



The Ohio State University  
Department of Electrical Engineering

ECE 205

**Circuit Analysis**

**Home work Set # 6**

**Print Your Name**

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**Problem#1: MATLAB Problem**

Sketch the following waveforms in MATLAB.

a)  $v_1(t) = 2u(t)$

b)  $v_2(t) = -3r(t+2) + 4r(t-2)$

**Problem#2: Problem 5-4 textbook**

Express the following signals as the sum of singularity functions. (step or ramp functions)

$$a) v_1(t) = \begin{cases} 2 & t < 1 \\ -5 & 1 \leq t < 2 \\ 0 & 2 < t \end{cases}$$

$$b) v_2(t) = \begin{cases} 0 & t < 0 \\ -4t & 0 \leq t < 2 \\ -12 + 2t & 2 \leq t < 6 \\ 0 & 6 \leq t \end{cases}$$

**Problem#3:**

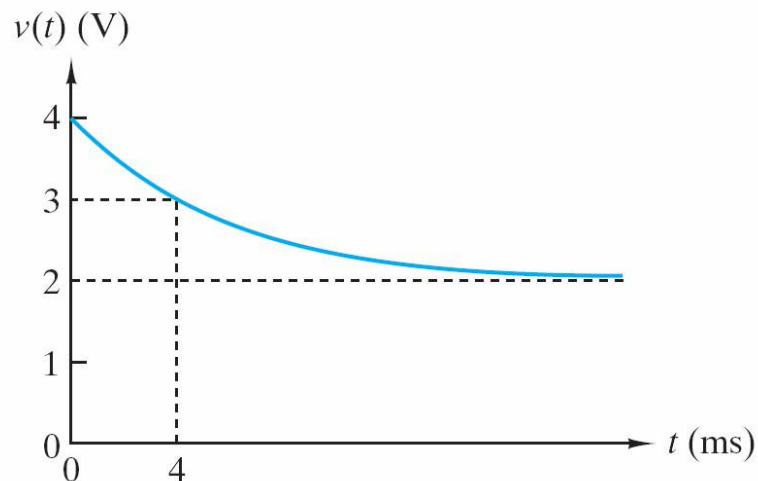
Sketch the following waveforms. Find the maximum and minimum values of each waveform.

a)  $v_1(t) = 25 - 5 \sin(10\pi t)$

b)  $v_2(t) = 5[e^{-5t} + \sin(10\pi t)]u(t)$

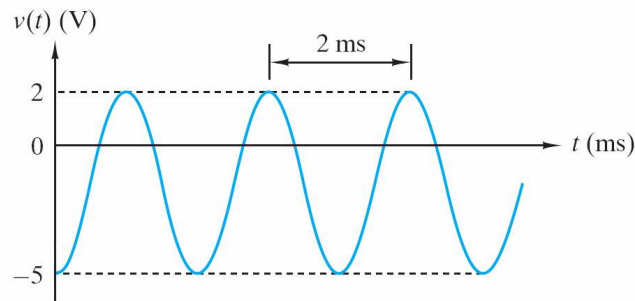
**Problem#4: Problem 5-27 textbook**

Write an expression for the waveform in Figure.

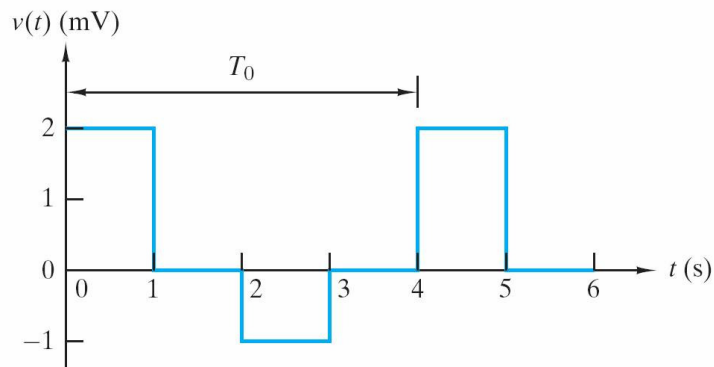


**Problem#5: Problem 5-26 textbook**

Find the expression for the sinusoidal waveform in Figure.

**Problem#6: Problem 5-34 textbook**

Find the  $V_p$ ,  $V_{pp}$ ,  $V_{avg}$ , and  $V_{rms}$  for the periodic waveform in given Figure.

**Problem#7: Problem 5-31 textbook**

Find  $V_p$ ,  $V_{pp}$ ,  $V_{avg}$ , and  $V_{rms}$  for each of the following sinusoids.

- $v_1(t) = 10\cos(2000\pi t) + 10\sin(2000\pi t)$
- $v_2(t) = -30\cos(2000\pi t) - 20\sin(2000\pi t)$

**Problem#8: MATLAB Problem**

The value of the waveform  $v(t) = (V_A - V_B e^{-\alpha t})u(t)$  is 5V at  $t=0$ , 8V at  $t=5$  ms, and approaches 12 V when  $t \rightarrow \infty$ . Find  $\alpha$ ,  $V_A$ , and  $V_B$  then sketch the waveform in MATLAB.