SRM Institute of Science and Technology
Department of Mathematics
18MAB102T-Advanced Calculus and Complex Analysis
2021-2022 Even
Unit – III: Laplace Transforms
Tutorial Sheet -7

S.No.	Questions	Answers
	Part – A [3 Marks]	
1	Find the Laplace Transform of $sin\omega t$	$\frac{\omega}{s^2+\omega^2}(1+e^{\frac{-\pi s}{\omega}})$
2	Find the Laplace Transform of $\sinh\frac{t}{2}\sin\frac{\sqrt{3}}{2}t$	$\frac{\sqrt{3}}{2}\frac{s}{s^4+s^2+1}$
3	Find the Laplace Transform of $e^t\sin^3 2t$	$\frac{3}{2}\left[\frac{s-3}{s^2-6s+10}-\frac{s-3}{s^2-6s+18}\right]$
4	Find the Laplace Transform of $te^{-4t}\sin 3t$	$\frac{6(s+4)}{((s+4)^2+9)^2}$
5	Find the Laplace Transform of $\frac{\sin 2t}{t}$	$\cot^{-1}\frac{s}{2}$
	Part – B[6 Marks]	
6	Find the Laplace Transform of $\frac{\cos at-\cos bt}{t}$.	$\frac{1}{2}\log\left(\frac{s^2+b^2}{s^2+a^2}\right)$
7	Find the Laplace Transform of the periodic function $f(t)=\frac{kt}{T}$, $0<t<T$, $f(t+T)=f(t)$.	$\frac{k}{Ts^2}+\frac{ke^{-sT}}{s(1-e^{-sT})}$
8	Verify initial and final value theorems for $f(t)=e^{-t}(t+2)^2$	
9	Find the Laplace Transform of the periodic function $f(t)=\begin{cases}\sin\omega t, & 0<t<\frac{\pi}{\omega},\\ 0, & \frac{\pi}{\omega}<t<\frac{2\pi}{\omega}.\end{cases}$	$\frac{\omega}{(s^2+\omega^2)(1-e^{-\frac{\pi s}{\omega}})}$
10	Find the Laplace Transform of $f(t)=\begin{cases}t-1, & 1<t<2,\\ 3-t, & 2<t<3.\end{cases}$	$\frac{1}{s^2}\left[e^{-s}-2e^{-2s}+e^{-3s}\right]$