

Name. _____		Printed Pages:01		
Student Admn. No.: _____				
School of Basic Sciences Summer Term Examination – July - August 2024 [Programme: B.Sc.] [Semester: IV] [Batch: 2021-2024]				
Course Title: Differential Equations and Mechanics		Max Marks: 100		
Course Code: CIUC401T		Time: 3 Hrs.		
Instructions:	1. All questions are compulsory. 2. Assume missing data suitably, if any.			
		K Level	COs	Marks
SECTION-A (15 Marks)		5 Marks each		
1.	Define Quasi-linear with an example. Find the partial differential equation by eliminating arbitrary constants a and b from the following equation $z = ax + by + a^2 + b^2$.	K1	CO1	5
2.	Classify the PDE: $r + s + t + px - qz = 0$.	K1	CO2	5
3.	Solve the given PDE: $p + 3q = z$ by using Lagrange's method.	K2	CO2	5
SECTION-B (40 Marks)		10 Marks each		
4.	Prove that $P_n(1) = 1$ by using generating function formula.	K2	CO2	10
5.	Solve the non-homogeneous PDE: $(D^3 - 2D^2D')z = 2e^{2x-y}$.	K2	CO3	10
6.	The position of a moving particle at time 't' is given by $x = t$, $y = b \sin t$. Find its path, velocity and acceleration.	K3	CO2	10
7.	Solve the equation by using Charpit method: $z = pq$	K3	CO3	10
SECTION-C (45 Marks)		15 Marks each		
8.	Show that $x = 0$ is an ordinary point of $(x^2 - 1)y'' + xy' - y = 0$, but $x = 1$ is a regular singular point.	K3	CO1	15
9.	Solve the given PDE: $(y + z)p - (x + z)q = x - y$ by using Lagrange's method.	K3	CO2	15
10	Write the Rodrigues Formula. Also, Find the polynomials $P_0(x)$, $P_1(x)$, $P_2(x)$ and $P_3(x)$ by using this formula.	K4	CO4	15