Student Name: **University Roll No.:**	**Printed Pages: 01**
School of Engineering **Second Theory Sessional Examination** **Even Semester (AS: 2024-25)** **B. Tech: CSE/AI/IOTBC/CCML [Year: II] [Semester : IV]**	
Course Title: Statistical and Numerical Technique **Course Code: NBS4401**	**Max Marks: 30** **Time: 1hr**

Instructions: 1- Read the question Carefully.
2-Notations have usual meaning.

	SECTION 'A' **Q.N.1. Attempt all parts of the following:**	**Course Objective**	**Marks**
a)	Define Percentage error with example.	CO2	1
b)	Prove that $\nabla = 1 - E^{-1}$.	CO2	1
c)	What is the rate of convergence of Regula-falsi method?	CO2	1
d)	Write the formula of Simpson's $1/3^{rd}$ rule.	CO3	1
e)	Write the formula of Runge-Kutta method of fourth order.	CO3	1
	SECTION 'B' **Q.N.2. Attempt any two parts of the following:**	**Course Objective**	**Marks**
a)	Find a smallest positive root of $x^3 - 5x + 3 = 0$ by using Newton Raphson's method?.	CO2	7.5
b)	Given the data f(1) = 4, f(2) = 5, f(7) = 5, f(8) = 4, compute f(6) using Lagrange's interpolation formula.	CO3	7.5
c)	Evaluate $\int_0^1 \frac{dx}{1+x}$ by dividing the interval of integration into 8 equal parts, using Simpson's $1/3^{rd}$ rule. Hence find $\log_e 2$ approximately.	CO3	7.5
	SECTION 'C' **Q.N.3. Attempt any one part of the following:**	**Course Objective**	**Marks**
a)	Solve the following system of equations by Gauss-Seidel method: $5x + 2y + z = 12$ $x + 4y + 2z = 15$ $x + 2y + 5z = 20$	CO2	10
b)	From the following table, find the first derivative at x = 4. x: 1, 2, 4, 8, 10 f(x): 0, 1, 5, 21, 27	CO3	10
c)	Apply Runge-Kutta method of fourth order to solve: $10\frac{dy}{dx} = x^2 + y^2, y(0) = 1$, for x = 0.1	CO3	10

Table 1: Mapping between COs and questions

COs	Questions Numbers	Total Marks
CO2	1(a), 1(b), 1(c), 2(a), 3(a)	20.5
CO3	1(d),1(e), 2(b), 2(c), 3(b), 3(c)	37

08.05.