

SRM Institute of Science and Technology
Department of Mathematics
18MAB102T-Advanced Calculus and Complex Analysis
2021-2022 Even
Unit – III: Laplace Transforms
Tutorial Sheet - 9

S.No.	Questions	Answers
Part – A [3 Marks]		
1	Using Convolution theorem to evaluate $L^{-1}\left[\frac{s}{(s^2+4)^2}\right]$.	$\frac{\sin 2t}{4}$
2	Find the inverse Laplace transform of $\frac{1}{s^2-5s+6}$ using Partial fraction method.	$e^{3t} - e^{2t}$
3	Find $L^{-1}\left(\frac{1}{s(s^2+a^2)}\right)$ using convolution.	$\frac{1}{a^2}[1 - \cos at]$
4	Find $L^{-1}\left(\frac{s^3}{s^4-a^4}\right)$ using Partial fraction method.	$\frac{1}{2}[\cosh at + \cos at]$
5	Find $L^{-1}\left(\frac{2as}{(s^2+a^2)^2}\right)$.	$t \sin at$
Part – B [6 Marks]		
6	Solve the equation by Laplace transform $y'' + 2y' + 5y = e^{-t} \sin t$, $y(0) = 0$, $y'(0) = 1$.	$\frac{e^{-t}}{3}(\sin t + \sin 2t)$
7	Solve the equation by Laplace transform $y'' + 9y = 6 \cos 3t$, $y(0) = 2$, $y'(0) = 0$.	$2 \cos 3t - t \sin 3t$
8	Find $L^{-1}\left(\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right)$ using convolution theorem.	$\frac{1}{a^2-b^2}[a \sin at - b \sin bt]$
9	Find the inverse Laplace transform of $\frac{s+4}{s(s-1)(s^2+4)}$ using Partial fraction method.	$-1 + e^t - \frac{1}{2} \sin 2t$
10	Solve the equation by Laplace transform $y'' - 4y' + 4y = 64 \sin 2t$, $y(0) = 0$, $y'(0) = 1$.	$-8e^{2t} + 17te^{2t} + 8 \cos 2t$