Example 3: (Production allocation problem)

A factory is engaged in manufacturing three products A, B and C which involve lathe work, grinding and assembling. The cutting, grinding and assembling times required for one unit of A are 2,1 and 1 hours repectively. Similarly, they are 3, 1, 3 hours for unit of B and 1,3,1 hours for one unit of C. The profits on A, B and C are Rs. 2, Rs 2 and Rs. 4 per unit respectively. Assuming that there are available 300 hours of the lathe time, 300 hours of grinder time and 240 hours of assembly time, how many units of each product should be produced to maximize profit? Formulate the problem mathematically.   [C.H.1987,2000;K.H.2002]

Example 7: A person requires 10, 12 and 12 units of chemical A, B and C respectively. A liquid product contains 3, 2 and 1 unit of A, B and C respectively. A dry product contains 1, 2 and 4 units of A, B and C per packet. If the liquid product sells for Rs. 2 per jar and the dry product sells for Rs 1 per packet, then formulate the problem as a linear programming problem. [C.H.2005]

Example 10: Food X contains 6 units of vitamin A per gram and 7 units of vitamin B per gram and cost 12 paise per gram. Food Y contains 8 units of vitamin A per gram and 12 units of vitamin B per gram and cost 20 paise per gram. The daily minimum requirement of vitamin A and B are 100 units and 120 units respectively. In finding the minimum cost of product mix, formulate the problem as a linear programming problem.   [C.H.1993,1999;V.H.2006]

Example 8: A firm manufactures two types of products A and B and sells them at a profit of Rs. 2 on type A and Rs. 3 on type B. Each product is processed on two machines G and H. Type A requires one minute of processing time on G and two minutes on H; type B requires one minute on G and one minute on H. The machine G is available for not more than 6 hours 40 minutes while machine H is available for 10 hours during any working day. Formulate the problem as a linear programming problem. [K.H.1998]

*2-9. A company produces two products, A and B. The sales volume for A is at least 80% of the total sales of both A and B. However, the company cannot sell more than 110 units of A per day. Both products use one raw material, of which the maximum daily availability is 300 lb. The usage rates of the raw material are 2 lb per unit of A, and 4 lb per unit of B. The profit units for A and B are $40 and $90, respectively. Determine the optimal product mix for the company.

*2-11. An individual wishes to invest $5000 over the next year in two types of investment: Investment A yields 5%, and investment B yields 8%. Market research recommends an allocation of at least 25% in A and at most 50% in B. Moreover, investment in A should be at least half the investment in B. How should the fund be allocated to the two investments?