

ASSIGNMENT : 1

UNIT : 1 & 2 Exercise on definition, formulation of linear programming problems.

1. State the general rules for formulating a dual LP problem from its primal.
2. Nachiketa Corporation manufactures two products A1 & A2. The profit per unit of the two products is Rs.50 & Rs.60 respectively. Both the products require processing in three machines. Below table indicates the available machine hours per week & time required on each machine for one unit of A1 & A2. Formulate as a linear programming problem.
3. Explain the significance of any two assumptions of LPP.

ASSIGNMENT : 2

UNIT : 2 Exercise on Graphical solution of linear programming problems

1. Use graphical method to solve the following LPP .

$$\text{Maximize } Z=17 X_1 +15 X_2$$

$$\text{Subject to: } 15X_1 +25X_2 \leq 375$$

$$24X_1+11X_2 \leq 265$$

$$\text{All } X_1 , X_2 \geq 0$$

2. Use Graphical Method to Solve the Following LPP.

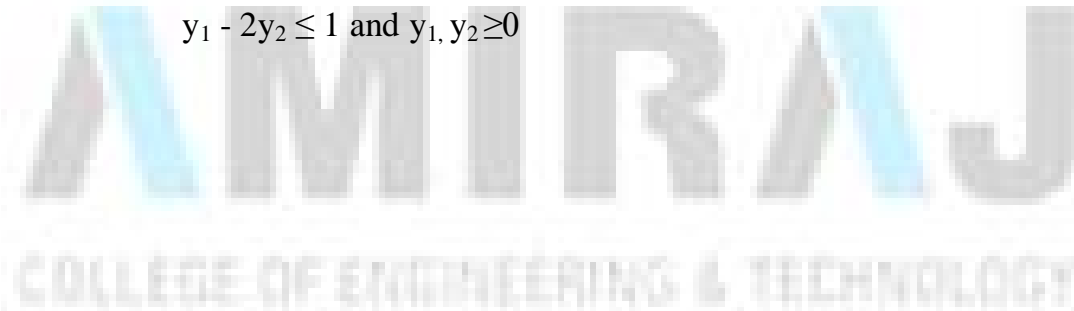
$$\text{Maximize } W = 2y_1 + y_2$$

$$\text{Subjected to } y_1 + 2y_2 \leq 10$$

$$y_1 + y_2 \leq 6$$

$$y_1 - y_2 \leq 2$$

$$y_1 - 2y_2 \leq 1 \text{ and } y_1, y_2 \geq 0$$



ASSIGNMENT : 3

UNIT : 2 Exercise and case problems on Simplex, Big M and Two phase LP Problems

1. Write the dual of the following linear programming problem.

$$\text{Minimize, } Z = 20 X_1 + 23 X_2$$

Subjected to,

$$-4X_1 - X_2 \leq -8$$

$$5X_1 - 3X_2 = -4$$

$$X_1, X_2 \geq 0$$

Solve the Dual problem using simplex method and predict the value of variables X_1, X_2 from the solution of dual linear programming problem.

2. Solve the following LPP by Big – M Method

$$\text{Maximize } Z = x_1 + 2x_2 + 3x_3 - x_4$$

$$\text{Subjected to } x_1 + 2x_2 + 3x_3 = 15$$

$$2x_1 + x_2 + 5x_3 = 20$$

$$x_1 + 2x_2 + x_3 + x_4 = 10 ; x_i \geq 0 ; i = 1, 2, 3, 4$$

ASSIGNMENT : 4

UNIT : 2 Exercise and case problems on Dual and Primal LP Problems

1. Find the dual of the following LPP.

$$\text{Maximize } Z = 4x_1 + 5x_2 + 12x_3$$

$$\text{Subjected to } 2x_1 + x_2 + 3x_3 \leq 4$$

$$3x_1 - 2x_2 + x_3 = 3 \text{ and } x_1, x_2, x_3 \geq 0$$

2. Find the dual of the following LPP.

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

$$\text{Subjected to } -x_1 + 3x_2 \leq 10$$

$$x_1 + x_2 \leq 6 \text{ and } x_1, x_2 \geq 0$$

ASSIGNMENT : 5

UNIT : 2 Exercise and case problems on Sensitivity Analysis

1. Explain Changes in Cost / Profit coefficient of decision variable.
2. What do you understand by sensitivity analysis? Discuss the effect of change in co-efficient of objective function.

ASSIGNMENT : 6

UNIT : 3 Exercise and case problems on Transportation and Transshipment Problems.

1. A Manufacturer wants to ship 8 loads of his product as shown in following matrix. The matrix gives the mileage from origins, O to the destinations, D. The shipping cost is Rs. 10 per load per mile. What will be the optimal schedule and optimal cost? Use Vogel's approximation method to find initial basis feasible solution and MODI method to obtain optimal solution.

	D ₁	D ₂	D ₃	Supply
O ₁	50	30	220	1
O ₂	90	45	170	3
O ₃	250	200	50	4
Demand	4	2	2	

2. Company has factories A1, A2 & A3 which supply to warehouses at W1, W2 & W3. Weekly factory capacities are 240, 200 & 130 units respectively. Weekly warehouses requirements are 190, 150 & 110 units respectively. Unit transportation costs Rs. As follows:- Find I.B.S. BY VAM method & Optimum solution BY MODI method.

	W ₁	W ₂	W ₃	SUPPLY
A ₁	16	20	12	240
A ₂	14	8	18	200
A ₃	26	24	16	130
DEMAND	190	150	110	450

ASSIGNMENT : 7

UNIT : 3 Exercise and case problems on Assignment and Travelling sales man Problems

1. Solve the following assignment problem by minimization method.

	I	II	III	IV	V
M1	12	5	9	18	11
M2	13	7	6	12	14
M3	3	2	3	4	5
M4	18	9	12	16	15
M5	12	6	14	19	10

2. The owner of a small machine shop has four machinists available. To assign jobs for the days. Five jobs are offered with the expected profit in rupees for each machinist on each job has been shown in matrix below. Find the assignment of machinists to jobs that will result in a maximum profit. Which job should be declined?

	JOB					
		A	B	C	D	E
MACHINIST	1	6.20	7.80	5.00	10.10	8.20
	2	7.10	8.40	6.10	7.30	5.90
	3	8.70	9.20	11.10	7.10	8.10
	4	4.80	6.40	8.70	7.70	8.00

ASSIGNMENT : 8

UNIT : 4 Exercise and case problems on Queuing theory

1. Explain the terms used in Queuing Model
2. Explain Kendall's Notation
3. List out the Component of Queuing System.

ASSIGNMENT : 9

UNIT : 7 Exercise and case problems on Game theory

1. Explain the Terms used in Game Theory.
2. Explain Matrix Reduction By Dominance.
3. Reduce the following matrix by Rule of Dominance

	B1	B2	B3	B4
A1	6	4	8	0
A2	6	8	4	8
A3	8	4	8	0
A4	0	8	0	16

ASSIGNMENT : 10

UNIT : 5 Exercise on Inventory model

1. The production department for a company requires 3500kg.of raw material for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs.35& the cost of carrying inventory is 25 percentage of the investment in the inventories. The price is Rs.10 per kg.The purchase manager wishes to determine an ordering policy for raw material. Calculate (1)The optimal lot size(2)The minimum yearly variable inventory cost(3)The optimal order cycle time(4)The minimum yearly total inventory cost.
2. Explain the following terms in connection with inventory management. (1) Re-order point (2) Safety stock (3) Lead time (4) Economic lot size (5) Carrying cost
3. The annual demand of a product is 15,000 units. Each unit cost Rs.50/- if the orders are placed in quantity below 150 units. For order of 200 and above the unit price is Rs.44/-. Assume inventory holding cost is 12% of the value of item and ordering cost is Rs.2/- per order find the economic lot size

ASSIGNMENT : 11

UNIT : 6 Exercise on Replacement theory

1. A firm is considering replacement of a machine whose cost price is Rs.12200& the scrap value Rs.200.The running costs are found from experience to be as follows. When should the machine be replaced?

YEAR	1	2	3	4	5	6	7	8
RUNING COST	200	600	700	1000	1200	1800	2500	4000

2. A Machine cost Rs. 500. Operation and Maintenance cost are Zero for the First Year and Increase by Rs. 100 Every Year. If Money is Worth 5% every Year, Determine the Best age at which the Machine Should be Replaced. The Resale Value of the Machine is Negligibly Small. What is the weighted average cost of owning and operating the Machine?

ASSIGNMENT : 12

UNIT : 9 Exercise and case problems on PERT/CPM

1. A Project is represented by the Network shown below & has the following data.
Determine(1)Expected Time &Variance(2)Earliest & Latest times to reach each event.(3)The critical path

TASK	A	B	C	D	E	F	G	H	I
OPTIMISTIC TIME	5	18	26	16	15	6	7	7	3
PESSIMISTIC TIME	10	22	40	20	25	12	12	9	5
MOST LIKELY TIME	8	20	33	18	20	9	10	8	4

2. Difference Between CPM & PERT.

