TEAM NAME (printed): * SOLUTIONS *

Team members **PRESENT** (printed full names): _____

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All 9 questions are equally weighted. Show your work and BOX-IN your final answer for credit.

1. What is the period of a 100 kHz sine wave?

$$T = \frac{1}{f} = \frac{1}{100kHz} = \boxed{10\mu S}$$

2. What angle in degrees is equivalent to π/4 radians?

$$\left(\frac{\pi}{4}\,RAD\right)\left(\frac{180\,DEG}{\pi\,RAD}\right) = \boxed{45°}$$

3. What angle in radians is equivalent to 60°?

$$60° \cdot \left(\frac{\pi\,RAD}{180°}\right) = \boxed{\frac{\pi}{3}\,RAD} \approx 1.0472\,RAD$$

4. What is the frequency (in Hz) of v(t) if v(t) = 35 sin(4000t)?

$$\omega = 4000\,r/s = 2\pi f \quad \therefore \quad f = \frac{4000\,rad/s}{2\pi} = \boxed{636.6Hz}$$

5. If i(t) = 4 sin(w_1t + 50°) and v(t) = 7 sin(w_1t - 30°), which one of these statements is true?
   a. i(t) leads v(t) by 80°
   b. i(t) lags v(t) by 80°
   c. i(t) leads v(t) by 20°
   d. i(t) lags v(t) by 20°

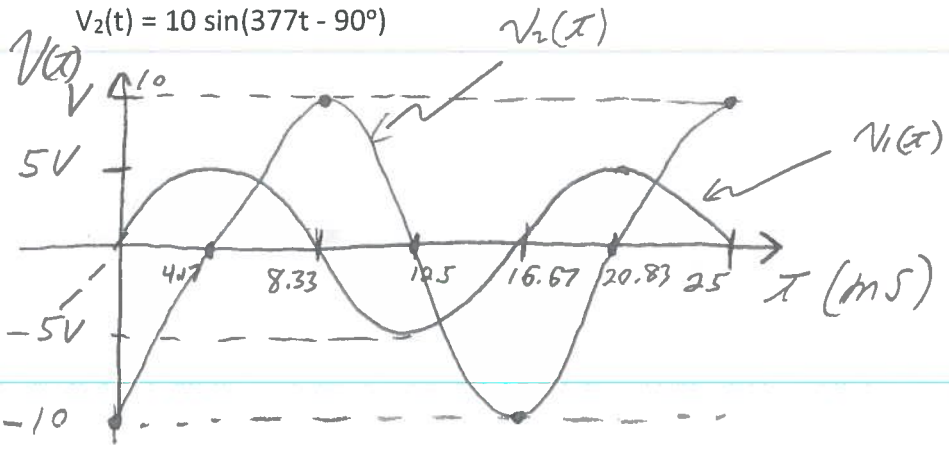
6. Sketch the following two waveforms on the same set of axes (voltage as a function of time) below. Label each axis carefully, including units and show/specify important points such as positive and negative peak values, zero crossings and the phase angle between each:

$V_1(t) = 5 \sin(377t)$

$V_2(t) = 10 \sin(377t - 90°)$

$\omega = 377 r/s = \frac{2\pi}{T}$

$\therefore T = 16.67 ms$



7. What is the frequency of a waveform that has a period of 20 ms?

$f = \frac{1}{T} = \frac{1}{20 ms} =$ **50Hz**

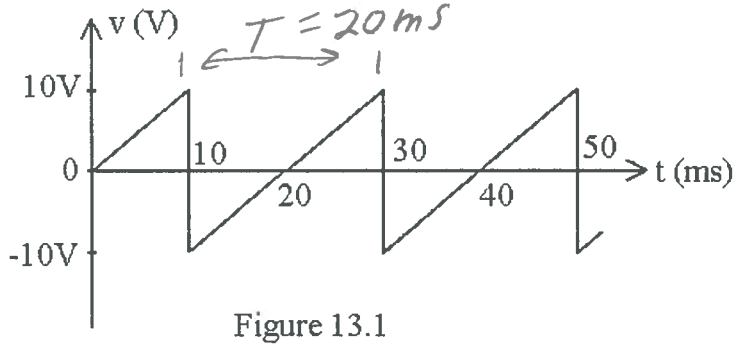


Figure 13.1

8. See Figure 13.1. What is the period of this waveform?

$T =$ **20 ms**

9. See Figure 13.1. What is the frequency of this waveform?

$f = \frac{1}{T} = \frac{1}{20 ms} =$ **50Hz**