

F-1734

Sub. Code

7BITA4

U.G. DEGREE EXAMINATION, APRIL 2019

Information Technology

Allied: OPERATION RESEARCH

(CBCS – 2017 onwards)

Time : 3 Hours

Maximum : 75 Marks

Part A

(10 × 2 = 20)

Answer **all** questions.

1. What is Operation Research?
2. What are the limitations of an O.R Model?
3. What is LPP?
4. Define Slack variable.
5. What is duality?
6. State Existence theorem of Duality.
7. Define an Unbalanced Assignment Problem.
8. What is the objective of traveling salesman problem?
9. Write the commonly used methods of finding BSF.
10. What is an unbalanced Transportation Problem?

Part B**(5 × 5 = 25)**Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the general methods of solving O.R Models.

Or

- (b) What are the scope of O.R?

12. (a) Explain the procedure for forming a LPP model.

Or

- (b) Solve the following LPP by the graphical method

$$\text{Maximize } Z = 3x_1 + 2x_2$$

Subject to

$$-2x_1 + x_2 \leq 1$$

$$x_1 \leq 2$$

$$x_1 + x_2 \leq 3$$

$$\text{and } x_1, x_2 \geq 0$$

13. (a) Find the dual of the LPP

$$\text{Maximize } Z = 3x_1 - x_2 + x_3$$

Subject to

$$4x_1 - x_2 \leq 8$$

$$8x_1 + x_2 + 3x_3 \geq 12$$

$$5x_1 - 6x_3 \leq 13$$

$$\text{and } x_1, x_2, x_3 \geq 0$$

Or

- (b) Explain the steps involved in Branch and Bound Method.

14. (a) Give the mathematical formulation of Assignment Problem.

Or

- (b) Write short notes on Travelling Salesman Problem.

15. (a) Solve the following by Least Cost Method

		To			
		D	E	F	Supply
From	A	6	4	1	50
	B	3	8	7	40
	C	4	4	2	60
Demand		20	95	35	

Or

- (b) Obtain an initial basic feasible solution to the following transportation problem using VAM.

		Store				
Warehouse		S ₁	S ₂	S ₃	S ₄	Availability
	A	5	1	3	3	34
	B	3	3	5	4	15
	C	6	4	4	3	12
	D	4	1	4	2	19
Demand		21	25	17	17	80

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the various phases in study of Operation Research.
17. Use Big -M Method to solve

$$\text{Minimize } Z = 4x_1 + 3x_2$$

Subject to

$$2x_1 + x_2 \geq 10$$

$$-3x_1 + 2x_2 \leq 6$$

$$x_1 + x_2 \geq 6$$

$$\text{and } x_1, x_2 \geq 0$$

18. Solve the following LPP using duality

$$\text{Minimize } Z = 2x_1 + 2x_2$$

Subject to

$$2x_1 + 4x_2 \geq 1$$

$$-x_1 - 2x_2 \leq -1$$

$$2x_1 + x_2 \geq 1$$

$$\text{and } x_1, x_2 \geq 0$$

19. Solve the following travelling salesman Problem:

	1	2	3	4	5
1	-	6	12	6	4
2	6	-	10	5	4
3	8	7	-	11	3
4	5	4	11	-	5
5	5	2	7	8	-

20. Solve the following transportation problem:

Origin	Destination						Supply
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	
O ₁	5	3	7	3	8	5	3
O ₂	5	6	12	5	7	11	4
O ₃	2	1	3	4	8	12	2
O ₄	9	6	10	5	10	9	8
Demand	3	3	6	2	1	2	