

**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 A 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 <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	Supply
O <sub>1</sub>	2	7	4	5
O <sub>2</sub>	3	3	1	8
O <sub>3</sub>	5	4	7	7
O <sub>4</sub>	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

Draw a network diagram to the following set of activities

<i>Activities</i>	<i>Preceding 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

Distinguish between PERT and CPM.

### Section C

Answer any **one** question

The question carries 11 marks

Solve the following LPP by using Two-phase simplex method

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

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

$$x_1 + 4x_2 \geq 4$$

$$x_1 + x_2 \leq 5$$

$$x_1, x_2 > 0.$$

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)

DashScholar