



JSS MAHAVIDYAPEETHA
JSS ACADEMY OF TECHNICAL EDUCATION, NOIDA
DEPARTMENT OF MATHEMATICS

Roll No.

CIA-1 AY 2024-25

Course : B.Tech
Semester : IV
Subject : Mathematics-IV
Time : 1 hrs.=60 min

Date : 01-05-25
Subject Code : BAS-403
Max. Marks : 20

COURSE OUTCOMES

C230.1	Classify partial differential equations and transform into canonical form and solve linear and nonlinear partial differential equations of first order.
C230.2	Apply the knowledge of partial differential equations to Engineering, sciences & technology.
C230.3	Introduce measures of central tendency and various forecasting techniques.
C230.4	To develop an understanding of the theory of probability, rules of probability and Probability distributions.
C230.5	Understand the meaning and process of hypothesis testing including T-test, Z-test, Chi-Square test, Quality Control chart.

Section-A

Attempt all the questions of this section

(1 X5=5)

Q. No.	Question	Marks	CO	BL/ KC*
1.	a Solve the following Partial Differential Equation $(D'^2 + DD'^2)z = 0$	1	CO1	
	b Solve the Partial Differential Equation $yz p - xz q = xy$	1	CO1	
	c Write the auxiliary equation of Charpit method?	1	CO1	
	d Classify the following operator $4 \frac{\partial^2 u}{\partial x^2} - 4 \frac{\partial^2 u}{\partial x \partial t} + 4 \frac{\partial^2 u}{\partial t^2}$	1	CO2	
	e Write the solution of one-dimensional Heat equation.	1	CO2	

Section-B

Attempt all the questions of this Section

(3X3=9)

2.	Solve the Partial Differential Equation $pz - qz = z^2 + (x + y)^2$	3	CO1	
	OR			
3	Solve $r + 2s + t = 2(y - x) + \sin(x - y)$.	3	CO1	
	Solve $(D^2 + DD' - 2D'^2)z = (y - 1)e^x$			
	OR			
4	Solve $(mz - ny)p + (nx - lz)q = ly - mx$, where $p = \frac{\partial z}{\partial x}$ & $q = \frac{\partial z}{\partial y}$.	3	CO1	
	By Charpit's method, find the complete solution of PDE $(p^2 + q^2)y = qz$.			
	OR			
4	Solve the Partial Differential Equation $\left(x^2 \frac{\partial^2 z}{\partial x^2} - 4xy \frac{\partial^2 z}{\partial x \partial y} + 4y^2 \frac{\partial^2 z}{\partial y^2} + 6y \frac{\partial z}{\partial y} \right) = x^3$	3	CO1	



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Section - C

Attempt all the questions of this Section

(6X1=6)

5	A tightly stretched string with fixed end points $x=0$ and $x=l$ is initially in a position given by $y = y_0 \sin^3 \frac{\pi x}{l}$. If it is released from rest from this position, find the displacement $y(x,t)$.	6	CO2	
	OR			
	Solve the following partial differential equation by method of separation of variables $4 \frac{\partial u}{\partial t} + \frac{\partial u}{\partial x} - 3u = 0$, $u(x,0) = 3e^{-x} - e^{-5x}$.			

29/04/25