NADAR SARASWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch: BE/ CIVIL,EEE,MECH	**Year / Semester** : II/III	Format No.	NAC/TLP-07a.13
Subject Code :MA8353	**Subject Name** : TRANSFORMS AND PARTIAL DIFFERENTIAL EUATIONS	Rev. No.	02
Unit No : 04	**Unit Name:** Fourier Transforms	Date	30-09-2020

OBJECTIVE TYPE QUESTION BANK

S.No.	Objective Questions [MCQ / True or False / Fill up with Choices)	BTL
1	Define Fourier Integral theorem. (a). $f(x)=\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} f(t)e^{is(x-t)}dtds$ (b). $g(x)=\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} g(t)e^{is(x-t)}dtds$ (c). $g(x)=\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} f(t)e^{is(x-t)}dtds$ (d). $f(x)=\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} g(t)e^{is(x-t)}dtds$	L4
2	Define Fourier Transform pair and its Parseval's identity. (a). $\int_0^{\infty}[F(S)]^2 ds=\int_0^{\infty}[f(x)]^2 dx$ (b).F[[f(x)] = F(S) (c). $f(x)=[F^{-1}(F(S)]$ (d).0	L4
3	Find the Fourier Transform of $f(x)=\begin{cases}e^{ikx}, a<x<b\\ 0, x<a \text{ and } x>b\end{cases}$ (a). $\frac{1}{\sqrt{2\pi}}\left(\frac{e^{i(S+X)}}{i(S+K)}\right)_a^b$ (b). $\frac{1}{\sqrt{2\pi}}\left(\frac{e^{i(S-X)}}{i(S-K)}\right)_a^b$ (c). $\frac{1}{\sqrt{2\pi}}\left(\frac{e^{i(S-X)}}{i(S-K)}\right)_b^a$ (d). $\frac{1}{\sqrt{2\pi}}\left(\frac{e^{i(S+X)}}{i(S+K)}\right)_b^a$	L4
4	State Convolution theorem on Fourier Transform (a).F[f(x)*g(x)]=F[f(x)].F[g(x)] (b).G[f(x)*g(x)]=G[f(x)].G[g(x)] (c). F^{-1}[f(x)*g(x)]= F^{-1} [f(x)].F[g(x)] (d). G^{-1}[f(x)*g(x)]= F^{-1} [f(x)].F[g(x)]	L4
5	State Fourier cosine transform pair on it. (a). $f(x)=\int_0^{\infty} F_C(S)\cos(sx)ds$ (b). $f(x)=\int_0^{\infty} F_C(S)\sin(sx)ds$ (c). $\int_0^{\infty}[F(S)]^2 ds=\int_0^{\infty}[f(x)]^2 dx$ (d). $f(x)=\int_0^{\infty} F_S(S)\sin(sx)ds$	L4
6	State Fourier sine transform pair on it.	L4

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	(a). $f(x)=\int_0^\infty F_C(S)\cos(sx)ds$ (b). $f(x)=\int_0^\infty F_C(S)\sin(sx)ds$ (c). $\int_0^\infty [F(S)]^2 ds=\int_0^\infty [f(x)]^2 dx$ (d). $f(x)=\int_0^\infty F_S(S)\sin(sx)ds$	
7	Find the Fourier cosine transform of $f(x)=e^{-ax}$,a>0. (a). $\frac{2}{\sqrt{2\pi}}\frac{a}{S^2+a^2}$	L4
8	Find the Fourier Sine transform of $f(x)=e^{-ax}$,a>0. (a). $\frac{2}{\sqrt{2\pi}}\frac{S}{S^2+a^2}$ (b). $\frac{2}{\sqrt{2\pi}}\frac{a}{S^2+a^2}$ (c). $\frac{2}{\sqrt{2\pi}}\frac{b}{S^2+a^2}$ (d). $\frac{2}{\sqrt{2\pi}}\frac{b}{S^2+a^2}$	L4
9		L4
10	Find the function f(x) whose sine transform is $\frac{e^{-as}}{S}$ (a). $\frac{2}{\sqrt{2\pi}}\tan^{-1}\left(\frac{x}{a}\right)$ (b). $\frac{2}{\sqrt{2\pi}}\sin^{-1}\left(\frac{x}{a}\right)$ (c). $\frac{2}{\sqrt{2\pi}}\cos^{-1}\left(\frac{x}{a}\right)$ (d). $\frac{2}{\sqrt{2\pi}}\cot^{-1}\left(\frac{x}{a}\right)$	L4
11	Find the Fourier transform of $f(x)=\begin{cases}1, \mid x\mid <a\\ 0, \mid x\mid >a\end{cases}$ (a). $\frac{\sqrt{2}}{\pi}\frac{Sinsa}{S}$ (b). $\frac{\sqrt{2}}{\pi}\frac{Cossa}{S}$ (c). $\frac{\sqrt{2}}{\pi}\frac{Sinsa}{S^2}$ (d). $\frac{\sqrt{2}}{\pi}\frac{Cossa}{S^2}$	L4
12	Find the Fourier transform of $f(x)=\begin{cases}a-x, \mid x\mid <a\\ 0, \mid x\mid >a\end{cases}$ hence find $\int_0^\infty\left(\frac{S\,\text{int}}{t}\right)^2$ (a) . $\frac{\pi}{2}$ (b). $\frac{\pi}{4}$ (c). $\frac{3\pi}{4}$ (d). $\frac{\pi}{14}$	L4
13	Find the Fourier transform of $f(x)=\begin{cases}a^2-x^2, \mid x\mid <a\\ 0, \mid x\mid >a\end{cases}$ and hence deduce that $\int_0^\infty\left(\frac{\sin t-t\cos t}{t^3}\right)^2 dt$	L4

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	. (a). $\frac{\pi}{2}$ (b). $\frac{\pi}{4}$ (c). $\frac{3\pi}{4}$ (d). $\frac{\pi}{15}$	
14	Find the Fourier transform of f(x) = $e^{x^2a^2}$, a>0 (a). $\frac{e^{-\frac{S^2}{4a^2}}}{\sqrt{2}a}$ (b). $e^{x^2a^2}$ (c). $xe^{\frac{-x^2}{2}}$ (d). $\frac{e^{-as}}{S}$	L4
15	Evaluate $\int_0^\infty \left(\frac{x}{x^2+a^2}\right)^2 dx$ (a). $\frac{\pi}{4a}$ (b). $\frac{\pi}{4a^3}$ (c). $\frac{3\pi}{4}$ (d). $\frac{\pi}{14}$	L4
16	Evaluate $\int_0^\infty \frac{dx}{\left(x^2+a^2\right)^2}$ (a). $\frac{\pi}{4a^3}$ (b). $\frac{\pi}{4a}$ (c). $\frac{\pi}{15}$ (d). 0	L4
17	Find the Fourier transform of $f(x) = e^{\frac{-x^2}{2}}$ (a). $e^{\frac{-s^2}{2}}$ (b).S $e^{\frac{-s^2}{2}}$ (c). $\frac{e^{-as}}{S}$ (d). e^{-ax}	L4
18	Find the Fourier transform of $f(x) = xe^{\frac{-x^2}{2}}$ (a). S $e^{\frac{-s^2}{2}}$ (b). $e^{\frac{-s^2}{2}}$ (c). $\frac{e^{-as}}{S}$ (d). e^{-ax}	L4
19	The Fourier Sine integral is (a). $\frac{2}{\pi}\int_0^\infty \sin\lambda x \int_0^\infty f(t)\sin\lambda t dt d\lambda$ (b). $\frac{2}{\pi}\int_0^\infty \cos\lambda x \int_0^\infty f(t)\sin\lambda t dt d\lambda$ (c). $\frac{2}{\pi}\int_0^\infty \cos\lambda x \int_0^\infty f(t)\sin\lambda t dt d\lambda$ (d). $\frac{2}{\pi}\int_0^\infty \sin\lambda x \int_0^\infty f(t)\cos\lambda t dt d\lambda$	L4
20	The Fourier Sine integral is	L4

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	(a). $\frac{2}{\pi}\int_0^\infty Cos\lambda x \int_0^\infty f(t) Cos\lambda t dt d\lambda$ (b). $\frac{2}{\pi}\int_0^\infty \cos\lambda x \int_0^\infty f(t)\sin\lambda t dt d\lambda$ (c). $\frac{2}{\pi}\int_0^\infty \cos\lambda x \int_0^\infty f(t)\sin\lambda t dt d\lambda$ (d). $\frac{2}{\pi}\int_0^\infty \sin\lambda x \int_0^\infty f(t)\cos\lambda t dt d\lambda$	