Code No: P21BST08

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)

II B.TECH I SEMESTER END REGULAR EXAMINATIONS, JAN - 2023

TRANSFORMATION TECHNIQUES & PARTIAL DIFFERENTIATION

(Common to EEE,ME,ECE,IT,CSE(IOTCSBT),AIDS,AIML Branches)

Time: 3 hours Max. Marks: 70

Answer all the questions from each UNIT (5X14=70M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
1.	a)	Find the Fourier Series of f(x) = $\frac{(\pi-x)^2}{2}\frac{(\pi-x)^2}{2}$ in 0≤x≤2π.	[7M]	1	1
	b)	Find the Fourier Series of f(x) = $e^{-x}e^{-x}$ in -1≤x≤1.	[7M]	1	1
		OR			
2.	a)	Find the Fourier Series of f(x) = $\|x\|\|x\|$ in -π≤x≤π and hence deduce that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+------=\frac{\pi^2}{8}\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+------=\frac{\pi^2}{8}$	[7M]	1	1
	b)	Find the half range cosine series of f(x) = x in 0<x<l.	[7M]	1	1
		UNIT-II			
3.	a)	Using Fourier Integral, show that $e^{-x}\cos x = \frac{2}{\pi}\int_0^\infty \frac{\lambda^2+2}{\lambda^4+4}\cos\lambda x\, d\lambda$	[7M]	2	3
	b)	$e^{-x}\cos x = \frac{2}{\pi}\int_0^\infty \frac{\lambda^2+2}{\lambda^4+4}\cos\lambda x\, d\lambda$form of f(x), then the complex Fourier transform of $f(x)\cos ax$ is $\frac{1}{2}[F(p+a)+F(p-a)]$	[7M]	2	3
		$f(x)\cos ax$ is $\frac{1}{2}[F(p+a)+F(p-a)]$ℛ			
4.	a)	Express $f(x)=\begin{cases}1 \text{ in} 0\le x\le\pi\\ 0 \text{ in } x>\pi\end{cases}$ $f(x)=\begin{cases}1 \text{ in} 0\le x\le\pi\\ 0 \text{ in } x>\pi\end{cases}$ as a Fourier Sine Integral and hence evaluate $\int_0^\infty \frac{1-\cos(\pi\lambda)}{\lambda}\sin(x\lambda)d\lambda$.	[7M]	2	5
	b)	$\int_0^\infty \frac{1-\cos(\pi\lambda)}{\lambda}\sin(x\lambda)d\lambda$.Cosine Transforms of x.	[7M]	2	1
		UNIT-III			
5.	a)	Prove that $z[n^2]=\frac{z^2+z}{(z-1)^3}z[n^2]=\frac{z^2+z}{(z-1)^3}$.	[7M]	3	5
	b)	Find the *Z* transform of *cosh* $n\theta$.	[7M]	3	1
		OR			
6.	a)	Using Convolution theorem , find $Z^{-1}\left[\frac{z^3}{Z(z-2)(z-3)}\right]$	[7M]	3	3
	b)	Solve the difference equation $u_{n+2}+4u_{n+1}+3u_n=3^n\ with\ u_0=0,u_1=1$	[7M]	3	3
		$u_{n+2}+4u_{n+1}+3u_n=3^n\ with\ u_0=0,u_1=1$V			
7.	a)	Verify Euler's theorem for $u=x^2\tan^{-1}\left(\frac{y}{x}\right)-y^2\tan^{-1}\left(\frac{x}{y}\right)$	[7M]	4	3
	b)	$u=x^2\tan^{-1}\left(\frac{y}{x}\right)-y^2\tan^{-1}\left(\frac{x}{y}\right)$ If $x=e^r.\mathrm{Sec}\,\theta;y=e^r.\mathrm{Tan}\,\theta$ then prove that $\frac{\partial(x,y)}{\partial(r,\theta)}.\frac{\partial(r,\theta)}{\partial(x,y)}=1$.	[7M]	4	5
		OR			
8.	a)	Expand e^{xy} in the neighbourhood of (1, 1).	[7M]	4	2

	b)	Find the volume of the greatest rectangular parallelepiped that can be inscribed in the ellipsoid $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$.	[7M]	4	1
		UNIT-V			
9.	a)	Form the Partial Differential Equation by eliminating *a* and *b* from $z=(x^2+a)(y^2+b)$.	[7M]	5	3
	b)	Solve the PDE $x^2p^2+y^2q^2=1x^2p^2+y^2q^2=1$.	[7M]	5	3
		OR			
10.	a)	Solve the partial differential equation $px-qy=y^2-x^2$.	[7M]	5	3
	b)	Solve the partial differential equation $(D-D'-1)(D-D'-2)z=e^{2x-y}$.	[7M]	5	3

$(D-D'-1)(D-D'-2)z=e^{2x-y}$.

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