Code No. F-12186/CBCS

FACULTY OF INFORMATICS

M.C.A. (2 Years Course) II-Semester (CBCS) (Backlog) Examination, March/April 2024

Subject: Operations Research

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

Note: I. Answer one question from each unit. All questions carry equal marks.
II. Missing data, if any, may be suitably assumed.

Unit – I

1. a) Explain dual simplex method.
   b) Use two phase simplex method to solve the following
   Min $z = 15 / 2x_1 - 3x_2$
   Subject to constraints $3x_1 - x_2 - x_3 \geq 3$
   $x_1 - x_2 + x_3 \geq 2$
   $x_1x_2x_3 \geq 0$.

(OR)

2. a) State the advantages and limitations of linear programming.
   b) By using the simplex method
   Maximize $Z = 8x_1 + 6x_2$
   S.T.C $4x_1 + 2x_2 \leq 60$
   $2x_1 + 4x_2 \leq 48$
   and $x_1 \geq 0$ and $x_2 \geq 0$.

Unit – II

3. a) Explain the procedure to solve the transportation problem using VAM method.
   b) Solve the following transportation problem by using VAM method.

Source	A	B	C	Supply
W	4	8	8	76
X	16	24	16	82
Y	8	16	24	77
Demand	72	102	41	

(OR)

4. a) Elaborate the initial basic feasible solution.
   b) Solve the following transportation problem

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

Unit – III

5. a) Solve the following assignment problem in order to minimize total cost. The cost matrix given below species assignment cost when different operators are assigned to various machines.

Machines	Operators				
	I	II	III	IV	V
A	30	25	33	35	36
B	23	29	38	23	26
C	30	27	22	22	22
D	35	31	29	27	32
E	27	29	30	24	32

b) Explain the formulation of integer planning.

(OR)

6. a) Solve the following assignment problem

Programmer	Program			
	A	B	C	D
1	120	100	80	90
2	90	90	110	70
3	110	140	120	100
4	90	90	80	90

b) Elaborate the branch and bound technique for assignment problem.

Unit – IV

7. a) Explain the dynamic programming method.

b) Solve the following linear programming using DP

Maximize $Z = 30x_1 + 15X_2$

S.T.C $6x_1 + 8x_2 \leq 180$

$15x_2 \leq 210$

and $x_1 \geq 0$ and $x_2 \geq 0$.

(OR)

8. a) Elaborate the principle of optimality.

b) Use dynamic programming to solve the following LPP

Maximize (x_1, x_2, x_3)

Subject to $x_1 + x_2 + x_3 = 5$

$x_1, x_2, x_3 \geq 0$.

Unit – V

9. a) Solve the following game.

***		Player B			
		B_1	B_2	B_3	B_4
Player A	A_1	0	1	-4	6
	A_2	3	4	4	5
	A_3	2	0	3	-2

b) Explain the dominance property.

(OR)

10. a) Solve the following game using graphical method.

***		Player B			
		B_1	B_2	B_3	B_4
Player A	A_1	2	2	3	-1
	A_2	4	3	2	6

b) Write notes on various strategies for playing a game.

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