

2018+155 551+8102
81 + 53h 551+8102

University of Information Technology & Sciences (UITS)
Faculty of Science and Engineering
Department of Computer Science and Engineering
Program: B.Sc. in CSE
Term Final Examination, Spring 2025
Course Title: Ordinary and Partial Differential Equations
Course Code: MATH 0541121

Marks: 50

Time: 3 (Three) hours

(Answer all questions)

Q. No.	Questions	Marks
1.	a) Solve the following differential equations: (i) $(D^4 - 1)y = 0$ (ii) $(D^2 - 2D - 3)y = 10\sin x$	[06]
	b) Solve the following system of differential equations: $\left. \begin{aligned} \frac{dx}{dt} &= -5x - y \\ \frac{dy}{dt} &= 4x - 2y \end{aligned} \right\}$	[04]
2.	a) State the general form of Cauchy-Euler differential equation of order n .	[02]
	b) Solve the following initial value problem: $x^2 \frac{d^2y}{dx^2} + 2x \frac{dy}{dx} - 6y = 14x^3, y(1) = 2, y'(1) = -6.$	[08]
3.	a) Construct partial differential equations by eliminating a and b from (i) $z = axe^y + \frac{1}{2}a^2e^{2y} + b$ (ii) $z = (x^2 + a)(y^2 + b)$	[06]
	b) Construct a partial differential equation from the following function: $\varphi(x^2 + y^2 + z^2, z^2 - 2xy) = 0.$	[04]
4.	Solve the following partial differential equations: (i) $zp = -x$ (ii) $p - q = 2x \sin(x + y)$ (iii) $x(y^2 - z^2)p + y(z^2 - x^2)q = z(x^2 - y^2)$	[10]
5.	a) Solve the following partial differential equations: (i) $(D_x^3 - 6D_x^2D_y + 11D_xD_y^2 - 6D_y^3)z = e^{5x+6y}$ (ii) $(D_x^2 - 2D_xD_y + D_y^2)z = \tan(y + x)$	[06]
	b) A 20 volt battery is connected to a series circuit in which the inductance is 0.5 henry and the resistance is 10 ohms. Compute the current i if the initial current is zero	[04]

23+6+90
= 69