

Name. _____		Printed Pages:02		
Student Admn. No.: _____				
School of Basic Sciences Backlog Examination, June 2023 [Programme: B.Tech (CSE)] [Semester: IV] [Batch: All]				
Course Title: Transformation & Operations Research		Max Marks: 100		
Course Code: MATH3600		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.	Find the inverse Laplace transform of the following function: $F(s) = \frac{3}{s+4}$	K1	CO2	5
2.	Estimate $(t \sin at)$.	K2	CO1	5
3.	Use Partial fraction to find the inverse Laplace transform of $\frac{1}{s^2-5s+6}$.	K1	CO2	5
SECTION-B (40 Marks)		10 Marks each		
4.	Find the Fourier sine and cosine transform of $e^{-ax}, x \geq 0, a > 0$.	K1	CO3	10
5.	Solve the Fourier cosine integral (representation) of the following function: $f(x) = \sin x \quad \text{if } 0 \leq x \leq \pi$ $= 0 \quad \text{if } x > \pi$	K3	CO3	10
6.	Develop the Laplace transform of $\sin 2t \cos 4t$.	K3	CO1	10
7.	Using convolution theorem, examine the inverse Z transform of the following function: $\frac{z^2}{(z-a)(z-b)}$ OR Using convolution theorem, examine inverse Z transform of the following function $\frac{z^2}{(z-1)(z-3)}$	K4	CO3	10
SECTION-C (45 Marks)		15 Marks each		
8.	The manager of a multinational company and the union of workers are preparing to sit down at the bargaining table to work out the details of a new contract for the workers. Each side has developed certain proposals for the contents of the new contract. Let us call union proposals "Proposal 1", "Proposal 2" and "Proposal 3", and manager's proposals "Contract A", "Contract B" and "Contract C". Both parties are aware of the financial aspects of each proposal-contract combination. The reward matrix is:	K5	CO5	15

<i>Proposal</i>	<i>Contract</i>		
	<i>A</i>	<i>B</i>	<i>C</i>
<i>1</i>	8.5	7.0	7.5
<i>2</i>	12.0	9.5	9.0
<i>3</i>	9.0	11.0	8.0

Reward matrix

Evaluate the value of the game.

9.

Minimize $Z = 600x_1 + 500x_2$
 Subject to
 (i) $2x_1 + x_2 \geq 80$,
 (ii) $x_1 + 2x_2 \geq 60$
 and $x_1, x_2 \geq 0$

K4

CO4

15

10

Analyze the following assignment problem:

	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	10	25	15	20
2	15	30	5	15
3	35	20	12	24
4	17	25	24	20

OR

Find the initial basic feasible solution of the following transportation problem using VAM and find the cost:

	D1	D2	D3	D4	D5	Supply
O1	4	7	0	3	6	14
O2	1	2	3	3	8	9
O3	3	1	4	0	5	17
Demand	8	3	8	13	8	

K4

CO5

15