Name. …….	**Printed Pages:01**
Student Admn. No.: ……..……..…	

School of Basic and Applied Sciences
Summer Term Examination, September 2023
[Programme: B. Tech.] [Semester: III]

Course Title: Numerical Methods	**Max Marks: 50**
Course Code: MATH2300	**Time: 3 Hrs.**

Instructions:
1. *All questions are compulsory.*
2. *Assume missing data suitably, if any.*

	SECTION-A (10 Marks)		**2 Marks each**	
1.	Write formula for Newton Raphson method.	CO1	K1/K2	2
2.	Write formula for forward backward formula.	CO2	K1/K2	2
3.	What is numerical integration.	CO3	K3/K4	2
4.	Write down Taylor's series formula for solving ODE.	CO4	K3/K4	2
5.	Classify the following PDE- $u_{xx} + 4u_{xy} + 4u_{yy} - u_x + 2u_y = 0$	CO5	K4	2
	SECTION-B (16 Marks)			
6.	Using Bisection method, find a **negative** root of the equation $x^3 - 4x + 9 = 0$. Perform Four iterations.	CO1	K3/K4	5
7.	The population of a town in decennial census were given in the following table. Year : 1921 1931 1941 1951 1961 Population (in thousand) : 46 66 81 93 101 Estimate the population for the year 1955 using **Newton's backward formula**	CO2	K3/K4	5
8.	Estimate the **missing terms** in the following data: x: 0 1 2 3 4 f(x): 1 3 9 ….. 81	CO6	K6	6
	SECTION-C (24 Marks)		**8 Marks each**	
9.	Find the value of $\int_4^{5.2} \ln(x)dx$ calculated using the **Trapezoidal rule** with six sub intervals	CO3	K4/K5	8
10.	Using **Euler's method**, find an approximate value of y corresponding to x=2, given that $\frac{dy}{dx} = x + 2y$ and $y(1) = 1$.	CO4	K4/K5	8
11.	Solve the equation $2\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ subject to the conditions $u(x,0) = x(4-x)$, $0 < x < 5$, $u(0,\ t) = u(4,\ t) = 0$, $t \geq 0$ taking h=1 Find the values of u upto t=5.	CO5	K5/K6	8