D2BCA2203 (PAGES 2) Reg.No...........................

Name: ....

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2023
(Regular/Improvement/Supplementary)

BCA
GBCA2C04T: OPERATIONS RESEARCH

Time: 2 Hours Maximum Marks: 60

SECTION A: Answer the following questions. Each carries *two* marks.
(Ceiling 20 Marks)

1. What is analogue model? Give an example.
2. Write the primal form of the following LPP

$$Max : Z = 3x_1 + x_2 + 2x_3$$
$$s.t \quad x_1 + x_2 + x_3 \leq 5$$
$$2x_1 + x_3 \geq 10$$
$$x_2 + 3x_3 \leq 15$$
$$x_1, x_2, x_3 \geq 0$$

3. What are transportation problems?
4. Give any two advantages of a model.
5. Write a short note on Least Cost entry method.
6. Find the initial feasible solution to the following Transportation problem using North West corner rule.

From	To I	II	Supply
1	2	7	5
2	5	5	7
3	1	6	13
Demand	15	10	

7. How will you solve maximization problem using assignment techniques?
8. Give any two differences between transportation problem and assignment problem.
9. Give any two network techniques.
10. How do we represent activities and events on a network diagram?
11. Define Latest Start Time.
12. Give the formula to find the expected time for each activity.

SECTION B: Answer the following questions. Each carries *five* marks.
(Ceiling 30 Marks)

13. Write a short note on various techniques of O.R
14. "O.R is the art of finding bad answers where worse exists". Comment.
15. Write the dual of $Max : Z = 3x_1 + x_2 + 2x_3$

$$s.t \quad x_1 + x_2 + x_3 \leq 5$$
$$2x_1 + 4x_3 = 10$$
$$x_2 + 3x_3 \leq 15$$
$$x_1, x_2, x_3 \geq 0$$

(PTO)

16. Solve the following assignment problem.

Job

	I	II	III	IV
A	12	30	21	15
Workers B	18	33	9	31
C	44	25	21	21
D	14	30	28	14

17. Solve the following assignment problem

	I	II	III	IV	V
A	10	12	16	11	12
B	13	10	--	11	10
C	--	12	15	12	8
D	15	9	13	8	9

18. For the set of data given below, determine the sequence that minimizes the total elapsed time for the five jobs.

Job :	1	2	3	4	5
Time on machine A :	5	1	9	3	10
Time on machine B :	2	6	7	8	4

19. The following table gives the activities in a construction project and other relevant information.

Activity (i - j)	1-2	1-3	1-4	2-5	3-5	3-6	4-6	5-6
Time duration	16	13	12	18	15	10	14	15

1) Construct network diagram.
2) Find Total float for each activity.
3) Which are the critical activities?

SECTION C: Answer any *one* question. Each carries *ten* marks.

20. Solve the following problem using simplex method.

Max: $Z = 6x_1 + 4x_2$

Subject to $-2x_1 + x_2 \leq 2$

$$x_1 - x_2 \leq 2$$
$$3x_1 + 2x_2 \leq 9$$
$$x_1, \quad x_2 \geq 0$$

21. Solve the following problem to maximize the profit.

To

From	I	II	III	Supply
A	2	7	14	5
B	25	23	10	8
C	5	15	7	7
D	1	16	12	14
Demand	7	9	18	

(1 x 10 = 10 Marks)