21101051

QP CODE: 21101051

Reg No : .....

Name : .....

BCA DEGREE (CBCS) EXAMINATION , MARCH 2021

Fourth Semester

Bachelor of Computer Application

Complementary Course - MM4CMT03 - OPERATIONS RESEARCH

2017 ADMISSION ONWARDS

18834BFA

Time: 3 Hours Max. Marks : 80

Part A

*Answer any **ten** questions.*

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

1. State the features of operation research.
2. Explain the use of OR in Agriculture field.
3. Describe any 2 limitations of OR.
4. What do you mean by Physical model? Give any 2 examples.
5. List the basic assumptions of linear programming problems.
6. What are slack and surplus variables?
7. Why BigM method is called method of penalities?
8. List any two methods to find intial BFS of a transportation problem.
9. How do you find the penalty in Vogel's approximation method?
10. Write the general effective matrix of an assignment problem.
11. What do you mean by principle of dominance in game theory?
12. What do you mean by zero sum game?

(10×2=20)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Define OR. Explain the origin of OR.
14. Explain at least four functions of operation research

15. An animal feed company must produce at least 200 kgs 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.

16. Show that the solution to the following L.P.P. is unbounded

Max Z= 2x+3y

Subject to $x-y \leq 0$

$x+y \geq 4$

$x \geq 0, y \geq 0$

17.

Factories\Warehouses	W1	W2	W3	W4	Supply
F1	10	18	11	7	20
F2	9	12	14	6	40
F3	8	9	12	10	35
Demand	16	18	31	30	

Formulate the above problem as an LPP.

18. Solve the following Assignment problem

Job/Man	1	2	3	4	5
I	12	8	7	15	4
II	7	9	17	14	10
III	9	6	12	6	7
IV	7	6	14	6	10
V	9	6	12	10	6

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

20. What do you mean by minimax and maximin principle?

21. Find the saddle point and solve the game

$$\begin{array}{c} \\ Player\,A \end{array} \begin{array}{c} \textbf{\textit{Player B}} \\ \begin{bmatrix} 15 & 2 & 3 \\ 6 & 5 & 7 \\ -7 & 4 & 0 \end{bmatrix} \end{array}$$

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

22. A company produces two types of products say type A and B. Product B is superior quality and product A is of lower quality. Profits on the two types of products are rs. 30 and Rs. 40 respectively. The dataon resource required, and available of resources are given below:

	Requirement		Capacity
	Product A	Product B	
Raw materials (kg)	60	120	12000
Machining (hours per piece)	8	5	600
assembly(Man hour)	3	4	500

Solve using Graphically.

23. Find the optimal solution of the following

	D1	D2	D3	D4	Supply
O1	6	4	1	5	14
O2	8	9	2	7	16
03	4	3	6	2	5
Demand	6	10	15	4	35

24. A steel company has three open hearth furnaces and five rolling mills . Transportation cost (rupees per quintal) for shipping steel from furnaces to rolling mills are shown in the following table.

Rolling Mills					
	M1	M2	M3	M4	Capacities
F1	6	1	9	3	70
F2	11	5	2	8	55
F3	10	12	4	7	70
Requirement	85	35	50	70	

25. (a) Explain probability method of solving a mixed strategy problem in game theory.
(b) Consider a modified form of "Matching based coins" game problem. The matching player A is paid Rs. 8 if two coins turn both heads and Re. 1 if both coin turn tails. B is paid Rs. 3 when the two coin does not match. Given the choice of being A or B, and what would be your strategy.

(2×15=30)