P33: For a one-link robot, the tip is at \( \theta = \frac{\pi}{2} \) rad at time \( t = 0 \) sec. It takes the tip 2 secs to go from \( \frac{\pi}{2} \) to \( (\frac{\pi}{2}+2\pi) \). Plot the x- and y-components as a function of time. Also, find the amplitude, frequency and period.

P34: A System Vibrating in Simple Harmonic motion is given by the equation

\[
y = 10 \cos(4\pi t + \frac{\pi}{2})
\]

where \( y \) is the displacement in cm and \( t \) is the time in seconds.

(a) Find the amplitude, frequency, period and phase shift for this function.
(b) Determine the displacement of the object 4.5 after release.
(c) Determine when the object will first reach its maximum negative displacement.

P35: A wooden block attached to the end of a spring is pulled down 100 mm and released, oscillating with simple harmonic motion and taking 5 secs to return to its point of release. The phase angle is zero.

(a) Determine the period, frequency, and amplitude of the motion.
(b) Write an equation to describe the block's displacement in cm.
(c) Determine the position of the block in 2.5 secs after release.
P38: In an electrical circuit, a voltage is given by \( V(t) = \sqrt{3} \sin(\omega t) + 8 \cos(\omega t - \theta) \). Find \( i(t) \) and write your answer in the form \( i(t) = M \sin(\omega t + \Theta) \) A. 

P37: For the circuit shown in the figure, \( V = 10 \text{ V} \), find the period and its value at \( t = 0.03 \text{ sec} \). 

Graph one cycle of the function.

100 \text{ sec}=T \text{ is the period of the AC signal.}

Find \( i(t) \) and write your answer in the form \( i(t) = Z(t) \sin(\omega t + \Theta) \) A. 

Graph one cycle of the function.

\[ i(t) = 8 \sin(\omega t + \Theta) \text{ A} \]
(a) Write the equations in the matrix form
(b) Solve the equations using the matrix algebra
(c) Solve the equations using Cramer's rule
(d) Solve the equation using the substitution method

P40: I have 20 coins in my wallet with a total value of $1.50. The coins are only nickels and dimes. Can you tell how many of each I have? Solve the problem
(a) Using the matrix algebra.
(b) Using the Cramer's rule.