

D 124428

(Pages : 3)

Name.....

Reg. No.....

**SECOND SEMESTER (CBCSS-UG) DEGREE SUPPLEMENTARY
EXAMINATION, APRIL 2025**

BCA

BCA 2C 04—OPERATIONS RESEARCH

(2019 Syllabus)

Time : Two Hours

Maximum : 60 Marks

Section A - Short Answer Type*All questions can be answered.**Each question carries 2 marks, Ceiling 20 marks.*

1. Write any two applications of OR.
2. What are the limitations of operation research?
3. What do you mean by models in OR?
4. Define Linear programming problem.
5. What are the characteristics of linear programming problems?
6. Write the standard form of the following problem.

$$\text{Maximize } Z = 3x_1 + 2x_2 + 5x_3$$

Subject to,

$$x_1 + 2x_2 + x_3 \leq 430$$

$$3x_1 + 2x_3 \leq 460$$

$$x_1 + 4x_3 \leq 420$$

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

7. What is degeneracy in transportation problems?
8. Write the short note on Lowest cost entry method.
9. What is travelling sales man problem?
10. Write the mathematical model of an assignment problem.
11. Give a brief notes on event, merge event, burst event and head event.
12. Write applications of Network analysis.

(Ceiling 20 marks)

Turn over

Section B - Paragraph/Problem Type*All questions can be answered.**Each question carries 5 marks, Ceiling 30 marks.*

13. Explain the role of OR in decision making.
14. Find the initial basic feasible solution for the transportation problem using NWCM.

Origin	Destination				Available
	D1	D2	D3	D4	
01	1	2	1	4	30
02	3	3	2	1	50
03	4	2	5	9	20
Required	20	40	30	10	

15. Find the optimum solution to the following problem showing the cost (Rs.) for assigning workers to jobs.

Workers	Job		
	X	Y	Z
A	18	17	16
B	15	13	14
C	19	20	21

16. Write a note on network analysis. Explain how network analysis useful for large complex projects.
17. The standard weight of a special purpose brick is 5 kg and it contains two basic ingredients B1 and B2. B1 costs Rs. 5/kg and B2 costs Rs. 8/kg. Strength considerations dictate that the brick contains not more than 4 kg of B1 and a minimum of 2 kg of B2. Since the demand for the product is likely to be related to the price of the brick, find out graphically the minimum cost of the brick satisfying the above conditions.
18. Distinguish between transportation problem and assignment problem.
19. Write a short note on CPM.

(Ceiling 30 marks)

Section C - Essay Type

Answer any **one** of the following questions.
The question carries 10 marks.

20. A small project consisting of ten activities has the following characteristics: Time estimates in weeks :

Activity	A	B	C	D	E	F	G	H	I	I
Preceding activity	–	–	A	A	A	C	D	B, E	H	F, G, I
Optimistic time	4	1	2	3	2	1.5	1.5	2.5	1.5	1
Most likely time	5	1.5	3	4	3	2	3	3.5	2.5	2
Pessimistic time	12	5	4	11	4	2.5	4.5	7.5	2.5	3

Draw the PERT network for the project and determine the critical path.

21. A fertilizer is marketed in polythene bags weighing at least 80 kg. Each bag of fertilizer consists of a mixture of two ingredients-nitrate and phosphate. The cost of nitrate is Rs. 40/- per kg and the cost of phosphate is Rs. 25/- per kg. Every bag must contain at least 1,500 gm of ammonia. The ammonia content in 1kg of nitrate is 20gm and in 1 kg of phosphate is 12 gm. Determine the optimum mix of phosphate and nitrate in a bag of fertilizer that will minimize the total cost.

(1 × 10 = 10 marks)