

**Islington College****Module Code: MA4001NI Logic and Problem Solving  
Simplex Method for solving LPP****1. Solve the following LPP using simplex Method.**

a. Maximize  $Z = 3x_1 + 4x_2$

Subjected to,

$$x_1 + x_2 \leq 20$$

$$2x_1 + 3x_2 \leq 50$$

$$x_1, x_2 \geq 0$$

b. Maximize  $Z = 2x_1 + 3x_2$

Subjected to,

$$10x_1 + 20x_2 \leq 175$$

$$x_1 + 2x_2 \geq 50$$

$$x_1, x_2 \geq 0$$

c. Minimize  $Z = 3x_1 + 4x_2 + 5x_3$

Subjected to,

$$x_1 + x_2 + x_3 \geq 30$$

$$10x_1 + 15x_2 + 20x_3 \leq 600$$

$$x_1, x_2, x_3 \geq 0$$

2. Nepal Electric Corporation manufacturer's two electrical products: washing machine and large fans. The assembly process for each is similar in that both require a certain amount of wiring and drilling. Each washing machine takes 3 hours of wiring and 2 hours of drilling. Each fan must go through 2 hours of wiring and 1 hour of drilling. During the production period 240 hours of wiring time and up to 140 hours of drilling time may be used. Each washing machine sold yields a profit of Rs 5250. Each fan assembled may be sold for a Rs.2150 profit. Formulate and solve this LPP using simplex method.

3. A manufacturer makes two products P1 and P2 using two machines M1 and M2. Product P1 requires 5 hours on machine M1 and no time on machine M2, product P2 requires 1 hour on machine M1 and 3 hours on machine M2. There are 16 hours of time per day available on machine M1 and 30 hours on M2. Profit margin from P1 and P2 is Rs. 2 and Rs. 10 per unit respectively. What should be the daily production mix to maximize profit? Use the Simplex Method.

4. A dealer wishes to purchase a number of fans and electric iron. He has only Rs. 5760 to invest and has space for at most 20 items. A fan costs him Rs. 360 and an electric iron Rs. 240. His expectation is that he can sell a fan at a profit of Rs. 22 and electric iron at a profit of Rs. 18. Assuming that he can sell all the items that he can buy, how should he invest his money in order to maximize his profit? Use the Simplex Method.

5. A dietician in a teaching hospital is to arrange a special diet using three foods F1; F2 & F3. Each gram of Food F1 contains 20 units of calcium, 10 units of iron and

10 units of vitamin A, and 20 units of cholesterol. Each gm of food F2 contains 10 units of calcium, 10 units of iron, 20 units of vitamin A and 24 units of cholesterol. Each gm of food F3 contains 10 units of calcium, 10 units of iron, 10 units of vitamin A and 18 units of cholesterol. If the minimum daily requirements are 300 units of calcium, 200 units of iron, 240 units of vitamin A. How many grams of each food should be used to meet the minimum requirements at the same time minimizing the cholesterol intake. Use simplex method.

6. Chemicals Ltd. must produce 10,000 kgs. of a special mixture for a customer. The mix consists of ingredients A, B and C. A Costs Rs. 8 per kg., B costs Rs. 10 per kg. and C costs Rs. 11 per kg. No more than 35000 kgs of A can be used and at least 1,500 kgs. of B must be used. Also, at least 2,000 kgs of C is required. Calculate the number of kgs. For each ingredient to use in order to minimize total costs for 10,000 kgs.

-END-