    green led = 0;

    red led = 0;
    }
```

Circuit Diagram

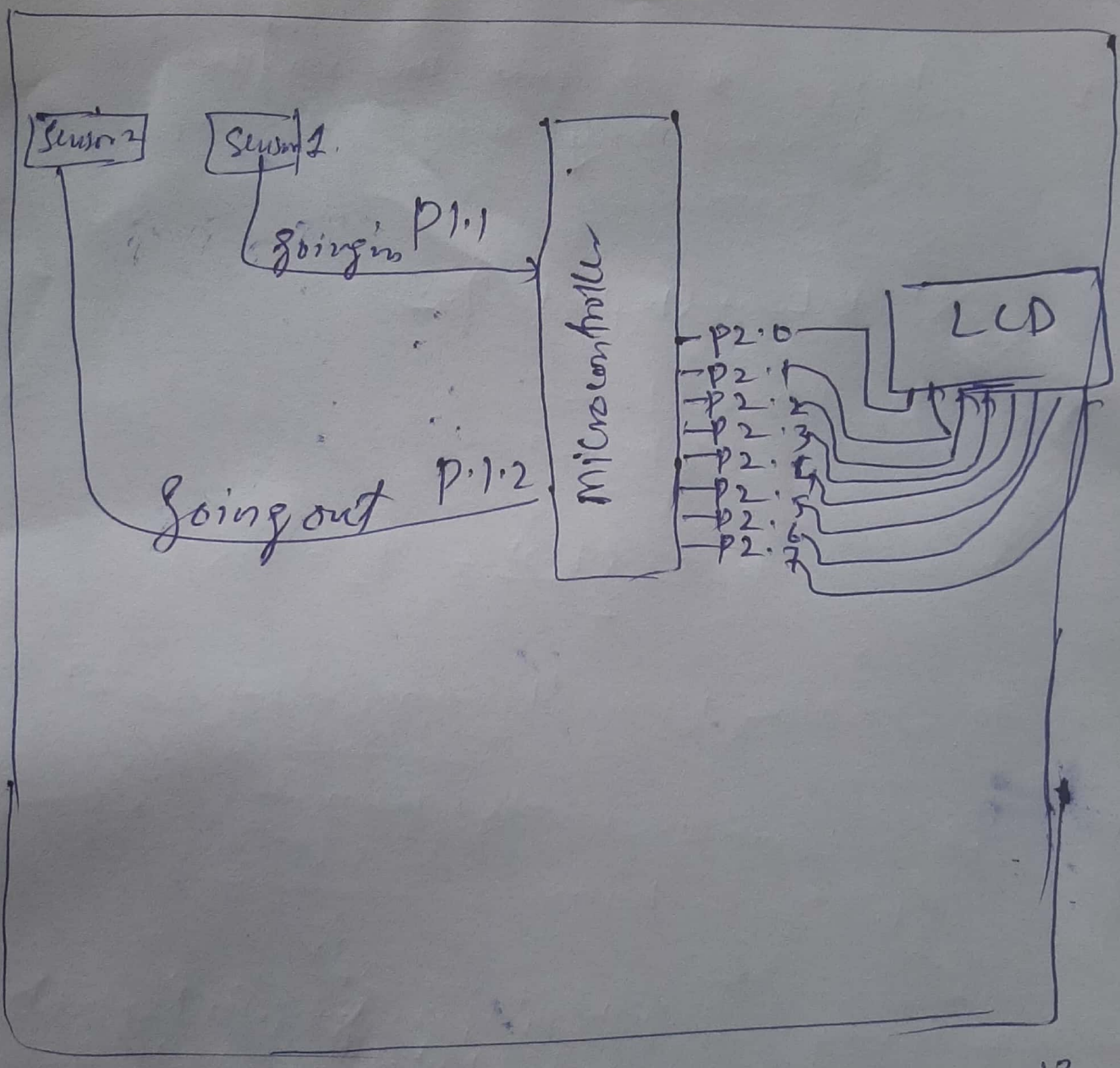


Q2

(b). #include <reg51.h>

```
int c;
  c=0
   P1.1=1;
   P1.2=1;
main()
{
  while (c<98)
  {

  If P1.1 = 1;
     c++;
  } else int b
     c--;      B=0
                while (b<=98)
                {
P2 = 0;          If P1.2=1;
                   c--;
                }
  P2 = c;
}
```

Circuit Diagram



13.