Application of LPP for Solving Word Problems

SUBJECT : (Mathematics)
CHAPTER NUMBER: 12
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Example 1

A dietician wishes to mix two types of foods in such a way that vitamin contents of the mixture contain at least 8 units of vitamin a and 10 units of vitamin C. Food 'I' contains 2 units/ kg of vitamin and 1 unit/kg of vitamin c. Food 'II' contains 1 unit/kg of vitamin a and 2 units/ kg of vitamin C. It costs Rs. 50 per kg to purchase Food 'I' and Rs. 70 per kg to purchase Food 'II'. Formulate this problem as a linear programming problem to minimize the cost of such a mixture.

Example 2

A dietician has to develop a special diet using two foods P and Q. Each packet (containing 30 g) of food P contains 12 units of calcium, 4 units of iron, 6 units of cholesterol, and 6 units of vitamin A. Each packet of the same quantity of food Q contains 3 units of calcium, 20 units of iron, 4 units of cholesterol, and 3 units of vitamin A. The diet requires at least 240 units of calcium, at least 460 units of iron, and at most 300 units of cholesterol. How many packets of each food should be used to minimize the amount of vitamin A in the diet? What is the minimum amount of vitamin A?

Example 3 (Transportation Problem)

There are two factories located one at place P and the other at place Q. From these locations, a certain commodity is to be delivered to each of the three depots situations at A, B, and C. The weekly requirements of the depots are respectively 5, 5, and 4 units of the commodity while the production capacity of the factories at P and q are respectively 8 and 6 units. The cost of transportation per unit is given below.

From/To	Cost (in Rs)		
	A	B	C
P	160	100	150
Q	100	120	100

How many units should be transported from each factory to each depot so that the transportation cost is minimum? What will be the minimum transportation cost?

Assignments

1. A manufacturer produces nuts and bolts. It takes 1 hour of work on machine A and 3 hours on machine B to produce a package of nuts. It takes 3 hours on machine A and 1 hour on machine B to produce a package of bolts. He earns a profit of ₹ 17.50 per package on nuts and ₹ 7 per package on bolts. How many packages of each should be produced each day to maximize his profits, if he operates each machine for at most 12 hours a day? Formulate the above as an LPP and solve it graphically.

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