



QP CODE: 21103031

21103031

Reg No :

Name :

B.Sc/BCA DEGREE (CBCS) EXAMINATIONS, OCTOBER 2021

Fourth Semester

Complementary Course - MM4CMT03 - OPERATIONS RESEARCH

(Common for B.Sc Cyber Forensic and Bachelor of Computer Applications)

2019 Admission only

68452C47

Time: 3 Hours

Max. Marks : 80

Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. What is operation research?
2. Explain the nature of operation research.
3. Describe the use of OR in Transport.
4. Briefly describe some application of operation research in functional areas of management.
5. What is a linear programming problem?
6. What do you mean by unbounded solution?
7. What are artificial variables and why are they introduced?
8. Write the mathematical model for the transportation problem given below:

Cost of transportation in Rupees

Destinations				
Sources	D1	D2	D3	D4
O1	C ₁₁	C ₁₂	C ₁₃	a ₁
O2	C ₂₁	C ₂₂	C ₂₃	a ₂
O3	C ₃₁	C ₃₂	C ₃₃	a ₃
Demand	b ₁	b ₂	b ₃	

9. What you mean by degeneracy in transportation problem?
10. Define assignment problem.





11. Define pay off matrix.
12. What do you mean by zero sum game?

(10×2=20)

Part B

*Answer any six questions.
Each question carries 5 marks.*

13. Explain the nature of operation research and its limitation.
14. Differentiate between deterministic model and probabilistic model.
15. Solve the following problem graphically

$$\begin{aligned} \text{Max } Z &= 3x_1 + 4x_2 \\ \text{Subject to } x_1 + x_2 &\leq 450 \\ 2x_1 + x_2 &\leq 600 \\ x_1 \geq 0, x_2 &\geq 0 \end{aligned}$$

16. Solve the following problem by simplex method

$$\begin{aligned} \text{Max } Z &= 3x + 5y \\ \text{Subject to } 3x + 2y &\leq 18 \\ x &\leq 4 \\ y &\leq 6 \\ x \geq 0, y &\geq 0 \end{aligned}$$

17. Find the initial basic feasible solution of the following transportation problem using the Least cost method.

	D1	D2	D3	D4	Supply
O1	6	4	1	5	14
O2	8	9	2	7	16
O3	4	3	6	2	5
Demand	6	10	15	4	35

18. Obtain an initial basic feasible solution of the following T P using VAM

		Destinations				
Sources		1	2	3	4	Supply
1		21	16	15	3	11
2		17	18	14	23	13
3		32	27	18	41	19
Demand		6	10	12	15	

19. Write the difference between a transportation problem and an assignment problem?





20. For what values of m , the game with the following matrix is determinable?

$$\begin{matrix} & \text{Player B} \\ \text{Player A} & \begin{bmatrix} m & 6 & 2 \\ -1 & m & -7 \\ -2 & 4 & m \end{bmatrix} \end{matrix}$$

21. In a game matching coins with two players, suppose A wins one unit of value when there are two heads, wins nothing when there are two tails and loses $1/2$ unit of value when there is one head and one tail. Determine the pay off matrix, best strategies and value of the game.

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **15** marks.

22. a) An animal feed company must produce at least 200kgs of a mixture consisting of ingredients X_1 and X_2 daily. X_1 costs Rs.3 per kg and X_2 Rs.8 per kg. No more than 80 kg of X_1 can be used and atleast 60 kgs of X_2 must be used. Formulate a mathematical model to the problem. Solve it graphically.

b) Explain the applications of LPP in industry and management.

23. Solve the following assignment problem

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

24. The owner of a small machine shop has four machines available to assign to jobs for the day. Five jobs are offered with expected profit in Rupees for each machines on each job as follows:

		Jobs				
Machines	A	B	C	D	E	
1	62	78	50	101	82	
2	71	84	61	73	59	
3	87	92	111	71	81	
4	48	64	87	77	80	

Determine the assignment of machines to jobs that will result in a maximum profit.





25. (a) Explain the principle of dominance in game theory.
(b) Following is the pay off matrix for the players A and B

		Player B				
		2	4	3	3	4
<i>Player A</i>		5	6	3	7	8
		6	7	9	8	7
		4	2	8	4	3

(2×15=30)

