Multiple Choice Test

Chapter 11.02
Continuous Fourier Series

1. Which of the following is an “even” function of $t$?
   (A) $t^2$
   (B) $t^2 - 4t$
   (C) $\sin(2t) + 3t$
   (D) $t^3 + 6$

2. A “periodic function” is given by a function which
   (A) has a period $T = 2\pi$
   (B) satisfies $f(t + T) = f(t)$
   (C) satisfies $f(t + T) = -f(t)$
   (D) has a period $T = \pi$
3. Given the following periodic function, \( f(t) \).

\[
f(t) = \begin{cases} 
  t^2 & \text{for } 0 \leq t \leq 2 \\
  -t + 6 & \text{for } 2 \leq t \leq 6
\end{cases}
\]

The coefficient \( a_0 \) of the continuous Fourier series associated with the above given function \( f(t) \) can be computed as

(A) \( \frac{8}{9} \)
(B) \( \frac{16}{9} \)
(C) \( \frac{24}{9} \)
(D) \( \frac{32}{9} \)

4. For the given periodic function \( f(t) = \begin{cases} 
  2t & \text{for } 0 \leq t \leq 2 \\
  4 - t & \text{for } 2 \leq t \leq 6 (= T)
\end{cases} \). The coefficient \( b_1 \) of the continuous Fourier series associated with the given function \( f(t) \) can be computed as

(A) \(-75.6800\)
(B) \(-7.5680\)
(C) \(-6.8968\)
(D) \(-0.7468\)
5. For the given periodic function \( f(t) = \begin{cases} 2t & \text{for } 0 \leq t \leq 2 \\ 4 & \text{for } 2 \leq t \leq 6 \end{cases} \) with a period \( T = 6 \). The Fourier coefficient \( a_1 \) can be computed as

- (A) \(-9.2642\)
- (B) \(-8.1275\)
- (C) \(-0.9119\)
- (D) \(-0.5116\)

6. For the given periodic function \( f(t) = \begin{cases} 2t & \text{for } 0 \leq t \leq 2 \\ 4 & \text{for } 2 \leq t \leq 6 \end{cases} \) as shown in Problem 5. The complex form of the Fourier series can be expressed as

\[
f(t) = \sum_{k=-\infty}^{\infty} \tilde{C}_k e^{jkw_0 t}\]

The complex coefficient \( \tilde{C}_1 \) can be expressed as

- (A) \(0.4560 + 0.3734i\)
- (B) \(0.4560 - 0.3734i\)
- (C) \(-0.4560 + 0.3734i\)
- (D) \(0.3734 - 0.4560i\)