Name = Sameep Vani

Roll Number = AU1940049

Major = BTech CSE

Course Code = ECE302

Course Name = Embedded Systems Design

Section = 1, (PART C)

Undertaking -

I certify that I have not violated the university Code of Conduct during this examination.

S.N.Vani

03/10/2021

A7) Necessary assumptions -
External Hardware interrupt (INT0) is used. Consider INT0 for falling edge interrupt. Also, we assume that once

Calculations →

Time period of Square wave $= 2(5+49)$

$= 2(54)$

$= 108\,\mu s$

We need Timer 0, CTC mode.

$\therefore 54 \times 10^{-6} = (OCR0 - TCNT0)(10^{-6})$

We are bounded that $TCNT0 = 25$

$\therefore 54 = OCR0 - 25$

$\therefore OCR0 = 79 = 0x4F.$

$TCNT0 = 25 = 0x19.$

Time delay = $\frac{\text{Time period of square wave}}{2}$

$= 54\,\mu s.$

```
#include <avr/io.h>
#include <avr/interrupt.h>

Void TOdelay()
{
    TCNT0 = 0x19; // 25 in hex
    TCCR0 = 0x09; // CTC mode, No prescale
    OCR0 = 0x4F; // Calculated before

    while((TIFR & 0x02)==0);

    TIFR= 0x02; Reset flag
    TCCR0= 0x00; Stop clock
}
void main()
{
    DDRA = 0x20; // PORTA.5 = output
    DDRC = 0xFF; // Whole PORTC = output
    PORTD= 0x04; // Activate Pull up
    ~~while(1); // Run forever~~
    TIMSK = 0x02; // Local interrupt
    MCUCR = 0x02; // Falling edge
    ~~ISR~~
    GICR = 0x40; // Activate INT0
    sei(); // Global interrupts.

    ~~PORTD = 0x~~ while(1); //Run forever
}
```

```
ISR(TIMER0_COMP_vect)
{
    PORTA ^= 0x20; // Toggle PORTA.5
    TODelay(); // Apply delay
}

ISR(INT0_vect)
{
    PORTC++; // Increment and display
             on PORTC.
}
```