Assignment-7

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-03-20, 23:59 IST.

1) Using the convolution theorem for Laplace transforms, \( L^{-1} \left[ \frac{p}{(p^2 + 4)^3} \right] \) is

- \( \frac{1}{64} (\sin 2t - 2t \cos 2t) \)
- \( \frac{1}{64} t(\sin 2t - 2t \cos 2t) \)
- \( \frac{1}{32} (\sin 2t - 2t \cos 2t) \)
- \( \frac{1}{32} t(\sin 2t - 2t \cos 2t) \)

No, the answer is incorrect.
Score: 0

Accepted Answers:
\( \frac{1}{64} t(\sin 2t - 2t \cos 2t) \)

2) \( L \left[ \int_0^t e^u \sin u \cos (t-u) \, du \right] \) is equal to

- \( \frac{p}{(p^2 + 1)(p^2 + 2)} \)
- \( \frac{1}{(p^2 + 1)(p^2 + 2)} \)

1 point
3) If \( L[f(t)] = \frac{p}{(p^2 + 1)(p^2 - 2p + 2)} \), then \( \lim_{t \to 0} f(t) \) is equal to

- 0
- 1
- 5
- 25

No, the answer is incorrect.

Score: 0

Accepted Answers:

4) If \( L[f(t)] = \frac{25p + 7}{(5p - 9)^2 + 10} \). Then \( \lim_{t \to 0} f(t) \) is equal to

- 0
- 1
- 3
- 5
- 25

No, the answer is incorrect.

Score: 0

Accepted Answers:

5) Let \( f(t) = \begin{cases} 3t & \text{if } 0 < t < 2, \\ 6 & \text{if } 2 < t < 4. \end{cases} \) where \( f(t) \) is a periodic function of period 4.

Then \( L[f(t)] \) is equal to

\[
3 - e^{-2p} - 6pe^{-4p} \\
\frac{1}{1 - e^{-4p}}
\]

\[
3 - 3e^{-2p} - 6pe^{-4p} \\
p^2(1 - e^{-4p})
\]

\[
3 - 3e^{2p} - 6pe^{4p} \\
p(1 - e^{-4p})
\]
3 - $e^{-2p} - 6pe^{-4p}$
\[\frac{1}{p^2(1 - e^{-4p})}\]

No, the answer is incorrect.
Score: 0

Accepted Answers:
$3 - 3e^{-2p} - 6pe^{-4p}$
\[\frac{1}{p^2(1 - e^{-4p})}\]

6) $L[t^2u_0(t)]$ equals

- $e^p\left(\frac{2}{p^3} + \frac{4}{p^2} + \frac{6}{p}\right)$
- $e^{-3p}\left[\frac{1}{p^3} + \frac{6}{p^2} + \frac{3}{p}\right]$
- $e^{2p}\left[\frac{1}{p^3} + \frac{4}{p^2} + \frac{9}{p}\right]$
- $e^{-3p}\left[\frac{2}{p^3} + \frac{6}{p^2} + \frac{9}{p}\right]$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$e^{-3p}\left[\frac{2}{p^3} + \frac{6}{p^2} + \frac{9}{p}\right]$

7) The function $f(t) = \begin{cases} t^2 & \text{if } 0 < t < 2, \\ 4t & \text{if } t > 2, \end{cases}$ in terms of unit step function is

- $tu_0(t) + (4t - t^2)u_2(t)$
- $t^2u_0(t) + (4t - t^2)u_2(t)$
- $t^2u_2(t) + (4t - t^2)u_0(t)$
- $tu_2(t) + (4t - t^2)u_0(t)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$t^2u_0(t) + (4t - t^2)u_2(t)$

8) $L^{-1}\left[\frac{4e^{-\pi i}}{p^2 + 16}\right]$ is equal to

- $(\cos 4t)u_{\frac{\pi}{4}}(t)$
- $(\sin 4t)u_{\frac{\pi}{4}}(t)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$(\cos 4t)u_{\frac{\pi}{4}}(t)$
9) The value of the integral \( \int_0^\infty \cos(2t) \delta \left( t - \frac{\pi}{3} \right) \, dt \) is equal to

- \( \frac{-1}{2} \)
- \( \frac{1}{2} \)
- \( \frac{-\sqrt{3}}{2} \)
- \( \frac{\sqrt{3}}{2} \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( \sin 4t u_\frac{\pi}{2} (t) \)

10) \( L \left[ t \sin^2 (t) \delta (t - 2) \right] \) is equal to

- \( 2e^{-2\pi} \sin 2 \)
- \( 2e^{-2\pi} \sin^2 2 \)
- \( 2e^{-2\pi} \sin^2 2p \)
- \( e^{-2\pi} \sin^2 2 \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( 2e^{-2\pi} \sin^2 2 \)