

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2024
(Regular/Improvement/Supplementary)

BCA

GBCA2C04T: OPERATIONS RESEARCH

Time: 2 Hours

Maximum Marks: 60

SECTION A: Answer the following questions. Each carries *two* marks.

(Ceiling 20 Marks)

1. What is critical path?
2. Write the Mathematical model of a LPP.
3. List out any two limitations of Operation Research.
4. Define assignment problem.
5. What is an unbalanced transportation problem?
6. Comment on artificial variable.
7. What do you understand by degeneracy in transportation problem?
8. What is feasible region?
9. How to find the dual of a given primal?
10. What is an optimal solution in transportation problem?
11. Give an account on travelling salesman problem.
12. What is an iconic model?

SECTION B: Answer the following questions. Each carries *five* marks.

(Ceiling 30 Marks)

13. Write the dual of the following LPP:

$$\text{Maximize } Z = 4x_1 + 3x_2$$

$$\text{Subject to } 2x_1 + 3x_2 \leq 16$$

$$4x_1 + x_2 \geq 10$$

$$x_1, x_2 \geq 0$$

14. Solve graphically:

$$\text{Minimize } Z = 60x + 50y$$

$$\text{Subject to } 4x + 8y \geq 80, 10x + 4y \geq 100, x, y \geq 0$$

15. Solve the Assignment Problem given below:

Worker \ Job	A	B	C	D	E
1	2	4	9	3	6
2	3	5	8	5	7
3	4	6	7	8	8
4	5	7	6	4	5
5	6	8	5	7	9

(PTO)

16. How to construct a simplex table?
 17. What are the differences between transportation problem and assignment problem?
 18. Find the optimum sequencing for the following problem to minimize time and also obtain total elapsed time:

JOB	A	B	C
1	8	9	12
2	13	8	12
3	10	12	11
4	14	7	7

19. Solve the following transportation problem by VAM:

	P	Q	R	Demand
A	4	14	8	10
B	6	6	2	16
C	10	8	14	14
D	2	12	4	28
Supply	14	18	36	

SECTION C: Answer any one question. Each carries ten marks.

20. i) Give an Account of the following:
 a) Least Cost Method. b) Big M Method.
- ii) An animal feed company must produce at least 150 kgs. of a mixture consisting of ingredients X1 and X2 daily. X1 costs Rs. 5 per kg and X2 Rs 7 per kg. No more than 70 kg of X1 can be used and atleast 50 kgs of X2 must be used. Formulate the mathematical model to the problem.
21. Draw the network diagram for the following table of Activity and Duration and find:
 i) EST,EFT,LST and LFT of all the activities.
 ii) The critical path.
 iii) Total Project Duration.

Activity	1-2	2-3	2-4	3-5	3-6	4-6	4-7	5-8	6-8	7-8
Duration	10	6	4	12	2	8	4	15	14	8

(1 x 10 = 10 Marks)