

Name : _____ Section: _____ CWRU e-mail: _____

CASE WESTERN RESERVE UNIVERSITY
Case School of Engineering
Department of Electrical Engineering and Computer Science
ENGR 210. Introduction to Circuits and Instruments (4)

Quiz No. 9

3/25/05

PUT ANSWERS IN THE SPACE PROVIDED AND, IF APPROPRIATE, SHOW YOUR WORK. BE SURE TO STATE ANY ASSUMPTIONS

Problem 1 Exponential Waveforms (10 points)

An exponential waveform has $v(t = 0 \text{ seconds}) = 5$ volts and $v(t = 2 \text{ seconds}) = 1.25$ volts.

(a) Determine the numerical value of the time constant T_c for these measurements.
 $T_c =$ _____

(b) Write a mathematical expression for the exponential waveform corresponding to these measurements. Your answer should not contain any unknown constants.

(c) Using your answer from (b) what is the value of $v(t)$ at $t=4$?

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Problem 2 Sinusoidal Waveforms (10 points)

A sinusoid has a period of $5\mu\text{s}$. At $t=0$ the amplitude is 12 volts. The waveform reaches its first positive peak after $t=0$ at $t=4\mu\text{s}$. Assume a sinusoidal waveform of the form $v(t) = A \cos(\omega(t - T_s))$. Using this measured data find the amplitude A , frequency ω , and time shift T_s of the sinusoidal signal.

$A =$ _____

$\omega =$ _____

$T_s =$ _____

SUPPLEMENTAL DATA: TRIG IDENTITIES

$\cos(x + y) = \cos x \cos y - \sin x \sin y$	$\sin(2x) = 2 \sin x \cos x$	
$\sin(x + y) = \sin x \cos y + \cos x \sin y$	$\cos(2x) = 2 \cos^2 x - 1 = 1 - 2 \sin^2 x$	