lab2 report

Step 3

$R = 34 k\Omega$

$T_2 - T_1 = T$

$\boxed{T = 135.4\ \mu s}$

$\omega = \frac{2\pi}{T} = \frac{2\pi}{135.4\ \mu s} = 48444$ rad/s

$\sigma = \frac{2}{135.4\ \mu s} \times \ln\left(\frac{3.875}{3.18}\right)$

Step 5 $R = 1.4\ k\Omega$

$T_2 - T_1 = T$

$T = 173.3\ \mu s$

$V_o(T/4) = 6.565V$

$V_o(3/4 T) = -374.201$ mV

$\sigma = \frac{2}{173.3\mu s} \times \ln\left(\frac{6.565}{374.2 \times 10^{-3}}\right)$

$\sigma = 33060.78$

$\omega = \frac{2\pi}{173.3 \times 10^{-6}}$

Step 8

τ:

$V(\tau = t) = A(1-e^{-1})$

$9.9 \times (1-e^{-1}) = 6.258$

T at V = 6.258 = τ

step 9:

$R = 10k$

$T_2 - T_1 = T = 133.523\ \mu s$

$\omega = \frac{2\pi}{T} = 47057$

$V(T/4) \rightarrow 16.878$

$V(3T/4) \rightarrow 4.8$

$\sigma = \frac{2}{T} \ln\left(\frac{16.87}{4.8}\right)$

$\sigma = 18827$

a,

Step 12

$\boxed{A = 9.96}$

$V(t=\tau) = 9.96(1-e^{-1}) = 6.295$

$\tau = t$ at $V = 6.295$

$\boxed{\tau = 40.5\ \mu s}$

Step 14

$T = T_2 - T_1 = 141.4\ \mu s$

$\omega = \frac{2\pi}{141.4\ \mu s} = 44436$

$V(T/4) \rightarrow 4.793$

$V(3T/4) \rightarrow -3.247$

$\sigma = \frac{2}{T} \ln\left(\frac{V_a}{V_{b_2}}\right) = 5508$

Step 16

$A = 9.895V$

$V(t=\tau) = 9.895(e^{-1})$

$\tau = t$ at $V = 3.6$

$\tau = 80.68\ \mu s$

ID									Name:

Post-Lab Questions (2 marks in total, 2/3 marks for each question)

(1) By examining your plots on Graph (2.1), answer the following:

a) What are the effects of varying the value of R on the step response of a second-order bandpass circuit?

b) What is the relationship between σ (from eqn 2.1) and τ (from eqn 2.2)? Do your measurements verify this relationship?

a) The T period increases when R decreases

b) when σ increases τ decreases

however my measurments have only 2 σ values and 1 τ So cannot use them to draw a conclusion

(2) By examining your plots on Graph (2.3), answer the following:

a) What are the effects of varying the value of R on the step response of a second-order lowpass circuit?

b) What is the relationship between σ (from eqn 2.3) and τ (from eqn 2.4)? Do your measurements verify this relationship?

a) the higher the value of R the weaker the damping effect (stops oscillating slower)

b) when σ increases τ decreases however there is only 1 σ and 1 τ so cannot use my measurments to draw a conclusion

(3) a) Suppose that the 8kΩ-resistor is removed from the circuit in Fig (2.6), what effects will this have on the step response?

it will reach zero/steady state extremly fast Since the only resistance in the circuit would be the function generator's internal resistance meaning resistance would be extremly low and as resistance increases the oscillation take longer

To slow down (↑R ↓ Damping)