ASSIGNMENT : 1

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

1. State the general rules for formulating a dual LP problem for it's 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 require on each machine for one unit of A1 &A2.Formulate as linear programming problem.

3. Explain significance of any two assumptions of LPP.

ASSIGNMENT : 2

UNIT : 2 Exercise on Graphical solution of linear programing problems

1. Use graphical method to solve the following LPP .
   Maximize $Z = 17 X_1 + 15 X_2$
   Subject to: $15X_1 + 25X_2 \leq 375$
   $24X_1 + 11X_2 \leq 265$
   All X_1 , $X_2 \geq 0$
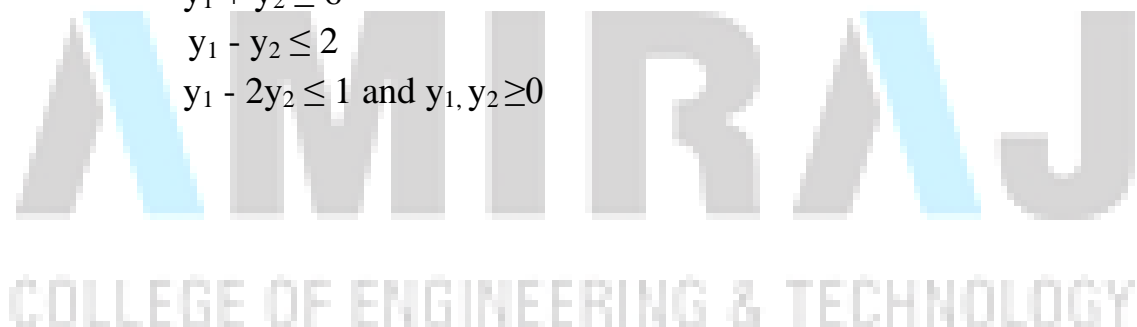
2. Use Graphical Method to Solve the Following LPP.
   Maximize $W = 2y_1 + y_2$
   Subjected to $y_1 + 2y_2 \leq 10$
   $\qquad y_1 + y_2 \leq 6$
   $\qquad y_1 - y_2 \leq 2$
   $\qquad y_1 - 2y_2 \leq 1$ and $y_1, y_2 \geq 0$

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.

   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 X1, X2 from the solution of dual linear programming problem.

2. Solve the following LPP by Big – M Method

   Maximize $Z = x_1 + 2 x_2 + 3x_3 - x_4$

   Subjected to $x_1 + 2 x_2 + 3x_3 = 15$

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

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

ASSIGNMENT : 4

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

1. Find the dual of the following LPP.
   Maximize $Z = 4x_1 + 5x_2 + 12x_3$
   Subjected to $2x_1 + x_2 + 3x_3 \leq 4$
   $3x_1 - 2x_2 + x_3 = 3$ and $x_1, x_2, x_3 \geq 0$

2. Find the dual of the following LPP.
   Maximize $Z = -x_1 + 2x_2$
   Subjected to $-x_1 + 3x_2 \leq 10$
   $x_1 + x_2 \leq 6$ 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 in 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 : 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 : 11

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.