Name. _____ **Printed Pages:02**

Student Admn. No.: _____

School of Business

Backlog Examination, June 2023

[Programme: BBA] [Semester: II] [Batch:]

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

Course Code: BBCC 1011 **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.	Explain any four-application area of Operations Research in Business	K2	CO1	5
2.	Differentiate Primal and Dual in Linear Programming Problem	K2	CO2	5
3.	Explain Duality concept with an example	K2	CO2	5
	SECTION-B (40 Marks) **10 Marks each**			
4.	Solve the following LPP by graphical method Minimize $Z= 4x_1+3x_2$ Subject to the linear constraints $200x_1+100x_2 \geq 4000$ $1x_1+2x_2 \geq 50$ $40x_1+40x_2 \geq 1400$ and $x_1,x_2 \geq 0$	K3	CO1	10
5.	Solve the TP for initial solution by Vogel's approximation method (VAM)	K3	CO2	10
6.	Discuss the various steps in Hungarian rule for solving an assignment problem	K4	CO3	10
7.	Examine the dominance principle with an example OR Analyze the various methods in solving a payoff in same theory and discuss the merits and demerits.	K4	CO4	10

	Destination			Supply
Origins	D1	D2	D3	
O1	2	7	4	**5**
O2	3	3	1	**8**
O3	5	4	7	**7**
O4	1	6	2	**14**
Demand	**7**	**9**	**18**	

PTO

SECTION-C (45 Marks) **15 Marks each**

8. Solve the following assignment problem showing cost for assigning 3 men to 3 jobs

	Men			
Job		A	B	C
	I	17	25	31
	II	10	25	16
	III	12	14	11

K4 CO3 15

9. Solve the following game

	Player A			
Player B		B1	B2	B3
	A1	2	-2	3
	A2	-3	5	-1

K5 CO4 15

10 A small Maintenance project consists of 12 activities. Construct a network diagram and calculate the total time required for the completion of the project. Obtain the critical Path also. Calculate

(i) Earliest Start Time
(ii) Latest Start Time
(iii) Earliest Finish Time
(iv) Latest Finish Time

Activity	Duration(days)	Activity	Duration (days)
1-2	2	5-8	5
2-3	7	6-7	8
2-4	3	6-10	4
3-4	3	7-9	4
3-5	5	8-9	1
4-6	3	9-10	7

K5 CO5 15

OR

Construct a network diagram and calculate the total time required for the completion of the project. Obtain the critical Path also. Calculate

(i) Total Float
(ii) Free Float
(iii) Independent Float

Activity	Duration(days)	Activity	Duration (days)
1-2	2	5-8	5
2-3	7	6-7	8
2-4	3	6-10	4
3-4	3	7-9	4
3-5	5	8-9	1
4-6	3	9-10	7