

(Minimization Program)

* DIET PROBLEM

The management of hospitals in regard to the preparation of hospital diet menus in order to minimize the cost of diet ~~is~~ can be done with the use of linear programming technique. In a diet problem of linear programming (L.P), we are to find out the combination of food items which will satisfy the minimum daily requirement of nutrients and entails the least cost of diet.

Taking a simple diet problem of L.P where ~~a~~ a consumer consumes two goods (food items) X_1 and X_2 . Each of two goods contains three nutrients - Carbohydrate, protein, and minerals in fixed proportion per kg of each food item. The following table provides the detailed information.

Nutrients	Nutrients contents per unit of food		Minimum daily requirement of nutrient
	X_1	X_2	
Carbohydrate	1	2	3
Protein	1	4	4
Mineral	3	1	3
Price per kg	₹12	₹42	

The consumer has to decide and select the combination of x_1 and x_2 which will minimize the cost of diet and at the same time the daily requirement of nutrients is also satisfied. The above problem can be translated into a formal mathematical statement as

Minimize cost

$$C = 12x_1 + 42x_2$$

Subject to

$$x_1 + 2x_2 \geq 3$$

$$x_1 + 4x_2 \geq 4$$

$$3x_1 + x_2 \geq 3$$

$$x_1 \geq 0 \quad \& \quad x_2 \geq 0$$