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

CIA-I

Course : B. Tech.
Semester : IV
Subject : Mathematics-IV
Time : 1:00-2:30 P.M

AY 2020-21 (EVEN Semester)
Date : 3 June 21
Subject Code : KAS 402
Max. Marks : 30

COURSE OUTCOMES	
C229.1	Classify partial differential equations and transform into canonical form and solve linear and nonlinear partial differential equations of first order.
C229.2	Apply the knowledge of partial differential equations to Engineering, sciences & technology.
C229.3	Introduce measures of central tendency and various forecasting techniques.
C229.4	To develop an understanding of the theory of probability, rules of probability and Probability distributions.
C229.5	Understand the meaning and process of hypothesis testing including T-test, F-test, Chi-Square test ,ANOVA, Quality Control chart.

Q. No.	QUESTIONS	CO	BL
PART- A: ATTEMPT ALL QUESTIONS (5X1 = 5 MARKS)			
1.	Find the PDE of all the spheres whose centre lie on the Z-axis.	CO1	1
2.	Solve $\frac{\partial^4 z}{\partial x^4} = 0$	CO1	1
3.	Find the general solution of PDE $xp + yq = z$.	CO1	1
4.	Classify the Partial differential equation $(1+x^2)\frac{\partial^2 z}{\partial x^2} + (5+2x^2)\frac{\partial^2 z}{\partial y \partial x} + (4+x^2)\frac{\partial^2 z}{\partial y^2} = \sin(x+y)$.	CO2	1,2
5.	Write Telegraph equation.	CO2	1
PART-B: ATTEMPT ANY THREE QUESTIONS (3X5 = 15 MARKS)			
6.	Solve the differential equation $z(x+y)p + z(x-y)q = x^2 + y^2$ by Lagrange's method.	CO1	3,4
7.	Solve $(2D^2 - DD' - D'^2 + 6D + 3D')z = xe^y$	CO1	3
8.	Using method of separation of variables find the solution of $4\frac{\partial u}{\partial t} + \frac{\partial u}{\partial x} = 3u$ when $u(x,0) = 3e^{-x} - e^{-5x}$	CO2	3
9.	Neglecting R and G, find the emf $v(x,t)$ in a line of length l , t seconds after the ends were suddenly grounded. Given that $i(x,0) = i_0$ and $v(x,0) = e_1 \sin \frac{\pi x}{l} + e_5 \sin \frac{5\pi x}{l}$	CO2	3
PART-C: ATTEMPT ANY ONE QUESTION (1X10 = 10 MARKS)			
10.	a) Find the complete integral by using Charpit's method $zpq = p + q$	CO1	3
	b) A tightly stretched string with fixed end points $x=0$ and $x=l$ is initially at rest in its equilibrium position. If it is set vibrating by giving to each of its points an initial velocity $\lambda x(l-x)$, Find the displacement of the string at any distance x from one end at any time t .	CO2	3
11.	a) Solve the following partial differential equation $x^2 r - y^2 t + px - qy = \log x$	CO1	2
	b) A rectangular plate with insulated surfaces is 8 cm wide and so long compared to its width that it may be consider infinite in length. If the temperature along one short	CO2	1,2



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	edge $y=0$ is given by $u(x,0) = 100 \sin \frac{\pi x}{8}$, $0 < x < 8$ while the two long edges $x=0$ and $x=8$ as well as the other short edge are kept at 0°C . Find the steady state temperature at any point of the plate.		
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