23U203 (Pages: 3) Name: ………………………..

Reg. No: ……………………..

SECOND SEMESTER B.C.A. DEGREE EXAMINATION, APRIL 2024

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U BCA2 C04 – OPERATIONS RESEARCH

(Computer Application – Complementary Course)

(2019 Admission onwards)

Time: 2.00 Hours Maximum: 60 Marks

Credit: 3

Part A (Short answer questions)

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

1. Explain the term model in operations research.
2. What are the categories in the models by the extent of generality?
3. Define the basic feasible solution.
4. Name two methods that are employed for the solution of linear programming problems having artificial variables.
5. Find an initial basic feasible solution to the following T.P. by Least Cost method.

	I	II	III	Supply
I	7	5	9	10
II	5	6	2	25
III	4	3	8	8
Demand	12	18	13	

6. How do you convert an unbalanced transportation problem to a balanced one?
7. Given below is an assignment problem, write it as a transportation problem:

	A_1	A_2	A_3
R_1	1	2	3
R_2	4	5	1
R_3	2	1	4

8. What you mean by a maximization assignment problem?
9. What is the use of a dummy activity in a network?
10. Define total float in an activity.
11. A project schedule has to the following characteristics

Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-10	9-10
Days	4	1	1	1	6	5	4	8	1	2	5	7

From the above information construct a network diagram.

12. What do you mean by Idle time on a machine?

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

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

13. Rewrite in Canonical form the following linear programming problem

Minimize $z = 2x + y + 4z$

Subject to the constraints: $-2x + 4y \leq 4$,

$x + 2y + z \geq 5$,

$2x + 3y \leq 2$

$x, y \geq 0$ and z unrestricted in sign

14. Obtain the dual problem of the following primal problem:

Minimize $z = x - 3y - 2z$

Subject to $3x - y + 2z \leq 7$

$2x - 4y \geq 12$

$-4x + 3y + 8z = 10$

$x, y \geq 0$ and z is unrestricted.

15. Find an initial basic feasible solution to the following T.P. by Vogel's approximation method.

	1	2	3	4	Supply
A	3	7	6	4	50
B	2	4	3	2	20
C	4	3	8	5	30
Demand	30	30	20	20	

16. Write the Hungarian method for solving an assignment problem.

17. Solve the following travelling salesman problem to minimize the cost per cycle:

From	To				
	A	B	C	D	E
A	∞	2	5	7	1
B	6	∞	3	8	2
C	8	7	∞	4	7
D	12	4	6	∞	5
E	1	3	2	8	∞

18. What are the advantages of PERT?

19. Use the graphical method to minimize the time added to process the following jobs on the machines shown, that is for each machine find the job which should be done first. Also calculate the total time elapsed to complete both the jobs:

Job 1	Sequence	A	B	C	D	E
Job 1	Time	3	4	2	6	2
Job 2	Sequence	C	B	A	D	E
Job 2	Time	5	4	3	2	6

(Ceiling: 30 Marks)

Part C (Essay questions)

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

20. Solve Maximize $z = 2x + y$

Subject to $4x + 3y \leq 12$

$4x + y \leq 8$

$4x - y \leq 8$

$x, y \geq 0$

21. Solve the following T.P. to minimize the total cost.

	1	2	3	4	Supply
A	6	1	9	3	70
B	11	5	2	8	55
C	10	12	4	7	90
Demand	85	35	50	45	

(1 × 10 = 10 Marks)

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