

ASSIGNMENT #1

Q1: Find ⁽⁵⁾ the amplitude, phase, period and the frequency of the sinusoid:-

$$v(t) = 12 \cos(50t + 10^\circ)$$

Soln

The amplitude is $V_m = 12V$

The phase is $\phi = 10^\circ$

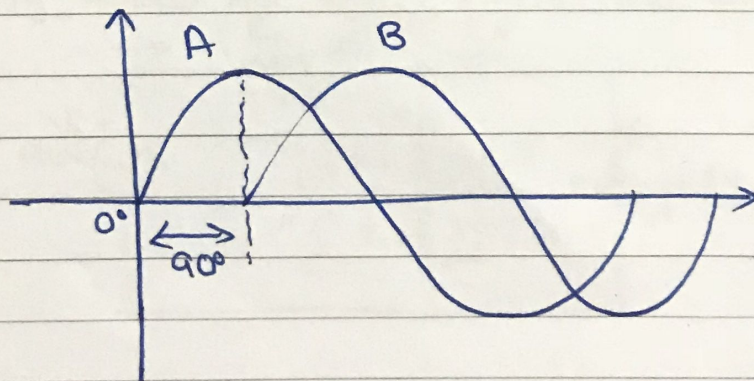
The angular frequency is $\omega = 50 \text{ rad/s}$

The period $T = \frac{2\pi}{\omega} = \frac{2\pi}{50} \Rightarrow 0.1257s$

The frequency is $f = \frac{1}{T} = \frac{1}{0.1257} \Rightarrow 7.958 \text{ Hz}$

Q2: Make a sketch of two sine waves as follows: Sine wave A is the reference and sine wave B lags A by 90° . Both have equal amplitudes. ⁽⁵⁾

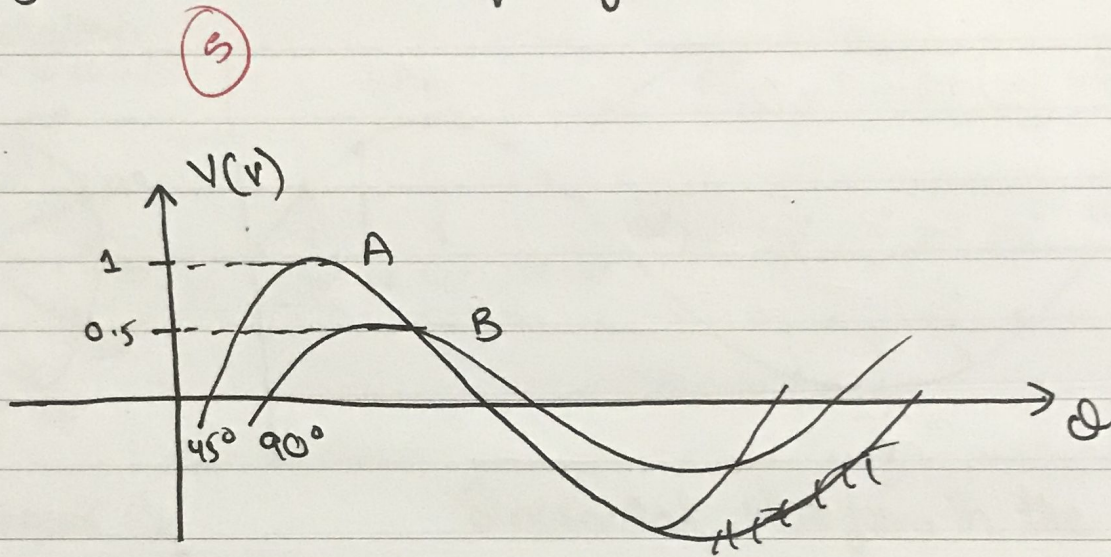
Soln



Q3 Determine the value of sine wave A in Figure below.
 at each of the following times, measured from the positive-going zero crossing. Assume the frequency is 5kHz.

a) $30 \mu\text{s}$

b) $125 \mu\text{s}$



Solⁿ

$$f_{\text{frequency}} = 5\text{kHz}$$

$$V_p = 1\text{V}$$

a) $30 \mu\text{s}$

Solⁿ-

$$\begin{aligned} v &= V_p \sin(2\pi ft - 45^\circ) \\ &= 1 \sin[2\pi \times 5\text{kHz} (30 \times 10^{-6}) - 45^\circ] \\ &= 1 \sin(0.9424 - 0.7853) \\ &= 1 (0.156) \Rightarrow 156 \text{ mV.} \end{aligned}$$