Name. _____ **Printed Pages:01**

Student Admn. No.: _____

School of Basic Sciences

Summer Term Examination – July - August 2024

[Programme: B.tech] [Semester: VI [Batch:]

Course Title: Operation Research **Max Marks: 100**

Course Code: E2UC511T **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.	Discuss simplex method with an example.	KL1	CO1	5
2.	Write dual of following problems: Max $z = x_1 + x_2$, s/t 2x1+ x2=5 ; 3x1-x2 = 6 ; x1,x2>=0	KL2	CO2	5
3.	What is the difference between optimal and feasible solution	KL1	CO1	5
	SECTION-B (40 Marks) **10 Marks each**			
4.	A goldsmith manufactures necklaces and bracelets. The total number of necklaces and bracelets that he can handle per day is atmost 24. It takes one hour to make a bracelet and half an hour to make a necklace. It is assumed that he can work for a maximum of 16 hours a day. Further the profit on a bracelet is Rs. 300 and the profit on a necklace is Rs. 100. Formulate this problem as a linear programming problem.	KL2	CO3	10
5.	Obtain initial feasible solution for the following Transportation table using North West Corner rule.	KL3	CO3	10

Source	Destination			Supply
	A	B	C	
1	2	7	4	5
2	3	3	1	8
3	5	4	7	7
4	1	6	2	14
Demand	7	9	18	

6.	Solve the following Assignment problem	KL3	CO3	10

M/J	A	B	C	D
1	7	5	8	4
2	5	6	7	4
3	8	7	9	8

7.	Solve the following LPP using graphical method: Max z =8000x1+7000x2	KL4	CO2	10

	s/t 3x1+x2≤ 66; x1+x2≤45; x1≤20; x1&x2≥0			
	SECTION-C (45 Marks) **15 Marks each**			
8.	Solve the following Problem using VAM. <table><tr><th rowspan="2">Source</th><th colspan="3">Destination</th><th rowspan="2">Supply</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>1</td><td>2</td><td>2</td><td>3</td><td>10</td></tr><tr><td>2</td><td>4</td><td>1</td><td>2</td><td>15</td></tr><tr><td>3</td><td>1</td><td>3</td><td>1</td><td>40</td></tr><tr><td>Demand</td><td>20</td><td>15</td><td>30</td><td></td></tr></table>	KL4	CO3	15
9.	Find an initial basic feasible solution of the following problem using Vogel Approximation method. <table><tr><th></th><th>D_1</th><th>D_2</th><th>D_3</th><th>D_4</th><th>Supply</th></tr><tr><td>O_1</td><td>5</td><td>3</td><td>6</td><td>2</td><td>19</td></tr><tr><td>O_2</td><td>4</td><td>7</td><td>9</td><td>1</td><td>37</td></tr><tr><td>O_3</td><td>3</td><td>4</td><td>7</td><td>5</td><td>34</td></tr><tr><td>Demand</td><td>16</td><td>18</td><td>31</td><td>25</td><td></td></tr></table>	KL5	CO3	15
10	Write Phase I for the following problem and then solve to show that the problem has no feasible solution. Max z =2x1+5x2 s/t 3x1+2x2 ≥12; 2x1+x2≤4; x1 & x2 ≥0	KL6	CO2	15