INDIAN INSTITUTE OF TECHNOLOGY
KHARAGPUR
DEPARTMENT OF ELECTRONICS AND ELECTRICAL COMMUNICATION

EC49001

MICROCONTROLLERS LABORATORY

LAB TEST

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18EC10054
E & ECE

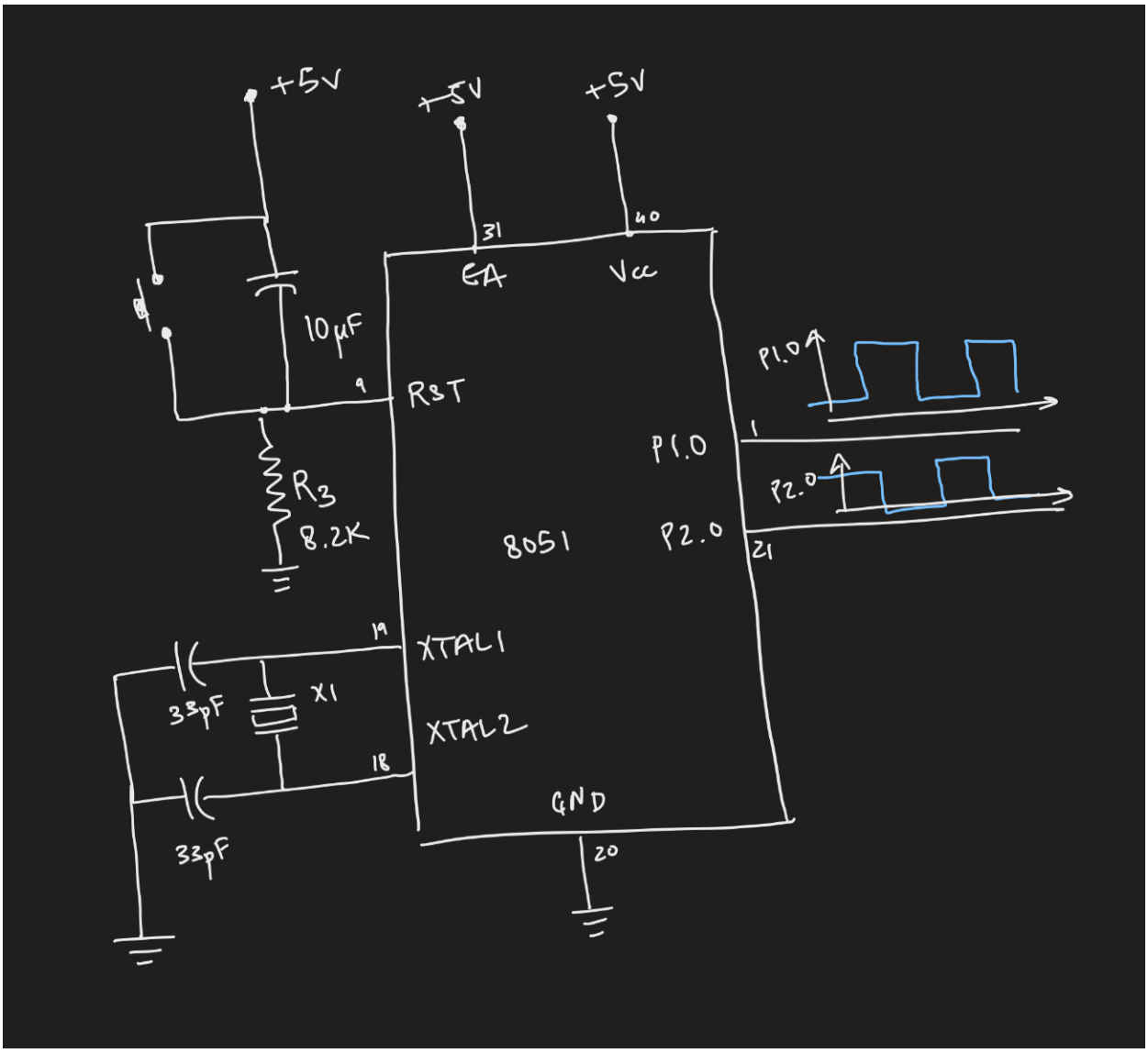
B. Tech.
2021 – 2022

Question:

Blink P1.0 and P2.0 alternatingly at a frequency of 1Hz.

Analysis:

i) Diagram



In this circuit, we have the standard connections to the reset pin and crystal oscillator. Note that the question states clock frequency to be 32.768KHz, which we assume to be system clock frequency. Hence, the XTAL frequency is 12*32.768 = 393.216 KHz. The P1.0 and P2.0 LED outputs are switched using a delay function which delays exactly half a second which uses the 8051's internal timer. This internal timer uses a

TLTH value of C000, the calculation for which is showed below.

ii) Calculations:

The timer clock input is 32.768 KHz

Time for 1 increment in timer $= \frac{1}{32.768\ KHz}$

$= 3 \times 10^{-5}\ s$

$\Rightarrow$ We need to make 32768 increments for 1s to pass.

or 16384 increments for 0.5s to pass

$TH\ TL = 2^{16} - 16384$

$= 49152$

$= C000$ in hexadecimal

$\Rightarrow TH = C0$

$TL = 00$

Code:

```
1.
1.  ; Author: Shikhar Mohan
2.  ; Date: 8/11/2021
3.  ; EC49001: Lab Test
4.
5.  LOOP:
6.  MOV P1,#0
7.  MOV P2,#1
8.  ACALL MAIN
9.  MOV P1,#1
10. MOV P2,#0
11. ACALL MAIN
12. LJMP LOOP
13.
14.
15. MAIN: MOV R6,#250
16. LOOP2: ACALL DELAY
17.       DJNZ R6,LOOP2
18.       SJMP MAIN
19.
20. DELAY: MOV TMOD,#00000001B
21.        MOV TH0,#0C0H
22.        MOV TL0,#000H
23.        SETB TR0
24. HERE: JNB TF0,HERE
25.       CLR TR0
26.       CLR TF0
27.       RET
```

Screenshot