

NOVEMBER/DECEMBER 2019

BASC 32 – QUANTITATIVE TECHNIQUES-I

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Why we use Operation Research?
2. List any two models of OR?
3. Define LPP.
4. What is feasible solution?
5. What is the need of Big-M method?
6. Define Two-phase Technique.
7. What are the common methods to obtain an IBFS for TP?
8. Define balanced TP.



9. Define Assignment Problem.
10. How the unbalanced assignment problem convert into balanced assignment problem?

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions.

11. (a) Write a short note on the importance of operation research in marketing management.

Or

- (b) State the different types of models used in O.R.

12. (a) Use graphical method to solve the LPP.

Maximize $Z = 2x_1 + 4x_2$

$$x_1 + 2x_2 \leq 5,$$

Subject to the constraint $x_1 + x_2 \leq 4,$

$$x_1 + x_2 \geq 0,$$

Or

14. (a) Explain North-West Corner Rule with example.

Or

- (b) Obtain an Initial Basic Feasible Solution (IBFS) to following Transportation Problem using Least Cost Method.

	D1	D2	D3	D4	Supply
O1	1	2	1	4	30
O2	3	3	2	1	50
O3	4	2	5	9	20
Demand	20	40	30	10	

15. (a) Solve the following assignment problem to minimize cost in rupees.

	Men			
Tasks	E	F	G	H
A	18	26	17	11
B	13	28	14	26
C	38	19	18	15
D	19	26	24	10

Or

- (b) Give an algorithm (steps) to solve the assignment problem.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE Questions.

16. Discuss the various phases in the study of Operation Research.

17. Use simplex method to

$$\text{Minimize } Z = x_1 - 3x_2 + 2x_3$$

$$3x_1 - x_2 + 2x_3 \leq 7$$

$$-2x_1 + 4x_2 \leq 12$$

$$\text{Subject to } -4x_1 + 3x_2 + 8x_3 \leq 10$$

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

18. Solve the following LPP using Two Phase method.

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

$$3x_1 + 2x_2 \geq 3,$$

$$\text{Subject to } x_1 + 4x_2 \geq 4,$$

$$x_1 + x_2 \leq 5$$

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

19. Find the optimal transportation cost of the following matrix using least cost method for finding the critical Solution.

		Market				
		A	B	C	D	E
Factory	P	4	1	2	6	9
	Q	6	4	3	5	7
	R	5	2	6	4	8
Demand		40	50	70	90	90

20. Solve the following assignment problem.

	M1	M2	M3	M4	M5
J1	9	22	58	11	19
J2	43	78	72	50	63
J3	41	28	91	37	45
J4	74	42	27	49	39
J5	36	11	57	22	25

- (b) Mr. Suri has a 100 acre farm. He can sell all tomatoes, lettuce or radishes which are produced in the farm. The selling price of these three are Rs. 2.00 per kg for tomatoes, Rs. 0.5 a head for lettuce and Rs. 3.00 per kg for radishes. The average yield per — acre is 2000 kgs of tomatoes, 3000 heads of lettuce, and 1000 kgs of radishes. Fertilizer is available at Rs. 0.50 per kg and the amount required per acre is 100 kgs each for tomatoes and lettuce and 50 kgs for radishes. Labour required for sowing, cultivating and harvesting per acre is 5 man-days for tomatoes and radishes, and 6 man-days for lettuce. A total of 400 man-days of labour are available at Rs. 20.00 per man-day.

Formulate the problem as an L.P model.

13. (a) Describe briefly the Big-M method of solving a LPP with artificial variable.

Or

- (b) Solve LPP by M method

Minimize $Z = 4x_1 + x_2$

$$3x_1 + x_2 = 3,$$

Subject to $4x_1 + 3x_2 \geq 6,$

$$x_1 + 2x_2 \leq 4$$

$$x_1, x_2 \geq 0.$$