St. Francis Institute of Technology

Laplace Transform (Practice Questions)

02 Marks Questions

1. Find $L[e^{-2t}(3t^5 + 4e^{-4t} - 3\sin 6t + 4\cos 4t)]$

2. Find $L[4t^3 + \cos 3t + e^{-2t}]$

3. Find $L[t\sin 3t]$

4. Find $L\left[\dfrac{\sin t}{t}\right]$

5. Find Laplace transform of $\dfrac{\cos\sqrt{t}}{\sqrt{t}}$ given that $L[\sin\sqrt{t}] = \dfrac{\sqrt{\pi}}{2s\sqrt{s}} e^{\frac{-1}{4s}}$

6. Find Laplace transform of $f(2t)$ if $L[f(t)] = \dfrac{8(s-3)}{(s^2-6s+25)^2}$

7. If $L[f(t)] = \dfrac{e^{-1/s}}{s}$ then find $L[e^{-t}f(3t)]$

8. Given that $4f'' + f = 0, f(0) = 0, f'(0) = 2$ show that $l[f(t)] = \dfrac{8}{4s^2+1}$

05 Marks Questions

1. Find Laplace transform of $e^{3t}f(t)$ where $f(t) = \begin{cases} t-1 & 1 < t < 2 \\ 3-t & 2 < t < 3 \\ 0 & Othrwise \end{cases}$

2. Find Laplace transform of $e^{\frac{-t}{2}}t\,f(3t)$ where $L[f(t)] = \dfrac{1}{s\sqrt{s+1}}$

3. Find $L\left[\int_0^t u^2 e^u \, du\right]$

4. Find $L\left[t\sqrt{1+\sin t}\right]$

5. Find $L\left[\dfrac{\cos at - \cos bt}{t}\right]$

6. Evaluate $\int_{t=0}^{\infty} \int_{u=0}^{t} \dfrac{e^{-u}\sin u}{u} \, du \, dt$

7. Evaluate $\int_0^{\infty} e^{-3t}t^2 \sin 2t \; dt$

8. Evaluate $\int_0^{\infty} e^{-t} \dfrac{1-\cos t}{t} \, dt$

9. Evaluate $\int_0^{\infty} e^{-2t} \dfrac{\cos 2t \sin 3t}{t} \, dt$