**QP CODE: 19101592**

19101592

Reg No : .....

Name : .....

**BCA DEGREE (CBCS) EXAMINATION , MAY 2019**

**Fourth Semester**

Bachelor of Computer Application

**Complementary Course - MM4CMT03 - OPERATIONS RESEARCH**

2017 ADMISSION ONWARDS

BE49AE19

**Maximum Marks: 80** **Time: 3 Hours**

## Part A

Answer any **ten** questions.

Each question carries **2** marks.

1. What is operation research?
2. Explain the use of OR in Agriculture field.
3. How OR is useful to the personnel management.
4. What you mean by Iconic model.? Give any 2 examples.
5. What are the uses of linear programming in management?
6. Define objective function. What you mean by constraints.
7. What you mean by degeneracy in LPP.
8. What you mean by Non- Degenerate basic feasible solution in Transportation Problem.
9. How to convert a Maximisation transportation problem to Minimisation?
10. What you mean by unbalanced assignment problem?
11. Define saddle point.
12. What is two person zero sum game.

(10×2=20)

## Part B

Answer any **six** questions.

Each question carries **5** marks.

13. Discuss four characteristics of operation research
14. Explain the nature of operation research and its limitation

15. Solve graphically the following problem

Max Z= 3x+5y

Subject to $x+y \leq 2000$

$x+y \geq 1500$

$x \geq 600$

$x \geq 0 y \geq 0$

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. Find the intial bfs to the transportation problem given below, by northwest corner rule

| Destination | | | | |
|---|---|---|---|---|
| Origins | D1 | D2 | D3 | Supply |
| O1 | 2 | 7 | 4 | 5 |
| O2 | 3 | 3 | 1 | 8 |
| O3 | 5 | 4 | 7 | 7 |
| O4 | 1 | 6 | 2 | 14 |
| Demand | 7 | 9 | 18 | |

18. Find the intial basic feasible solution of the following transportation problem using the Vogel's Approximation method

| | 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 |

19. Three accountants are to be assigned to three projects. The assignment costs in units of $1000 are in the table below:

| Projects | | | |
|---|---|---|---|
| | P1 | P2 | P3 |
| A1 | 15 | 9 | 12 |
| A2 | 7 | 5 | 10 |
| A3 | 13 | 4 | 6 |

Give assignments so that the total cost is minimum

20. What are the assumptions of a game?

21. Solve the game by probability method.

***Player B***

$$Player A \begin{bmatrix} 8 & 5 \\ 2 & 6 \end{bmatrix}$$

(6×5=30)

## Part C

Answer any **two** questions.

Each question carries **15** marks.

22. Solve the following L. P problem using Big M method Min Z= $3x_1 + 8x_2$

Subject to $x_1 + x_2 = 200$

$x_1 \leq 20$

$x_2 \geq 60$

$x_1 \geq 0, x_2 \geq 0$

23. Find the optimal solution of the following TP

| Destinations | | | | | |
|---|---|---|---|---|---|
| Origin | A | B | C | D | Supply |
| 1 | 1 | 5 | 3 | 3 | 34 |
| 2 | 3 | 3 | 1 | 2 | 15 |
| 3 | 0 | 2 | 2 | 3 | 12 |
| 4 | 2 | 7 | 2 | 4 | 19 |
| Demand | 21 | 25 | 17 | 17 | |

24. a)Define Assignment problem. What you mean by effective matrix of an assignment problem. Write the mathematical representation of an assignment problem.

b)

| Job | | | | |
|---|---|---|---|---|
| Workers | | x | y | z |
| | A | 18 | 17 | 16 |
| | B | 15 | 13 | 14 |
| | C | 19 | 20 | 21 |

Formulate this assignment problem as an LPP.

25. (a) Explain the principle of dominance in game theory.

(b) Solve the game whose pay off matrix is given by

***Player B***

$$Player\,A \begin{bmatrix} 2 & 4 & 3 & 4 \\ 5 & 6 & 3 & 8 \\ 6 & 7 & 9 & 7 \\ 4 & 2 & 8 & 3 \end{bmatrix}$$

(2×15=30)