Multiple Choice Test

Chapter 11.04
Discrete Fourier Transform

1. Given that $W = e^{-i\left(\frac{2\pi}{N}\right)}$, where $N = 3$. Then $F = W^N$ can be computed as $F =$
   (A) 0
   (B) 1
   (C) -1
   (D) e
2. Given that $W = e^{-i\left(\frac{2\pi}{N}\right)}$, where $N = 3$. $F = W^{\frac{N}{2}}$ can be computed as $F =$
   (A) 0
   (B) 1
   (C) -1
   (D) e

3. Given that $N = 2$, $\{f\} = \begin{Bmatrix} 4-6i \\ -2+4i \end{Bmatrix}$. The values for vector $\{\widetilde{C}^R\}$ shown in

$$\widetilde{C}_n^R = \sum_{k=0}^{N-1} \left\{ f^R(k)\cos(\theta) + f^I(k)\sin(\theta) \right\}$$

can be computed as:

   (A) $\begin{Bmatrix} -2 \\ -6 \end{Bmatrix}$
   (B) $\begin{Bmatrix} -2 \\ 6 \end{Bmatrix}$
   (C) $\begin{Bmatrix} 2 \\ -6 \end{Bmatrix}$
   (D) $\begin{Bmatrix} 2 \\ 6 \end{Bmatrix}$

4. Given that $N = 2$, $\{f\} = \begin{Bmatrix} 4-6i \\ -2+4i \end{Bmatrix}$. The values for $\{\widetilde{C}^I\}$ shown in Equation (22D)

$$\widetilde{C}_n^I = \sum_{k=0}^{N-1} \{f^I(k)\cos(\theta) - f^R(k)\sin(\theta)\}$$

can be computed as

(A) $\begin{Bmatrix} -2 \\ -10 \end{Bmatrix}$

(B) $\begin{Bmatrix} -1 \\ -10 \end{Bmatrix}$

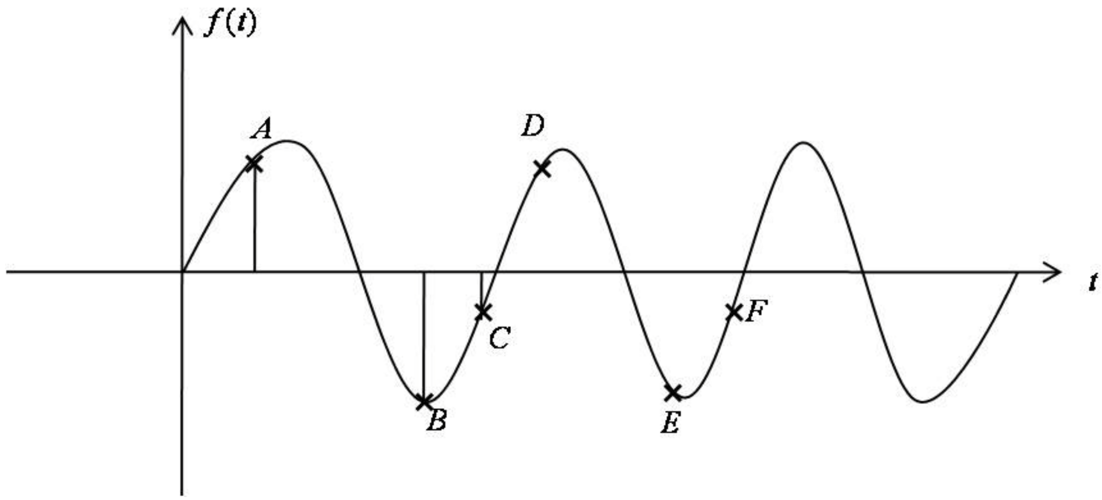
(C) $\begin{Bmatrix} -2 \\ -5 \end{Bmatrix}$

(D) $\begin{Bmatrix} -1 \\ -5 \end{Bmatrix}$

5. If the forcing function $F(t)$ is given as $F(t) = \sum_{n=0}^{7} 10 \times \sin(2\pi nt)$. Then, to avoid aliasing phenomenon, the minimum number of sample data points $N_{\min}$ should be

(A) 8
(B) 16
(C) 24
(D) 32

6. Based on the figure below, aliasing phenomena will not occur because there were



(A) 2 sample data points per cycle.
(B) 4 sample data points per cycle.
(C) 4 sample data points per 2 cycles.
(D) 6 sample data points per 2 cycles.