Code No. D-0426/N

FACULTY OF INFORMATICS

MCA (CBCS) III Semester (New) (Backlog) (2020-2021 Batch) Examination, April 2022

Subject: Operations Research

Time: 3 Hours **Max. Marks: 70**

Note: Answer any five questions from the following. All questions carry equal marks.

1 a) List the characteristic of graphical method of LPP.

b) Solve graphically the following LPP.

Maximum = $3x_1 + 2x_2$

S.T.C. $-2x_1 + x_2 \leq 1$

$x_1 \leq 2$

$x_1 + x_2 \leq 3$

$x_1 \geq 0,\ x_2 \geq 0.$

2 a) Define slack and surplus variable.

b) Solve the following LPP.

Maximum Z = $3x_1 + 2x_2$

S.T.C. $-2x_1 + x_2 \leq 40$

$x_1 + x_2 \leq 24$

$2x_1 + 3x_2 \leq 60$

$x_1,\ x_2 \geq 0.$

3 a) Define IBFS and feasible solution.

b) Solve by using VAM method and obtain optimum solution.

	D_1	D_2	D_3	D_4	Capacity
O_1	6	4	1	5	14
O_2	8	9	2	7	16
O_3	4	3	6	2	5
Requirement	6	10	15	4	

4 a) Write the steps for matrix minima (lowest-cost entry) method.

b) Solve the following by matrix minima method.

	D_1	D_2	D_3	D_4	Capacity
O_1	1	2	3	4	6
O_2	4	3	2	0	8
O_3	0	2	2	1	10
Requirement	4	6	8	6	

…2

5 a) Write the steps of Hungarian method for solving assignment problem.
b) Solve the following Assignment problem.

	I	II	III	IV	V
A	2	9	2	7	1
B	6	8	7	6	1
C	4	6	5	3	1
D	4	2	7	3	1
E	5	3	9	5	1

6 a) Write short notes on integer programming.
b) Solve the following integer programming problem.

Maximum Z = $7x_1 + 9x_2$

S.T.C. $-x_1 + 3x_2 \leq 6$

$7x_1 + x_2 \leq 35$

$x_1, x_2 \geq 0$ and are integers.

7 a) Define forward and backward induction process.
b) Write characteristics of dynamic programming.

8 a) Write short notes on DPP.
b) Solve the following LPP by dynamic programming problem.

Maximum Z = $10x_1 + 30x_2$

S.T.C. $3x_1 + 6x_2 \leq 168$

$12x_2 \leq 240$

$x_1, x_2 \geq 0.$

9 a) Define two person zero sum game.
b) Solve the 2xn game by using graphical method.

	I	II	III	IV
I	2	5	3	-1
II	4	3	2	6

10 a) Define saddle point and write rules to find saddle point.
b) Solve the following Mx2 game.

	I	II
I	2	4
II	2	3
III	3	2
IV	-2	6

****

Code No. D-0427/O

FACULTY OF INFORMATICS

M.C.A. III-Semester (CBCS) (Backlog)(Old) (2020-2021 Batch)Examination, April / May 2022

Subject : Operations Research

Time : 3 Hours **Max. Marks: 70**

Note: Answer any Five questions from the following:
All questions carry equal marks.

1. a) Define
   i) Feasible solution ii) Basic feasible solution

   b) Solve the LPP using graphical method.
   Maximize Z=10x+30y
   Subject to $4x+6y \le 12$
   $8x+4y \le 16$
   $x, y \ge 0$

2. a) Define
   i) Surplus variables ii) Artificial variables

   b) Use simplex method to solve the LPP.
   Maximize Z=2x+y
   Subject to $4x+3y \le 12$
   $4x+y \le 8$
   $4x-y \le 8$
   $x, y \ge 0$

3. a) Write about least cost entry method?
   b) Obtain initial basic feasible solution of following transportation problem?

	D1	D2	D3	D4	Total
O1	1	2	1	4	30
O2	3	3	2	1	50
O3	4	2	5	9	20
Total	20	40	30	10	100

4. Solve the following transportation problem for optimality

		TO			
		A	B	C	Supply
From	I	50	30	220	1
	II	90	45	170	3
	III	250	220	50	4
	Demand	4	2	2	

..2

5. Find the optimal solution to the following assignment problem

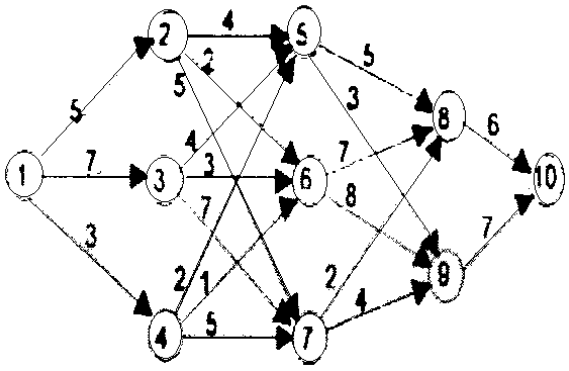
Machines

Jobs	A	B	C	D	E
1	10	5	9	18	11
2	13	19	6	12	14
3	3	2	4	4	5
4	18	9	12	17	15
5	11	6	14	19	0

6. Find the optimal integer solution to the following linear programming problem
Maximize Z=x+2y
Subject to $2y \le 7$
$x + y \le 7$
$2x \le 11$
$x, y \ge 0$ and are integers

7. Define a) Principle of optimality
b) recursive function
c) stages
d) state variable
e) forward recursion

8. Find the shortest path from city 1 to city 10 in the diagram shown below using dynamic programming



9. Solve the following game using dominance property

		B			
		I	II	III	IV
A	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	O	4	0	8

10. Solve the following 2x3 game graphically and find the value of game.

		B		
		I	II	III
A	I	1	3	11
	II	8	5	2

****