

**PROBLEM:**

For the following short answer questions, write your answers in the space provided or circle the correct answer:

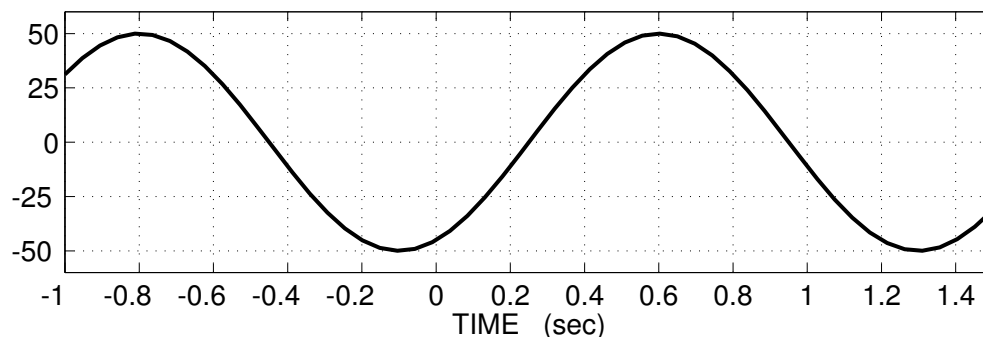
(a)  $x(t)$  is defined by:  $x(t) = \sum_{k=-10}^{10} \frac{4k}{j\pi} e^{j2.5\pi kt}$ . Pick the correct response about the period:

- (i) The period ( $T$ ) of  $x(t)$  is  $T = 1.25$  sec.
- (ii) The period ( $T$ ) of  $x(t)$  is  $T = 2.5$  sec.
- (iii) The period ( $T$ ) of  $x(t)$  is  $T = 0.4$  sec.
- (iv) The period ( $T$ ) of  $x(t)$  is  $T = 0.8$  sec.
- (v) The period ( $T$ ) of  $x(t)$  is  $T = 2.5\pi$  sec.

(b) **TRUE** or **FALSE**: “Suppose that the signal  $x(t)$  is a *single frequency* sinusoid and its spectrum has frequency components only at  $f = \pm 7$  Hz. If a new signal is defined by  $y(t) = x(t - \frac{1}{2})$  then  $y(t)$  has frequency components at the same frequencies **and** the complex amplitudes in the spectrum are the same.” EXPLAIN.

(c) In the figure below determine the phase of the sinusoid. Write your answer here:

Sinusoid:  $x(t) = A\cos(\omega_0 t + \phi)$



(d) In the figure above determine the frequency ( $\omega_0$ ) in radians/sec.  the correct answer.

- (A) 1.4    (B)  $5\pi/7$     (C)  $10\pi/7$     (D)  $5/7$     (E)  $2.8\pi$