21. Use dual simplex method to solve the LPP :

Minimize $z = 3x_1 + x_2$

Subject to the constraints : $x_1 + x_2 \geq 1$

$2x_1 + 3x_2 \geq 2$

and $x_1, x_2 \geq 0$

22. Solve the following game graphically.

Player B

$$\text{Player A} \quad \begin{array}{c} \\ A_1 \\ A_2 \end{array} \begin{array}{c} \begin{array}{cccc} B_1 & B_2 & B_3 & B_4 \end{array} \\ \begin{Bmatrix} 2 & 1 & 0 & -2 \\ 1 & 0 & 3 & 2 \end{Bmatrix} \end{array}$$

23. Write an algorithm for Monte-Carlo simulation.

24. Find the starting solution in the following transportation problem by Vogel's approximation method. Also obtain the optimum solution :

	D_1	D_2	D_3	D_4	Supply
S_1	3	7	6	4	5
S_2	2	4	3	2	2
S_3	4	3	8	5	3
Demand	3	3	2	2	

NOVEMBER 2017 **51311/SAZ5C**

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. What are the essential characteristics of a linear programming model?

2. Define slack and surplus variables in LPP.

3. What is infeasible solution?

4. Write the basic duality theorem.

5. Write the statement of fundamental theorem of duality.

6. Define transportation problem.

7. Write the difference between transportation problem and assignment problem.

8. List out the solutions for sequencing problem?

9. Define total elapsed time in sequencing problem.

10. What is simulation?

11. Define simulated sampling method.

12. What are the elements of simulation model?

III BCA - Resource Management Techniques.

SECTION B — (5 × 5 = 25 marks)

Answer any FIVE questions.

13. Use the graphical method to solve the following LPP :

Maximize : $z = 6x_1 + x_2$

Subject to the constraints : $2x_1 + x_2 \geq 3$

$x_2 - x_1 \geq 0$

and $x_1, x_2 \geq 0$

14. Use two-phase simplex method to solve the following LPP :

Maximize $z = 5x_1 + 3x_2$

Subject to the constraints : $2x_1 + x_2 \geq 1$

$x_1 + 4x_2 \geq 6$

and $x_1, x_2 \geq 0$

15. Write an algorithm for Big M method.

16. Obtain an initial basic feasible solution to the following transportation problem using the North-West Corner rule.

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Requirement	200	225	275	250	

17. Write the rules of network construction.

18. Using graphical method, calculate the minimum time needed to process job 1 and 2 on five machines A, B, C, D and E, (i.e) for each machine find the job which should be done first. Also calculate the total time needed to complete both jobs.

Job 1	Sequence :	A	B	C	D	E
	Time (hours) :	6	8	4	12	4
Job 2	Sequence :	B	C	A	D	E
	Time (hours) :	10	8	6	4	12

19. Use graphical method to solve the LPP :

Maximize $z = 2x_1 + 4x_2$

Subject to the constraints : $x_1 + 2x_2 \leq 5$

$x_1 + x_2 \leq 4$

and $x_1, x_2 \geq 0$

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

20. Use simplex method to solve the following LPP :

Maximize $z = 3x_1 + 5x_2 + 4x_3$

Subject to the constraints : $2x_1 + 3x_2 \leq 8$

$2x_2 + 5x_3 \leq 10$

$3x_1 + 2x_2 + 4x_3 \leq 15$

and $x_1, x_2, x_3 \geq 0$