

Code No: P21BST08

HALL TICKET NUMBER

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

II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 2023
TRANSFORMATION TECHNIQUES & PARTIAL DIFFERENTIATION
(Common to EEE,ME,ECE,IT,CSE(IOTCSBT),AIDS,AI ML 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 $f(x) = \begin{cases} -k & \text{in } -\pi < x < 0 \\ k & \text{in } 0 < x < \pi \end{cases}$	[7M]	1	
	b) $f(x) = \begin{cases} -k & \text{in } -\pi < x < 0 \\ k & \text{in } 0 < x < \pi \end{cases} = \sin ax$ in $-l \leq x \leq l$.	[7M]	1	
OR				
2.	a) Find the Fourier Series of $f(x) = x - x^2$ in $-\pi \leq x \leq \pi$.	[7M]	1	
	b) Find the half range cosine series of $f(x) = x \sin x$ in $0 < x < \pi$.	[7M]	1	
UNIT-II				
3.	a) If $F(p)$ is the complex Fourier transform of $f(x)$, then the complex Fourier transform of $f(x) \sin ax$ is $\frac{1}{2i} [F(p+a) - F(p-a)]$	[7M]	2	
	b) $f(x) \sin ax$ is $\frac{1}{2i} [F(p+a) - F(p-a)]$ defined by $f(x) = \frac{1}{1+x^2}$	[7M]	2	
OR				
4.	a) Find the Fourier Transform of $f(x) = \begin{cases} 1, & x < a \\ 0, & x > a \end{cases}$ and hence evaluate $\int_0^{\infty} \frac{\sin p}{p} dp$ and $\int_{-\infty}^{+\infty} \frac{\sin ap \cos px}{p} dp$.	[7M]	2	
	b) Find the Fourier sine transform of $\frac{1}{x} e^{-ax}$.	[7M]	2	
UNIT-III				
5.	Solve the difference equation $y_{n+2} + 6y_{n+1} + 9y_n = 2^n$ with $y_0 = 0, y_1 = 0$	[14M]	3	
OR				
6.	a) Find the z transform of $e^t \sin 2t$.	[7M]	3	
	b) If $U(z) = \frac{2z^2+5z+14}{(z-1)^4}$ then evaluate u_2 and u_3 .	[7M]	3	
UNIT-IV				
7.	a) Prove that $u = \frac{x^2 - y^2}{x^2 + y^2}; v = \frac{2xy}{x^2 + y^2}$ are functionally dependent and find the relation between them.	[7M]	4	
	b) Expand the function $e^x \sin y$ in powers of x and y upto terms of 3 rd degree.	[7M]	4	
OR				
8.	a) Expand $f(x, y) = e^y \cdot \log(1+x)$ in powers of x and y .	[7M]	4	



	b)	Find the maximum value of $u = x^2y^3z^4$ if $2x+3y+4z=a$.	[7M]	4	
UNIT-V					
9.	a)	Form the PDE by eliminating f and g from $z = f(y) + g(x + y)$	[7M]	5	
	b)	Solve the partial differential equation $(mz - ny)p + (nx - lz)q = ly - mx$ $(mz - ny)p + (nx - lz)q = ly - mx$ OR	[7M]	5	
10.		Solve $\frac{\partial^3 z}{\partial x^3} - 2 \frac{\partial^3 z}{\partial x^2 \partial y} = 2e^{2x} + 3x^2y$	[14M]	5	
