SEHAR
1018150 79

Analog Electronics Assignment-3

Solution: time for led in ON state = 100 ms = 100×10^{-3} s

" " " " OFF " = 200 ms = 200×10^{-3} s

$$\boxed{T = 0.693\,RC}$$

(a) let us assume $C = 1\mu F = 10^{-6} F$

$t_{ON} = 0.693\,RC$

$100 \times 10^{-3} = 0.693\,R_3\,(10^{-6})$

$$\frac{100 \times 10^{-3}}{0.693 \times 10^{-6}} = R_3$$

$R_3 = 144,300.144\,\Omega$

now, $t_{OFF} = 0.693\,R_2 C$

$200 \times 10^{-3} = 0.693\,R_2\,(10^{-6})$

$$\frac{200 \times 10^{-3}}{0.693 \times 10^{-6}} = R_2$$

$R_2 = 288,600.289\,\Omega$

and we assume $R_1 = R_4 = 1K\Omega$

(b) $F = \frac{1}{T}$ $\quad (T = t_1 + t_2)$

$T = 100 + 200$

$= 300\,ms$

$= 300 \times 10^{-3}$

$= \frac{1}{300} \times 10^{+3}$

$= \frac{1000}{300} = \boxed{3.3\,Hz = F}$

(c) Duty cycle $= \frac{t_{ON}}{T(t_1+t_2)} \times 100 = \frac{100}{300} \times 100$

$= 33.33\,\%$

CIRCUIT DIAGRAM :

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