Application to Differential and Difference Equations (ADDE)-Quiz 2

1. Name *

Sushanth mallari

2. Roll. No. *

21bce9092

All questions are compulsory

3. Mark the wrong option (1 Point)

- $L(\sin ax) = a/(s^2 + a^2)$
- $L(e^{-ax} \sin x) = 1/\left((s + a)^2 + a^2\right)$
- $L(t \sin ax) = 2as/(s^2 + a^2)^2$

- $L\left(t^{-\frac{1}{2}}\right) = \pi/2$

4. Which of the following expressions is correct for Laplace transform (1 Point)

- $L(f(t)) = \int_0^\infty e^{-st} f(t)dt$
- $L(f(t)) = \int_0^\infty e^{-t} f(t)dt$
- $L(f(t)) = \int_0^\infty e^{-t} f(s)dt$
- $L(f(t)) = \int_0^\infty e^{-st} f(s)ds$

5. Which of the following statement is true for unit step function in connection with Laplace transform (1 Point)

- It makes function unit everywhere
- It is concerned with translation of a given function to a given distance in the positive direction
- It is concerned with translation of a given function to zero.
- None of the above

6. Which of the following is correct option for unit step function (1 Point)

$u_a\ (t)$.

- $L\ (u_a(t)f(a-t)) = e^{-as}F(s),\ where\ F(s)\ is\ Laplace\ transorm\ off(t)$
- $L\ (u_a(t)f(t-a)) = e^{-as}F(s),\ where\ F(s)\ is\ Laplace\ transorm\ off(t)$
- $L\ (u_a(t)f(t-a)) = e^{-at}F(s),\ where\ F(s)\ is\ Laplace\ transorm\ off(t)$
- $L\ (u_a(t)f(t-a)) = e^{as}F(s),\ where\ F(s)\ is\ Laplace\ transorm\ off(t)$

7. Suppose f is a periodic function with the existence of the Laplace transform and period P. Then which of the following statement is correct (1 Point)

- $L\ (f(t)) = \frac{\int_0^P e^{-st}dt}{(1-e^{-s})}$
- $L\ (f(t)) = \frac{\int_0^P e^{-t}dt}{(1-e^{-Ps})}$
- $L\ (f(t)) = \frac{\int_0^P e^{-st}dt}{(1-e^{-Ps})}$
- $L\ (f(t)) = \frac{\int_0^P e^{-st}ds}{(1-e^{-Ps})}$

8. Suppose the Laplace transform of (1 Point)

$f(t)$ *is* $F(s)$ *then*

- $L\left(\frac{1}{t}f(t)\right) = \int_s^{\infty} sF(s)ds$
- $L\left(\frac{1}{t}f(t)\right) = \int_s^{\infty} F(s)ds$
- $L\left(\frac{1}{t}f(t)\right) = \int_0^{-\infty} F(s)ds$
- $L\left(\frac{1}{t}f(t)\right) = \int_0^{\infty} F(s)ds$

9. Mark the wrong formula (1 Point)

- $L^{-1}\left(\frac{(s^2-a^2)}{(s^2+a^2)^2}\right) = t\cos at$
- $L^{-1}\ \frac{1}{(s^2+a^2)} = \frac{1}{a}\sin at$
- $L^{-1}\left(\frac{1}{((s-a)^2-b^2)}\right) = \frac{1}{b}e^{at}\sin bt$
- $L^{-1}\left(\frac{1}{(s-3)}\right) = e^{3t}$

10. The algebraic equation during the process of finding the solution by Laplace transform of the initial value problem (1 Point)

$\frac{d^2y}{dx^2} - 2\frac{dy}{dx} - 8y = 0,\ y(0) = 3,\ \frac{dy}{dx}(0) = 6$ *is*

- $\left(s^2 - 2s - 8\right)Y(s) = 0$

- $\left(s^2 - 2s - 8\right) Y(s) - 3s = 0$
- $\left(s^2 - 5s - 8\right) Y(s) = 0$
- $\left(s^2 - 3s - 5\right) Y(s) = 0$

11. The value of (1 Point)

$L^{-1}\left(\frac{3s}{(s-4)(s+2)}\right)$ *is*

- (selected) $2e^{4t} - e^{-2t}$
- $2e^{4t} - e^{2t}$
- $2e^{4t} + e^{-2t}$
- $2e^{4t} + e^{2t}$

12. Suppose f and g are two functions whose Laplace transform exists, and let c and d be constants. Then which of the following is true (1 Point)

- $L(cf - dg) = cL(f) + dL(g)$
- (selected) $L(cf - dg) = cL(f) - dL(g)$

- $L(cf + dg) = cL(f) - dL(g)$
- $L(cf + dg) = cL(g) + dL(f)$