

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2023
(Supplementary- 2018 Admission)

BCA
CBCA2C04T: OPERATIONS RESEARCH

Time: 3 Hours

Maximum Marks: 80

PART A: Answer all the questions. Each carries one mark.

1. What is an artificial variable?
2. Comment on feasible region.
3. Define total float.
4. What is unbalanced transportation problem?
5. Define Optimal Solution.
6. What do you mean by assignment problem?
7. Define sequencing problem.
8. Which method is used for solving Assignment Problem?
9. What is predecessor activity?
10. Write the advantages of Graphical Method.

(10 x 1=10 Marks)

PART B: Answer all the questions. Each carries two marks.

11. Explain Travelling salesman problem.
12. How to construct a simplex table?
13. State the rules for drawing network diagram.
14. Write any two applications of Network technique.
15. Explain the features of Operations Research.
16. What is an objective function?
17. Define LFT.
18. Explain the process of n jobs through 3 machines.

(8 x 2 = 16 Marks)

PART C: Answer any six questions. Each carries four marks.

19. What is the row reduction method in assignment problem?
20. Explain the procedure of assignment problem.
21. Formulate the dual of the LPP:

$$\text{Maximize } Z = x_1 - 2x_2 + 3x_3$$

$$\text{Subject to } 2x_1 + x_2 + 3x_3 = 2$$

$$2x_1 + 3x_2 + 4x_3 = 1$$

$$x_1, x_2, x_3 \geq 0$$

(PTO)

22. Explain the procedure of two phase method.
23. Define transportation problem. Give its mathematical formulation.
24. Describe the procedure for solving two jobs through machine
25. Define Operation research and explain its limitation.
26. Write the uses of Linear Programming Problem.
27. Discuss the steps involved in VAM and MODI method.

(6 x 4 = 24 Marks)

PART D: Answer any three questions. Each carries ten marks.

28. Solve the linear programming problem using Two phase method

$$\text{Max } Z = 3x_1 - x_2$$

$$\text{Subject to } 2x_1 + x_2 \leq 2; x_1 + 3x_2 \geq 3; x_2 \leq 4; x_1, x_2 \geq 0$$

29. Solve the following minimal assignment problem:

15	13	14	17
11	12	15	13
13	12	10	11
15	17	14	16

30. Construct the network diagram and identify the critical path and find the minimum time of completion of the project when time is in days of each task is as follows:

Activity	1 - 2	1 - 3	1 - 4	2 - 4	2 - 6	3 - 5	3 - 6	4 - 5	5 - 6
Duration	8	8	10	10	16	18	14	17	9

31. What are the phases of Operations Research and explain the areas where operations research is used?
32. Find the initial basic feasible solution of the given transportation problem using NWCM:

	D ₁	D ₂	D ₃	D ₄	Supply
O ₁	1	2	1	4	30
O ₂	3	3	2	1	50
O ₃	4	2	5	9	20
Demand	20	40	30	10	

(3 x 10 = 30 Marks)