Name. _____ **Printed Pages:01**

Student Admn. No.: _____

School of Basic Science

Summer Term Examination – July - August 2024

[Programme: B.Sc. Maths] [Semester:6)[Batch:2023-2024]

Course Title: Numerical Analysis And Operation Research **Max Marks: 100**

Course Code: C1UC602B **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 truncation error with example.	K1	CO1	5
2.	Give Dual of following: Min $z = 3x_1 - 2x_2 + 4x_3$ Subject to constraints $3x_1+5x_2+4x_3 \geq 7$; $6x_1+x_2+3x_3 \geq 4$; $7x_1-2x_2-x_3 \leq 10$; $x_1-2x_2+5x_3 \geq 3$; $4x_1+7x_2-2x_3 \geq 2$; $x_1, x_2, x_3 \geq 0$	K2	CO2	5
3.	Solve the following problem graphically: Min $Z = x_1 - 2x_2$ subject to $-2x_1 + x_2 \leq 8$; $-x_1 + 2x_2 \leq -24$ and $x_1, x_2 \geq 0$,	K2	CO3	5
	SECTION-B(40 Marks) 10 Marks each			
4.	Find a real root of the equation $x^3-2x-5=0$ using the Bisection method correct to two decimal places.	K3	CO2	10
5.	Find the solution of the system of equations: $28x + 4y - z = 32, \quad x + 3y + 10z = 24, \quad 2x + 17y + 4z = 35$ Perform 2 iterations, using the Gauss-Seidel iteration method.	K3	CO3	10
6.	Solve the following transportation problem to maximize profit using North West Corner Method:	K4	CO2	10

	D1	D2	D3	D4	Supply
S1	6	4	1	5	14
S2	8	9	2	7	16
S3	4	3	6	2	5
Demand	6	10	15	4	

7. Consider the problem of assigning five jobs to five persons. The assignment costs are given as follows:

	Jobs				
Person	1	2	3	4	5
A	10	5	13	15	16
B	3	9	18	13	6
C	10	7	2	2	2
D	7	11	9	7	12
E	7	9	10	4	12

K4 | CO3 | 10

SECTION-C (45 Marks) 15 Marks each

8. Derive the Lagrange's interpolation formula. K5 | CO3 | 15

9. Solve the following transportation problem to maximize profit using Vogels Approximation method:

	D1	D2	D3	D4	Supply
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	250	

K5 | CO4 | 15

10 Solve the following LPP problem using simplex method:

Max $Z = 3x_1+2x_2+4x_3$

Subject to constraints: $4x_1+3x_2+5x_3 \leq 20$; $2x_1+2x_2+4x_3 \leq 25$; $0 \leq x_1$; $0 \leq x_2$; $0 \leq x_3$.

K5 | CO3 | 15