21. Using dual simplex method solve the LP problem

Minimize $z = 2x_1 + x_2$

Subject to constraints

$3x_1 + x_2 \geq 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 3$ and

$x_1, x_2 \geq 0$.

22. Solve the transportation problem with unit transportation costs in rupees, demands and supplies as given below.

		Destination			
		D_1	D_2	D_3	Supply (units)
Origin	A	5	6	9	100
	B	3	5	10	75
	C	6	7	6	50
	D	6	4	10	75
Demand (units)		70	80	120	

23. Solve the following sequencing problem giving the optimal solution if passing is not allowed.

		Machines			
		M_1	M_2	M_3	M_4
Jobs	A	13	8	7	14
	B	12	6	8	19
	C	9	7	8	15
	D	8	5	6	15

24. What are the advantages and disadvantages of Monte Carlo simulation?

III BCA - Resource Management Techniques.

APRIL 2019 **51311/SAZ5C**

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. What are the applications of operation research?
2. Define surplus variables.
3. Define slack variables.
4. Write any two disadvantage of Big-M method over two-phase method.
5. Define transportation problem.
6. Define optimal solution.
7. Write the difference between transportation problem and assignment problem.
8. Defines sequencing problem.
9. Define idle time.
10. Define saddle point.
11. Define dummy activity.
12. Define simulation with examples.

SECTION B — (5 × 5 = 25 marks)

Answer any FIVE questions.

13. Express the following LP problem in standard form

Minimize $z = 5x_1 + 7x_2$

Subject to constraints.

$x_1 + x_2 \leq 8$

$3x_1 + 4x_2 \geq 3$

$6x_1 + 7x_2 \geq 5$

and $x_1, x_2 \geq 0$.

14. Write the advantage of linear programming.

15. Write an algorithm for two-phase method.

16. Find the initial basic feasible solution for the following transportation problem by VAM.

		Distribution centres				Availability
		D_1	D_2	D_3	D_4	
Origin	S_1	11	13	17	14	250
	S_2	16	18	14	10	300
	S_3	21	24	13	10	400
Requirements		200	225	275	250	

17. Find the sequence that minimizes the total elapsed time required to complete the following jobs on machines, M_1, M_2 and M_3 in the order M_1, M_2, M_3.

Task	A	B	C	D	E	F
M_1	8	3	7	2	5	1
M_2	3	4	5	2	1	6
M_3	8	7	6	9	10	9

18. Write an algorithmic steps for processing of two-jobs on n-machines.

19. Suppose that the sales of a particular item per day is Poisson with mean 5, then generate 20 days of sales by Monte-Carlo method.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

20. Solve the following LP problem by the graphical method.

Minimize $z = 3x_1 + 5x_2$

Subject to constraints :

$-3x_1 + 4x_2 \leq 12$

$x_1 \leq 4$

$2x_1 - x_2 \geq -2$

$x_2 \geq 2$

$2x_1 + 3x_2 \geq 12$ and $x_1, x_2 \geq 0$.