E–0396

Sub. Code
1BCESA3

U.G. DEGREE EXAMINATION, APRIL 2019

Computer Science

Allied : RESOURCE MANAGEMENT TECHNIQUES

(CBCS – 2011 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A ($10 \times 2 = 20$)

Answer **all** questions.

1. What is the role of OR in industry?
2. Write the first two phases of OR.
3. Give the matrix form of an LPP.
4. What is the test of optimality?
5. What is duality?
6. Define an IPP.
7. Give any two applications of assignment problem.
8. Write the method to solve an assignment problem.
9. What is non-degenerate transportation problem?
10. What is Row minima method?

Part B ($5 \times 5 = 25$)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the different features of OR.

Or

(b) Describe the various methods used in OR.

12. (a) Solve graphically the following LPP.

Maximize $Z = 2x_1 + x_2$

Subject to the constraints

$x_1 + 2x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

$x_1 - 2x_2 \leq 1, \; x_1, x_2 \geq 0.$

Or

(b) Solve by simplex method.

Maximize $Z = x_1 - x_2 + 3x_3$

Subject to the constraints

$x_1 + x_2 + x_3 \leq 10$

$2x_1 - x_3 \leq 3$

$2x_1 - 2x_2 + 3x_3 \leq 0$

$x_1, x_2, x_3 \geq 0.$

13. (a) Using the duality theory solve.

Maximize $Z = 3x_1 + 4x_2$

Subject to the constraints

$x_1 - x_2 \leq 1$

$x_1 + x_2 \geq 4$

$x_1 - 3x_2 \leq 3; \; x_1, x_2 \geq 0$

Or

(b) Solve the IPP.

Maximize $Z = x_1 + 4x_2$

Subject to the constraints

$2x_1 + 4x_2 \leq 7$

$5x_1 + 3x_2 \leq 15$

$x_1, x_2 \geq 0$ and are integers.

14. (a) Explain the mathematical formulation of assignment problem.

Or

(b) Solve the following Assignment Problem.

	J_1	J_2	J_3	J_4
W_1	20	13	7	5
W_2	25	18	13	10
W_3	31	23	18	15
W_4	45	40	23	21

15. (a) Obtain an initial basic feasible solution to the following transportation problem using Vogels approximation method.

	D_1	D_2	D_3	D_4	
S_1	2	3	11	7	6
S_2	1	5	6	1	4
S_3	5	8	15	9	10
	8	6	3	3	

Or

(b) Explain unbalanced TP.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail on modeling in OR.

17. Solve using, two-phase simplex method.

Maximize $Z = 5x_1 + 8x_2$

Subject to the constraints

$3x_1 + 2x_2 \geq 3$

$x_1 + 4x_2 \geq 4$

$x_1 + x_2 \leq 5$

$x_1, x_2 \geq 0$

18. Solve by dual simplex method the following problem.

Minimize $Z = 2x_1 + 2x_2 + 4x_3$,

Subject to the constraints

$$2x_1 + 3x_2 + 5x_3 \geq 2$$
$$3x_1 + x_2 + 7x_3 \leq 3$$
$$x_1 + 4x_2 + 6x_3 \leq 5$$
$$x_1, x_2, x_3 \geq 0$$

19. Solve the following travelling salesman problem.

	A	B	C	D
A	∞	4	7	3
B	4	∞	6	3
C	7	6	∞	7
D	3	3	7	∞

20. Solve the following Transportation Problem.

	X	Y	Z	
A	8	7	5	60
B	6	8	9	70
C	9	6	5	80
	50	80	80	