C 4353 **(Pages : 4)** **Name.....**

Reg. No.....

SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2021

B.C.A.

BCA 2C 04—OPERATIONS RESEARCH

Time : Two Hours Maximum : 60 Marks

Section A (Short Answer Type Questions)

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

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'.

(8 × 3 = 24 marks)

Section B (Short Essay Type Questions)

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. What are the limitations of OR ?

Turn over

14. Solve Graphically :

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

$$\text{subjected to } x_1 + 2x_2 \leq 2000 ;$$

$$x_1 + x_2 \leq 1500 ;$$

$$x_2 \leq 600 ;$$

$$x_1, x_2 \geq 0.$$

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 :

$$\begin{array}{c} \\ \text{Workers} \end{array} \begin{array}{c} \begin{array}{ccc} x & y & z \end{array} \\ \begin{bmatrix} 18 & 17 & 16 \\ 15 & 13 & 14 \\ 19 & 20 & 21 \end{bmatrix} \end{array}.$$

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

Activities	*Preceeding activities*
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.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*

The question carries 11 *marks.*

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

Maximize $Z = 5x_1 + 8x_2$

subjected to : $3x_1 + 2x_2 \geq 3$

$x_1 + 4x_2 \geq 4$

$x_1 + x_2 \leq 5$

$x_1, x_2 \geq 0.$

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 × 11 = 11 marks)