C 43147 **(Pages : 4)** **Name.....**

Reg. No.....

SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2023

B.C.A.

BCA 2C 04—OPERATIONS RESEARCH

(2019—2022 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answer Type Questions)

Answer **all** *questions.*
Each question carries 2 *marks.*
Ceiling 20 *marks.*

1. Define Operations Research ?
2. Write any *two* applications of OR.
3. What is Surplus variable ?
4. What are the basic assumptions of LPP ?
5. What do you mean by Transhipment Problem ?
6. What do you mean by basic feasible solution of a Transportation problem ?
7. Define Travelling salesman problem.
8. Write down mathematical formulation of assignment problem.
9. Define total float, free float and independent float.
10. What is sequencing problem ?
11. Define no passing rule on sequencing problem.
12. Define Degeneracy in Transportation problem.

Turn over

Section B (Short Essay Type Questions)

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

13. Explain the role of operation research in decision-making.

14. Solve the following LPP by Graphically :

Maximize $Z = X_1 + 3X_2$
subject to constraints
$X_1 + 2X_2 \leq 9$
$X_1 - X_2 \geq 2$
$X_1 + 4X_2 \leq 11$
$X_1, X_2 \geq 0.$

15. Solve LPP using simplex method :

Maximize $Z = 2X_1 + 3X_2$
subject to constraints
$X_1 + 2X_2 \leq 6$
$2X_1 + X_2 \leq 8$
$X_1, X_2 \geq 0.$

16. Obtain Initial basic feasible solution of the following Transportation problem using North West Corner rule :

	D_1	D_2	D_3	D_4	Supply
S_1	1	2	1	4	30
S_2	3	3	2	1	50
S_3	4	2	5	9	20
Demand	20	40	30	10	

17. Find the initial solution of the following Transportation Problem by using Least Cost 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	

18. Solve the following assignment problem :

	1	2	3	4	5
A	8	4	2	6	1
B	0	9	5	5	4
C	3	8	9	2	6
D	4	3	1	0	3
E	9	5	8	9	5

19. Compare PERT and CPM.

Section C (Essay Type Questions)

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

20. Solve LPP using simplex method :

Maximize $Z = 2X_1 + 3X_2$
subject to constraints

$$X_1 + X_2 \leq 4$$
$$-X_1 + X_2 \leq 1$$
$$X_1 + 2X_2 \leq 5$$
$$X_1, X_2 \geq 0.$$

Turn over

21. Solve the following transportation problem and determine optimal allocation :

	D_1	D_2	D_3	D_4	Supply
S_1	21	16	25	13	11
S_2	17	18	14	23	13
S_3	32	27	18	41	19
Demand	6	10	12	15	

(1 × 10 = 10 marks)