

SRM Institute of Science and Technology College of Engineering and Technology

Department of Mathematics

 $SRM\ Nagar,\ Kattankulathur-603203,\ Chengalpattu\ District,\ Tamilnadu$

Academic Year: 2022-2023(ODD)

Course Code &Title: 18MAB201T-Transforms and Boundary Value Problems

Year &Sem: II/III, Unit: IV

Tutorial 3 Part A

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1	Define convolution $f * g$ of two functions $f(x)$ and $g(x)$.	
2	Write down the expressions for $F[f(x) * g(x)]$ and $F^{-1}[f(x) * g(x)]$.	
3	State the Parseval's identity.	
4.	Write down the values of $\int_0^\infty e^{-x^2} dx$, $\int_0^\infty \frac{\sin(x)}{x} dx$, $\int_0^\infty \frac{\sin^2 x}{x^2} dx$ and $\int_0^\infty \frac{\sin^4 x}{x^4} dx$.	

Part B

5.	Find the value of $\int_0^\infty \frac{\sin^2 x}{x^2} dx$ using Parseval's identity.
6.	Find the Fourier transform of $f(x) = 1 - x $, if $ x < 1$ and hence find the value of $\int_0^\infty \frac{\sin^4 x}{x^4} dx$ by using the Parseval's identity.
7.	Using Parseval's identity evaluate
	$\int_0^\infty \frac{ds}{(a^2+s^2)^2}$ and $\int_0^\infty \frac{ds}{(a^2+s^2)(b^2+s^2)}$.
8.	Show that
	$F[f'(x)] = -isF(s), F[f^n(x)] = (-is)^n F(s).$
9.	Show that
	$F_c[f'(x)] = -\sqrt{\frac{2}{\pi}}f(0) + sF_s(s) \text{ and } F_s[f'(x)] = -sF_c(s)$
	By assuming that $f(x) \to 0$ as $x \to \infty$.