

SRM Institute of Science and Technology
Department of Mathematics
18MAB102T-Advanced Calculus and Complex Analysis
2020-2021 Even
Unit – III: Laplace Transforms
Tutorial Sheet - I

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	Evaluate $\int_0^{\infty} t^3 e^{-t} \sin t \, dt$.	0
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 $f(t) = \begin{cases} t-1, & 1 < t < 2, \\ 3-t, & 2 < t < 3. \end{cases}$	$\frac{1}{s^2} [e^{-s} - 2e^{-2s} + e^{-3s}]$