

C 82409

(Pages : 4)

Name.....

Reg. No.....

SECOND SEMESTER B.A./B.Sc. DEGREE EXAMINATION, APRIL 2020

(CBCSS—UG)

B.C.A.

BCA 2C 04—OPERATIONS RESEARCH

(2019 Admissions)

Time : Two Hours

Maximum : 60 Marks

Section A (Short Answer Type Questions)

Answer all the questions.

Each question carries maximum of 2 marks.

Ceiling 20 marks.

1. Write any *two* applications of OR ?
2. What do you mean by an objective function of an LPP ?
3. What are the basic assumptions of a LPP ?
4. What do you mean by an artificial variable ?
5. What do you mean by basic feasible solution of a Transportation problem ?
6. What are Assignment problems ?
7. Define Travelling salesman problem.
8. What do you mean by Degeneracy in a TP ?
9. What is network analysis ?
10. What is meant by a Critical path ? Why should we know which activities are critical ?
11. What is dummy activity ?
12. Distinguish between 'Slack' and 'float'.

(Ceiling : 20 marks)

Turn over

Section B (Short Essay Type Questions)

*Answer all the questions.
Each question carries 5 marks.
Ceiling 30 marks.*

13. What are the limitations of OR ?

14. Solve Graphically :

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

$$\text{subjected to : } x_1 + 2x_2 \leq 2,000$$

$$x_1 + x_2 \leq 1,500$$

$$x_2 \leq 600$$

$$x_1, x_2 \geq 0.$$

15. A manufacturer of furniture makes two products, chairs and tables. Processing of these products is done on two machines A and B. A chair requires 2 hours on machine A and 6 hours on machine B. A table requires 5 hours on machine and no time on machine B. There are 16 hours of time per day available on machine A and 30 hours on machine B. Profit gained by the manufacturer from a chair is Re. 1 and from a table is Rs. 5 respectively. Formulate the problem into a LPP in order to maximise the total profit ?

16. Find the initial solution of the following TP by using Lowest cost entry method :

| | D ₁ | D ₂ | D ₃ | Supply |
|----------------|----------------|----------------|----------------|--------|
| O ₁ | 2 | 7 | 4 | 5 |
| O ₂ | 3 | 3 | 1 | 8 |
| O ₃ | 5 | 4 | 7 | 7 |
| O ₄ | 1 | 6 | 2 | 14 |
| Demand | 7 | 9 | 18 | |

17. Find the optimal solution to the following Assignment problem showing the cost for assigning workers to jobs :

| | x | y | z |
|---------|----|----|----|
| Workers | 18 | 17 | 16 |
| | 15 | 13 | 14 |
| | 19 | 20 | 21 |

18. Draw a network diagram to the following set of activities :

| <i>Activities</i> | <i>Proceeding activities</i> |
|-------------------|------------------------------|
| A | ----- |
| B | ----- |
| C | A |
| D | A |
| E | B and C |
| F | B and C |
| G | B and C |
| H | D and E |
| I | F |
| J | F |
| K | G |
| L | H and I |
| M | H and I |
| N | J, K and L |

19. Distinguish between PERT and CPM.

(Ceiling : 30 marks)

Section C (Essay Type Questions)

*Answer any one question.
Each question carries 10 marks.*

20. Solve the following LPP by using Two-phase simplex method :

$$\text{Maximize } Z = 5x_1 + 8x_2$$

$$\text{subjected to } 3x_1 + 2x_2 \geq 3$$

$$x_1 + 4x_2 \geq 4$$

$$x_1 + x_2 \leq 5 : x_1, x_2 \geq 0.$$

Turn over

21. Solve the following minimal assignment problems :

| | I | II | III | IV | V |
|---|---|----|-----|----|---|
| A | 1 | 3 | 2 | 3 | 6 |
| B | 2 | 4 | 3 | 1 | 5 |
| C | 5 | 6 | 3 | 4 | 6 |
| D | 3 | 1 | 4 | 2 | 2 |
| E | 1 | 5 | 6 | 5 | 4 |

(1 × 10 = 10 marks)

