<u>Ans To the Question no 1</u>

Using pq-abcde-r

23-54039-3

a. Time interval r0 ms

30ms

0.03s

Timer 0= 0-255

Timer 1= 0-655335

F_Clock= 1q MHz

13 MHz

Prescaler= 1,8,64,256,512,1024

Tick Time $T_t = \frac{1024\ (using\ prescaler\ )}{F_{Clock}}$

$= \frac{1024}{13000000}$

= 78.77µs

$T_{overflow}$ = 65536×78.77

=5.61s

Since 30ms<5.16s then, we can use single overflow counting

$Ncount = \frac{Tt}{Ttick}$

$= \frac{0.03}{78.77 \times 10^{-6}}$

=381

Load TCNT1=65536-381

=65155

b.

T_{target}= abc ms

= 540 ms

= 0.54s

Ncount = $\frac{0.54}{78.77\times10^{-6}}$

= 6855

TCNT1= 65536-6855

= 58681

Final Timer Count $\quad T = 6855\times\frac{1024}{13000000}$

=0.54s or 540ms which fits in Timer 1

<u>Ans To the Question no 2</u>

pq-abcde-r

For Id 23-50313-1

Given, T_{bounce} = b= 0ms

Since its unrealistic for calculation then let's answer t bounce = 6ms

V_{th}=2×r = 2.1v

V_{th2}=0×pq v = 0.23v

Current I = pa= 25μA =25×10^{-6}

Supply voltage V_{cc}= V_f= 5V

Switching Point = 0.r V = 0.3V

Hysteresis Voltage = V_H = V_{th} - V_{th2}

= 2.1- 0.3 = 1.8V

Signal R2 = $\frac{-tbounce}{C \ln\frac{\mathrm{Vth2}}{\mathrm{Vfinal}}}$

=$\frac{-6\times10\text{^}-3}{1\times10\text{^}-6\times\ln\frac{0.23}{5}}$

=1.9k ≈ 2k

During Discharging , Due to Leakage Current of 25μA, Voltage drop of

V=IR

= {25×10^(-6)} ×(2×10^3)

=0.05V

During The rising signal ,

R1+R2= $\frac{-tbounce}{C \ln(1-\frac{\mathrm{Vth2}}{\mathrm{Vfinal}})}$

= $\frac{-6\times10\text{^}-3}{1\times10^{-6}\ \ln(1-\frac{2.1}{5})}$ =11kΩ

R1 = 11-2 = 9 kΩ

R2= 2 kΩ